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EOSDIS Core System Project

Mission Operation Procedures for the ECS Project

Release 6A

March 2001

Raytheon Company
Upper Marlboro, Maryland

Mission Operation Procedures for the ECS Project

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RESPONSIBLE ENGINEER

<u>Rodney Creecy /s/</u>	<u>3/5/01</u>
Rodney Creecy, Scientist/Engineer EOSDIS Core System Project	Date

SUBMITTED BY

<u>Lonney Head /s/</u>	<u>3/5/01</u>
Lonney Head, I&O Support Manager EOSDIS Core System Project	Date

Raytheon Company
Upper Marlboro, Maryland

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Preface

This document is a contract deliverable with an approval code of 3. This technical paper is delivered to NASA for information only, but is subject to approval as meeting contractual requirements.

Any questions should be addressed to:

Data Management Office
The ECS Project Office
Raytheon Systems Company
1616 McCormick Drive
Upper Marlboro, MD 20774-5301

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Abstract

This document, The Mission Operation Procedures for Release 6A for ECS, provides DAAC procedures that assign and describe operators, engineers, operations support, administration and management staff actions required to configure, maintain and operate the Release 6A ECS system. The DAAC portion of this document contains system-level standard procedures that can be modified at the DAACs during subsequent training, operations exercises and procedure review activities to reflect desired uniqueness. The objectives of Release 6A system are to provide ECS components to support the Sage III; fully automated on-demand processing support; Landsat 7 floating scene and band subsetting; Processing Toolkit upgrades; user authorization checks; one way interoperability and subscriptions support for ASTER GDS for on-demand requests; V0 Gateway enhancements to support full core metadata and product specific attributes, Landsat 7 floating scenes, on-demand requests, and billing; and Integrated Browse capability.

Keywords: operations, DAACs, SMC, EOC, mission support, operation procedures, TRMM, EOS, AM-1, Landsat 7, software, integration, test, SSI&T, Version 0

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Appendix A. Additional Material

Abbreviations & Acronyms

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1. Introduction

This document, Mission Operation Procedures for the Release 6A system for ECS, provides Maintenance and Operations (M&O) procedures to configure, maintain and operate the Release 6A ECS system.

1.1 Identification

This document meets the milestone specified as Contract Data Requirements List (CDRL) Item 117, DID 611/OP3 under contract NAS5-6000. It reflects the ECS as delivered at Release 6A.

1.2 Scope

The scope of this document is directed to DAAC M&O activities to support the Release 6A ECS system. Both procedures and instructions are identified. Operations procedures are defined as the step-by-step commands or on-line procedures needed to perform a function. The Operations Instructions are the off-line procedures or directives for performing administrative, operations, management, or operations support activities, e.g., Configuration Management, Problem Management, Quality Assurance, etc.

1.2.1 On-Site Procedures Tailoring Guide

Each DAAC may modify these procedures and instructions to accommodate site-specific M&O requirements. Such documentation should be versioned and dated in MS Word format with a master copy forwarded to the EDF SEO System Engineering. For specifics on authoring, formatting, importing, exporting and maintenance of procedures and instructions see Chapter 20, Library Administration.

1.3 Purpose

The purpose of this document is to identify the procedures and instructions to operate and maintain Release 6A systems. In addition, DAAC staff responsibilities are identified. The DAAC M&O staff is comprised of operators, engineers, as well as operations support, administration and management staff personnel.

This document will also be used as a training aid for M&O staff who are located at the sites. The operations procedures and operations instructions were derived from, and are intended to be consistent with, the system functions and capabilities specified in the ECS design specifications and the operations activities described in the ECS Operations Concept Document.

1.4 Status and Schedule

This document is to be delivered at CSR minus two weeks. Updates will be made to reflect subsequent system releases. Changes will be submitted through established configuration

management procedures, such as document change notices or published revisions known as interim updates published to the web site at <http://edhs1.gsfc.nasa.gov/waisdata/rel5/html/611update.html>.

1.5 Organization

The contents subsequent to this first section are presented as follows:

- Section 2 **Related Documentation.** Lists documents that drive, support or expand on the material in this manual.
- Section 3 **System Administration.** Identifies the operations procedures and/or operations instructions for system administration activities, such as backup and restore, log maintenance, user account administration, and workstation installation.
- Section 4 **Database Administration.** Identifies the operations procedures and/or operations instructions for database administration activities, such as product installation, disk storage management, login and privileges administration, database validation, backup and recovery, database configuration, tuning and performance monitoring.
- Section 5 **Security Services.** Identifies the operations procedures and/or operations instructions for security services activities, such as user authentication and authorization, data access control, network services monitoring, password protection, file modification monitoring.
- Section 6 **Network Administration.** Identifies the operations procedures and/or operations instructions for network administration activities, such as network and system configuration monitoring, network services monitoring.
- Section 7 **System Monitoring.** Identifies the operations procedures and/or operations instructions for network system monitoring, such as problem monitoring and resolution.
- Section 8 **Problem Management.** Identifies the operations procedures and/or operations instructions for submitting trouble tickets and for processing and resolving trouble ticket submissions.
- Section 9 **Configuration Management.** Identifies the operations procedures and/or operations instructions for configuration management activities, such as CCB support, configuration item identification, configuration change requests (CCRs) submission and processing, configuration status accounting, configuration audits, data management, operational database maintenance, software transfer and installation.

- Section 10 **Metadata Administration.** Identifies the operations procedures and/or operations instructions for metadata administration activities, such as establishing collections, populating the database, specifying Earth Science Data Type (ESDT) services.
- Section 11 **Production Rules for PGEs to Function in ECS.** This section is intended to explain the production rules governing the use of product generation executives (PGEs) in ECS. This section addresses the syntax and operational procedures for specifying production rules.
- Section 12 **Resource Planning.** Identifies the operations procedures and/or operations instructions for resource planning activities for non-routine ground events.
- Section 13 **Production Planning.** Identifies the operations procedures and/or operations instructions for production planning activities for job and resource prioritization and scheduling.
- Section 14 **Production Processing.** Identifies the operations procedures and/or operations instructions to support data processing activities.
- Section 15 **Quality Assurance.** Identifies the operations procedures and/or operations instructions to perform DAAC manual non-science quality assurance activities, such as visualization of science data products and updating quality assurance metadata.
- Section 16 **Ingest.** Identifies the operations procedures and/or operations instructions to support data acquisition.
- Section 17 **Archive Procedures.** Identifies the operations procedures and/or operations instructions for archiving activities, such as archive repository maintenance, fault monitoring and notification, temporary data storage.
- Section 18 **Data Distribution.** Identifies the operations procedures and/or operations instructions to support data distribution activities, such as media operations and product shipment. This new revision documents the Product Distribution System upgrade.
- Section 19 **User Services.** Identifies the operations procedures and/or operations instructions to support user services activities to address user requests.
- Section 20 **Library Administration.** Identifies the operations procedures and/or operations instructions to support librarian administration activities, such as database administration of the Document Data Server Subsystem, change package preparation and distribution, master document control and maintenance.

- Section 21 **COTS Hardware Maintenance.** Identifies the operations procedures and/or operations instructions for preventive and corrective maintenance activities of COTS hardware for the ECS project.
- Section 22 **Software Maintenance.** Identifies the operations procedures and/or operations instructions to support maintenance activities for both COTS software, custom software, and science software.
- Section 23 **Property Management.** Identifies the operations procedures and/or operations instructions for the receipt, control, and accountability of ECS property at ECS sites during Release 5A.
- Section 24 **Installation Planning.** Identifies the operations procedures and/or operations instructions to support installation planning activities for conducting site surveys, ensuring that site preparations/coordination are completed on schedule, facilitating receipt and installation of the hardware.
- Section 25 **COTS Training.** Identifies the operations procedures and/or operations instructions to support COTS training activities, such as training request processing, training coordination, training scheduling, training record maintenance.
- Section 26 **Science Software Integration & Test (SSI&T) Operational Procedures.** Identifies the operations procedures and/or operations instructions to support SSI&T activities.
- Section 27 **ILM (Integrated Logistics Maintenance Management).** ILM helps the M&O staff at the DAACs, EOC, and SMC to maintain records that describe all inventory components and their assembly structures and interdependencies. The database maintained by this tool, keeps chronological histories (a record of the transactions) of receipt, installation, and relocation of inventory items. There is a new license management section and general updates to work order processes, forms, and report formats.
- Section 28 **Maintenance of ECS Configuration Parameters.** These procedures describe the overall maintenance of the ECS Configuration Parameters Baseline for ECS custom software and hardware, including patches, database, operating systems, Commercial-off-the-shelf (COTS) and networks.
- Appendix A **Miscellany.** Contains additional information related to previous sections.
- **Abbreviations and Acronyms.** Identifies abbreviations and acronyms used throughout this document.

2. Related Documentation

2.1 Parent Documents

The parent documents are the documents from which this Mission Operation Procedures' scope and content are derived.

423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work
423-41-03	Goddard Space Flight Center, EOSDIS Core System (ECS) Contract Data Requirements Document

2.2 Applicable Documents

The following documents are referenced within this Mission Operation Procedures, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this volume.

209-CD-001	Interface Control Document Between EOSDIS Core System (ECS) and the NASA Science Internet for the ECS Project
209-CD-002	Interface Control Document Between EOSDIS Core System (ECS) and ASTER Ground Data System for the ECS Project
209-CD-006	Interface Control Document Between the EOSDIS Core System (ECS) and the National Oceanic and Atmospheric Administration (NOAA) Affiliated Data Center (ADC) for the ECS Project
209-CD-007	Interface Control Document Between the EOSDIS Core System (ECS) and TRMM Science Data and Information System (TSDIS) for the ECS Project
209-CD-008	Interface Control Document Between the EOSDIS Core System (ECS) and the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC) for the ECS Project
209-CD-009	Interface Control Document Between the EOSDIS Core System (ECS) and the Marshall Space Flight Center (MSFC) Distributed Active Archive Center (DAAC) for the ECS Project
209-CD-010	Interface Control Document Between the EOSDIS Core System (ECS) and the Langley Research Center (LaRC) Distributed Active Archive Center (DAAC) for the ECS Project

209-CD-013	Interface Control Document Between the EOSDIS Core System (ECS) and the Landsat 7 System for the ECS Project
305-CD-002	Science Data Processing Segment (SDPS) Design Specification for the ECS Project
305-CD-003	Communications and System Management (CSMS) Design Specification for the ECS Project
305-CD-004	Overview of Release A SDPS and CSMS System Design Specification for the ECS Project
305-CD-005	Release A SDPS Client Subsystem Design Specification for the ECS Project
305-CD-006	Release A SDPS Interoperability Subsystem Design Specification for the ECS Project
305-CD-007	Release A SDPS Data Management Subsystem Design Specification for the ECS Project
305-CD-008	Release A SDPS Data Server Subsystem Design Specification for the ECS Project
305-CD-009	Release A SDPS Ingest Subsystem Design Specification for the ECS Project
305-CD-010	Release A SDPS Planning Subsystem Design Specification for the ECS Project
305-CD-011	Release A SDPS Data Processing Subsystem Design Specification for the ECS Project
305-CD-012	Release A CSMS Communications Subsystem Design Specification for the ECS Project
305-CD-013	Release A CSMS Systems Management Subsystem Design Specification for the ECS Project
305-CD-014	Release A GSFC DAAC Design Specification for the ECS Project
305-CD-015	Release A LaRC DAAC Design Specification for the ECS Project
305-CD-016	Release A MSFC DAAC Design Specification for the ECS Project
305-CD-017	Release A EDC DAAC Design Specification for the ECS Project
305-CD-019	Release A System Monitoring and Coordination Center Design Specification for the ECS Project
305-CD-040	Flight Operations Segment (FOS) Design Specification for the ECS Project (Segment Level Design) Overview

305-CD-041 Flight Operations Segment (FOS) Planning and Scheduling Design Specification for the ECS Project

305-CD-042 Flight Operations Segment (FOS) Command Management Design Specification for the ECS Project

305-CD-043 Flight Operations Segment (FOS) Resource Management Design Specification for the ECS Project

305-CD-044 Flight Operations Segment (FOS) Telemetry Design Specification for the ECS Project

305-CD-045 Flight Operations Segment (FOS) Command Design Specification for the ECS Project

305-CD-046 Flight Operations Segment (FOS) Real-Time Contact Management Design Specification for the ECS Project

305-CD-047 Flight Operations Segment (FOS) Analysis Design Specification for the ECS Project

305-CD-048 Flight Operations Segment (FOS) User Interface Design Specification for the ECS Project

305-CD-049 Flight Operations Segment (FOS) Data Management Design Specification for the ECS Project

305-CD-050 Flight Operations Segment (FOS) Planning and Scheduling Program Design Language (PDL) for the ECS Project

305-CD-051 Flight Operations Segment (FOS) Command Management Program Design Language (PDL) for the ECS Project

305-CD-052 Flight Operations Segment (FOS) Resource Management Program Design Language (PDL) for the ECS Project

305-CD-053 Flight Operations Segment (FOS) Telemetry Program Design Language (PDL) for the ECS Project

305-CD-054 Flight Operations Segment (FOS) Real-Time Contact Management Program Design Language (PDL) for the ECS Project

305-CD-055 Flight Operations Segment (FOS) Analysis Program Design Language (PDL) for the ECS Project

305-CD-056 Flight Operations Segment (FOS) User Interface Program Design Language (PDL) for the ECS Project

305-CD-057 Flight Operations Segment (FOS) Data Management Program Design Language (PDL) for the ECS Project

305-CD-058	Flight Operations Segment (FOS) Command Program Design Language (PDL) for the ECS Project
313-CD-001	EOSDIS Core System (ECS) Internal Interface Control Document for the Flight Operations Segment for the ECS Project
313-CD-600	Release 6A ECS Internal Interface Control Document for the ECS Project
601-CD-001	Maintenance and Operations Management Plan for the ECS Project
604-CD-001	Operations Concept for the ECS Project: Part 1-- ECS Overview
604-CD-003	Operations Concept for the ECS Project: Part 2A -- ECS Release A
605-CD-001	Operations Scenarios for the ECS Project: ECS Release A
609-CD-600	Release 6A Operations Tools Manual for the ECS Project
505-41-33	Goddard Space Flight Center, Interface Control Document Between EOSDIS Core System (ECS) and Science Computing Facilities (SCF)

2.3 Information Documents

2.3.1 Information Documents Referenced

The following documents are referenced herein and, amplify or clarify the information presented in this document. These documents are not binding on the content of the ECS Mission Operation Procedures for the ECS Project.

501-CD-001	Performance Assurance Implementation Plan (PAIP) for the ECS Project
532-CD-001	Release A Environmental Control Plan for the ECS Project
602-CD-001	Property Management Plan for the ECS Project
613-CD-002	Release A COTS Maintenance Plan for the ECS Project
613-CD-003	Release B COTS Maintenance Plan for the ECS Project
616-CD-001	Release A Integrated Logistics Support Plan for the ECS Project
622-CD-001	Training Plan for the ECS Project
CM-1-016-1	Software Development Using ClearCase, ECS Work Instruction
CM-1-023-1	Software Build Process Using ClearCase, ECS Work Instruction
423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specifications for the EOSDIS Core System (ECS)

2.3.2 Information Documents Not Referenced

The following documents, although not referenced herein and/or not directly applicable, do amplify or clarify the information presented in this document. These documents are not binding on the content of the Mission Operation Procedures for the ECS Project.

607-CD-001 ECS Maintenance and Operations Positions Descriptions for the ECS Project

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3. System Administration

This section covers the procedures necessary for the System Administrator (SA) and/or Operator (OPR) to manage and operate the system.

Detailed procedures for tasks performed by the System Administrator and/or Operator are provided in the sections that follow. The procedures assume that the administrator and/or operator is authorized and has proper access privileges to perform the tasks (i.e., root) and that the SA and/or OPR has been properly trained in all aspects of the system.

Each procedure outlined will have an **Activity Checklist** table that will provide an overview of the task to be completed. The outline of the **Activity Checklist** is as follows:

Column one - **Order** shows the order in which tasks should be accomplished.

Column two - **Role** lists the Role/Manager/Operator responsible for performing the task.

Column three - **Task** provides a brief explanation of the task.

Column four - **Section** provides the Procedure (P) section number or Instruction (I) section number where details for performing the task can be found.

Column five - **Complete?** is used as a checklist to keep track of which task steps have been completed.

The following is the **Activity Checklist** table that provides an overview of the overall system administration processes and who performs them

Table 3.1. System Administration - Activity Checklist

Order	Role	Task	Section	Complete?
1	OPR	Secure Shell	(I) 3.1	
2	OPR	System Startup/Shutdown	(I) 3.2	
3	OPR	System Backup and Restore	(I) 3.3	
4	SA	User Administration	(I) 3.4	
5	SA	Security	(I) 3.5	

For procedures outlined in this section, there are corresponding **QUICK STEP** procedures immediately following in this chapter. The **QUICK STEP** procedures are designed for persons who have *prior training or are experienced system administrators with prior system administration experience*. The **QUICK STEP** procedures should be used by *experienced persons ONLY*.

3.1 Secure Shell

Secure Shell (ssh) is a set of programs that greatly improve network security. The primary need for it on ECS is to allow secure, interactive access to ECS DAACs without needing burdensome procedures and mechanisms and additional hardware.

Secure in this context means not sending passwords "in the clear" so that hackers may intercept them and also provides encryption of the entire session.

Secure Shell is to be used for any inter-access among system platforms and between DAACs

Table 3.1-1. Secure Shell - Activity Checklist

Order	Role	Task	Section	Complete?
1	OPS	Initiating sshsetup	(I) 3.1.1	
2	OPR	Setting up remote access ssh	(I) 3.1.2	
3	OPR	Changing Your Passphrase	(I) 3.1.3	

3.1.1 Setting Up ssh

Most users will start from the same host whether from an X terminal, a UNIX workstation or a PC. Prior to executing ssh commands, use **setenv DISPLAY <IP address>:0.0** at your local host. To ensure system security, do not use the **setenv DISPLAY** command on subsequent hosts accessed via ssh. The process is started by running the sshsetup script which will enable ssh to other hosts from which one may use the same home directory. The only thing you need to do before executing the script is to pick a good passphrase of at least 10 characters. You can, and should, use spaces and multiple words with numbers and misspellings and special characters. Note that passwords are NOT echoed back to the screen.

To initialize Secure Shell Access (ssh), execute the procedure steps that follow:

- 1** Login to your normal Unix workstation where your home directory resides.
- 2** Initiate Secure Shell setup by typing **/tools/bin/sshsetup**, then press Return/Enter.
 - You will see an information statement:
Use a passphrase of at least 10 characters which should include numbers or special characters and MAY include spaces
- 3** At the prompt "New passphrase:" **enter your passphrase <enter>**.
- 4** At the prompt "Retype new passphrase:" **re-enter your passphrase <enter>**.
 - You will then see:
Initializing random number generator...
Generating p: Please wait while the program completes ...
%

- This establishes the .ssh sub-directory in your <username>/home directory, creates the local ssh key, and creates the necessary files.

3.1.2 Remote ssh Access

If you need to access a host with a different home directory, you will need to run the sshremote script. This script sets up the destination host with the new set of keys and transfers the source (local) key to the destination and the destination key to the source. You must have an existing account on the remote host.

To set up remote access shell (ssh), execute the procedure steps that follow:

- 1 Login into your normal Unix workstation where your home directory resides.
- 2 Initiate Secure Shell remote setup by typing **/tools/bin/sshremote**, then press Return/Enter.
 - You will see the following prompt:
You have a local passphrase. Do you want to setup for:
 - 1 VATC
 - 2 EDF
 - 3 MiniDAAC
 - 4 GSFC DAAC
 - 5 GSFC M and O
 - 6 EDC DAAC
 - 7 EDC M and O
 - 8 LaRC DAAC
 - 9 LaRC M and O
 - 10 NSIDC DAAC
 - 11 NSIDC M and O
 - 12 Exit from script

Select:
- 3 At the "Select" prompt, type in the corresponding number to the desired host, then press Return/Enter.
 - You will receive a prompt similar to the following for the VATC:
Working...
- 4 At the prompt "Enter passphrase for RSA key '<username>@<hostname>': Type in your **passphrase** and then press Return/Enter.
 - A prompt similar to the following will be displayed:

Last login: Thu Jul 9 10:41:13 1998 from echuser.east.hit

No mail.

Sun Microsystems Inc. SunOS 5.5.1 Generic May 1996

t1code1{username}1:

5 At the prompt "Press <ctrl>a to run sshsetup and exit <enter> to logoff t1code1u", type <ctrl>-a to initiate the sshsetup script on the remote host

- You will see an information statement:

Use a passphrase of at least 10 characters which should include numbers or special characters and MAY include spaces

6 At the prompt "New passphrase:" **enter your passphrase <enter>**.

7 At the prompt "Retype new passphrase:" **re-enter your passphrase <enter>**.

- You will then see:

Initializing random number generator...

Generating p: Please wait while the program completes ...

%

8 At the "t1code1" prompt type **exit**, then press Return/Enter.

- The following information will be displayed:

Updating locally...

Updating t1code1u.ecs.nasa.gov

%

- This establishes the ssh key at the remote host and exchanges key information with your local host.

Note: The ssh keys at remote sites can be different from the local host ssh key.

3.1.3 Changing Your Passphrase

Another script has been developed to change your passphrase on the local host and then transfer the key to the other environments. The ssh keys for remote hosts will have to be changed separately. Use the following procedure to change your passphrase:

To change your Secure Shell Passphrase, execute the procedure steps that follow:

1 Login to your normal Unix workstation where your home directory resides.

- Initiate passphrase change by typing **/tools/bin/sshchpass**, then press Return/Enter.

- You will see an information statement:

Use a passphrase of at least 10 characters which should include numbers or special characters and MAY include spaces

- 2 At the prompt "Old passphrase:" **enter your old passphrase <enter>**
- 3 At the prompt "New passphrase:" **enter your passphrase <enter>**.
- 4 At the prompt "Retype new passphrase:" **re-enter your passphrase <enter>**.
 - You will then see an information prompt similar to the following:
ssh-keygen will now be executed. Please wait for the prompt to Return!
/home/bpeters/.ssh/authorized_keys permissions have already been set.

%

3.2 System Startup and Shutdown

The Startup and Shutdown processes begin when it has been determined by the DAAC Operations Supervisor or his designee that it is necessary to stop or start the system. The least impacting method is determined and users are appropriately notified.

When determining the least impacting way to perform the startup or shutdown, the OPR, along with the Operations Supervisor takes into consideration whether only specific server software packages would need to be started/stopped or an entire system startup/shutdown is required.

Once these steps have been taken, the shutdown or startup is performed.

The **Activity Checklist** table that follows provides an overview of the startup and shutdown processes.

Table 3.2-1. Startup/Shutdown - Activity Checklist

Order	Role	Task	Section	Complete?
1	OPS Sup	Determine that Startup/Shutdown is necessary.	(I) 3.2	
2	OPR	Determine the Least Impacting Way to Perform the Startup/Shutdown.	(I) 3.2	
3	OPR	Notify Those Effected by the Startup/Shutdown.	(I) 3.2	
4	OPR	Perform the Startup/Shutdown	(P) 3.2	

3.2.1 Startup

Startup means that power to the system is restored and the system is being taken to a fully useable and operational state.

3.2.1.1 Cold - By Subsystem

A cold startup means that power to the system has been previously powered off and the system(s) is being restarted from this cold state. The System Startup process begins after a previously completed shutdown, either scheduled or emergency. The System Startup is done in sequential order by subsystem. This startup sequence is predetermined by the SA.

This procedure assumes that the OPR has been properly trained to startup all aspects of the system and that the system is currently powered off (due to a normal or emergency shutdown).

The procedure assumes that the Startup has been scheduled well in advance, all planning involved has been concluded well in advance and all other Distributed Active Archive Centers (DAACs) have been notified of the system returning to an on-line state.

This section explains how to perform a cold system startup by subsystem. The sequence of the execution of the steps below are VERY IMPORTANT. To begin a cold system startup, execute the procedure steps that follow:

- 1 The **sequence** of booting the machines is **IMPORTANT**:
 - ***Remember to power on peripherals before powering on each CPU***
 - ***Monitor each system Boot Up activity on that system's monitor***
 - *****The DNS and NIS servers must be booted FIRST***
 - ***Once each system has booted without error, proceed to the next machine***
 - Boot the machines per Table 3.2-2
- 2 Continue booting the remaining machines

Table 3.2-2 presents the cold system startup machine boot sequence, however, the machine names are to be added once identified at each DAAC, per their specific baseline by the SA.

Table 3.2-2. Cold System Startup - Machine Boot Sequence

Step	What to Enter or Select	Action to Take (Server)	Machine Name
1	(No entry)	NIS Master	x0css02
2	(No entry)	DCE Servers	x0css02
3	(No entry)	DNS Master	x0css02
4	(No entry)	Clearcase Server(s)	x0mss0x
	(No entry)	Interface Server(s)	x0ins0x
5	(No entry)	MSS: <i>Tivoli Server,</i> <i>HP Openview Server</i>	x0mshxx
6	(No entry)	DSS	x0acs0x
7	(No entry)	Ingest	x0icg0x
8	(No entry)	PDPS	x0pls0x
9	(No entry)	Others	

3.2.1.2 Warm - By Subsystem Startup

A warm startup means the system has been previously powered on, but the system(s) is not fully operational, either the system has had some service performed (i.e. single user mode) or is being rebooted to correct some minor malfunction. The System Startup is done in sequential order by subsystem. This startup sequence is predetermined by the software dependencies.

The order of the re-boot is contingent on software dependencies per site.

If the NIS/DCE servers service has been interrupted, the users will automatically be transferred to a backup server. Once the faulty server(s) has been repaired, re-establish connection with the primary NIS/DCE server by rebooting the Backup Server; the users would then be transferred back to the primary NIS/DCE server.

Table 3.2-3 presents the **QUICK STEP** procedure required to perform a warm system startup.

Table 3.2-3. Warm System Startup - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	(No entry)	determine software dependencies
2	(No entry)	reboot independent server(s)
3	(No entry)	reboot dependent server(s)

Note - in addition to warm system startup/reboot sequences, ECS servers which use the Sybase SQL server may need to be bounced whenever the SQL server is bounced. At present, this is certainly the case for all STMGT servers. That is, if the Sybase SQL server is stopped and restarted for any reason, all STMGT servers need to be stopped and restarted, once the Sybase SQL server has come back on-line.

3.2.1.3 Additional tasking - Updating leapsec.dat and utcpole.dat files

In addition to starting system servers there are essential tasks that System Administrators must perform on a regular basis.

In order to ensure proper operation of Program Generated Executives (PGEs), two files must be updated weekly with data transferred from the U.S. Naval Observatory. These files are `${PGSHOME}/database/common/TD/leapsec.dat` and `${PGSHOME}/database/common/CSC/utcpole.dat`. The update of these files is accomplished by executing `leapsec_update.sh` and `utcpole_update.sh` in the `/tools/admin/exec` directory with root privileges. It has not been determined yet if these tasks will be accomplished manually or via cron job scripting .

3.2.2 Shutdown

Shutdown means that the system is being removed from a fully useable and operational state and possibly, power to the system will be terminated. The types of shutdown would vary depending upon circumstances (i.e. shutdown to single user mode; shutdown to power off; etc.)

3.2.2.1 Normal - By Subsystem

The Normal System Shutdown process is performed at the discretion of the SA usually for a scheduled repair. The system shutdown is **normally performed in reverse order of the system startup**.

The procedures assume that the Shutdown has been scheduled well in advance, all planning involved has been concluded well in advance and the OPR/SA has been properly trained to shutdown all aspects of the system.

This section explains how to perform a normal system shutdown by subsystem.

3.2.2.1.1 Shutdown a Machine

The OPR must be logged in as root to perform a shutdown. To begin a normal system shutdown, execute the procedure steps that follow:

- 1 Login to the server as root.
- 2 Enter root password.
- 3 Type **wall** and press **Return**. Use **wall -a** on Sun machines to cross NFS mounts.
- 4 Type **This machine is being shutdown for *reason*. The anticipated length of down time is xxx. Please save your work and log off now. The machine will be coming down in xxx minutes. We are sorry for the inconvenience.** then press **Return**. Press **Control** and **D** keys **simultaneously**. Include your name and closest telephone number.
- 5 Wait at least five minutes.
- 6 Type **shutdown -g600 -i0 -y** UNIX prompt and press **Return**. (600 = Number of Seconds)
- 7 When the system is at the prompt it is safe to **Power off** all peripherals first, and then the CPU.

The servers should be shutdown in the reverse order of the startup:

- 1 Determine which machines are dependent on a server first:
 - *Once each system has stopped without error, power off peripherals*
 - *Proceed to the following machine*
 - *Follow steps 1-7 for Task: 3.2.2.1.1 Shutdown Machine for each machine*
- 2 **Do NOT** turn power off on the **HP Systems**, instead bring them down to the halted mode, unless power is going to be lost for the entire facility.
- 3 The **NIS/DCE server** must be the **last system** to be shutdown.

Table 3.2-4 presents the **QUICK STEP** procedure required to perform a normal system shutdown.

Table 3.2-4. Normal System Shutdown - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	(No entry)	determine subsystems and server dependencies
2	(No entry)	Login to the server as root
3	wall	Press Return
4	This machine is being shutdown for <i>reason</i> . The anticipated length of down time is <u>xxx</u> . Please save your work and log off now. The machine will be coming down in <u>xxx</u> minutes. We are sorry for the inconvenience.	Press Control and D keys simultaneously
5	(No entry)	Wait at least five minutes
6	shutdown -g600 -i0 -y - OR - shutdown now -i0 -y	Press Return
7	(No entry)	Power off all peripherals and the CPU.
8	(No entry)	Repeat steps 2 through 7 above for all servers Table 3.2.2

3.2.2.2 Emergency - By Subsystem

The Emergency System Shutdown process begins after it is determined that the system may fail during emergency situations (i.e., storms, power outages) by the System Administrator (SA). The Emergency System Shutdown is done in sequential order by subsystem. This shutdown sequence is predetermined by the SA.

The NIS/DCE servers must be the last system to shutdown.

Detailed procedures for tasks performed by the OPR/SA are provided in the sections that follow.

This section explains how to perform an emergency system shutdown by subsystem. The OPR must be logged in as root to perform a shutdown. To begin an emergency system shutdown, execute the procedure steps that follow:

- 1 Login to the server as root.
- 2 Enter root password.

- 3 Type **sync** at the UNIX prompt and hit **Return**.
Sync executes the sync system primitive. If the system is to be stopped, sync must be called to insure file system integrity. It will flush all previously unwritten system buffers out to disk, thus assuring that all file modifications up to that point will be saved.
- 4 Type **sync** again at the UNIX prompt and hit **Return**.
- 5 Type **halt** at the UNIX prompt and hit **Return**.
- 6 Once the halt has completed, turn the power switch on all the peripherals and the CPU off.

The servers should be shutdown in the following order:

- 1 Shutdown all client workstations.
- 2 *Follow steps 1-7 for Task: 3.2.2.1.1 Shutdown Machine for each machine*
- 3 Do **NOT** turn power off on the **HP Systems**, instead bring them down to the halted mode, unless power is going to be lost for the entire facility.
- 4 The **NIS/DCE servers** must be the **last systems** to shutdown.

In case of **EXTREME emergency** where time does not allow you to execute the above procedures, execute the following procedure steps for **Sun machines ONLY**.

- 1 Login to the server as root.
- 2 Enter root password.
- 3 Hit the L1 or Stop key and the a key simultaneously.
- 4 Once returned to an **ok** or **>** prompt, turn the power switches on the CPU and all peripherals to off.

NOTE: The use of L1a does not ensure file system integrity. There is a very high risk of losing data when using this process.

Table 3.2-5 presents the **QUICK STEP** procedures required to perform a Emergency System Shutdown.

Table 3.2-5. Emergency System Shutdown - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	(No entry)	determine subsystems and server dependencies
2	(No entry)	Login to server as root
3	(No entry)	Type sync at prompt and press enter
4	(No entry)	Type sync at prompt and press enter
5	(No entry)	Type halt at prompt and press enter
6	(No entry)	Turn power switches on CPU and all peripherals to off.
7	(No entry)	Repeat steps 2 through 5 above for all servers

3.2.2.3 Server - By Server Software

The System Shutdown by Server Software process is performed by the OPR. The system shutdown is normally performed in reverse order of the system startup.

The procedures assume that the Shutdown has been scheduled well in advance, all planning involved has been concluded well in advance and the SA has been properly trained to shutdown all aspects of the system.

Table 3.2-6 presents the **QUICK STEP** procedure required to perform a normal system shutdown.

Table 3.2-6. Server System Shutdown - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	(No entry)	determine software dependencies
2	(No entry)	shutdown dependent server(s)
3	(No entry)	shutdown independent server(s)

3.3 System Backup and Restore

System Backup and Restore is the process of copying, either the entire or partial system, the information from the machine for safe keeping for a specific time period. Restore is the process of returning the data to the machine to allow operation to continue from a specific point in time. The OPR must be in the admin list to use Networker. This is not root privilege.

3.3.1 Incremental Backup

Non-scheduled incremental backups can be requested at any time by submitting a request for **Incremental Backup** to the **OPS supervisor**. The supervisor schedules the request with the OPR who performs the incremental backup. Afterwards, the OPR notifies the requester and supervisor that the incremental backup is complete.

The **Activity Checklist** table that follows provides an overview of the incremental backup processes.

Table 3.3-1. Incremental Backup - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Submit Request for Incremental Backup to OPS Supervisor.	(I) 3.3.1	
2	OPS Super	Schedule Incremental Backup with OPR	(I) 3.3.1	
3	OPR	Perform Incremental Backup.	(P) 3.3.1	
4	OPR	Notify Requester and OPS Super when Incremental Backup is Complete.	(I) 3.3.1	

Detailed procedures for tasks performed by the OPR are provided in the sections that follow.

The procedures assume that the requester's request for an incremental backup has already been approved by DAAC Management. Incremental backups can be requested at any time by submitting a request for **Full Backup** to the **OPS supervisor**. In order to perform the procedure, the OPR must have obtained the following information from the requester:

- a. **Name of machine to be backed up**
- b. **Files/directories to be backed up (optional)**

To perform an incremental backup for the requester, execute the procedure steps that follow:

Note 1: If you run out of tapes at any time during this procedure, execute procedure 3.3.5.1 Labeling Tapes and then return to this procedure.

- 1** Log into the **machine to be backed up** by typing: `ssh BackedUpSystemName`, then press **Return**.
- 2** At the Passphrase prompt: enter *YourPassphrase*, then press **Return**.
 - Or press **Return** twice to get the Password prompt.
- 3** Enter *YourPassword*, then press **Return**.
 - Remember that *YourPassword* is case sensitive.
 - You are authenticated as yourself and returned to the UNIX prompt.
- 4** Log in as root by typing: `su`, then press **Return**.
 - A password prompt is displayed.
- 5** Enter the *RootPassword*, then press **Return**.
 - Remember that the *RootPassword* is case sensitive.
 - You are authenticated as root and returned to the UNIX prompt.
- 6** Execute the NetWorker Administrative program by entering: `nwadmin &`, then press **Return**.
 - A window opens for the NetWorker Administrative program.

- You are now able to perform an incremental backup.
- 7 Click Clients.
- Click Client Setup
 - Click Host Being Backed Up
 - Highlight the group to be Backed Up
- 8 Go to the **Customize** menu, select **Schedules**.
- The **Schedules** window opens.
- 9 Look at the button for today. If there is an **i** next to the date on this button, go to step 12.
- The **i** stands for incremental.
 - The **f** stands for full.
- Whichever is on the button for today is what kind of backup that will be done, unless it is overridden.
- 10 Click and hold the button for today, select **Overrides** from the resulting menu, select **Incremental** from the next resulting menu.
- 11 Click the **Apply** button.
- 12 Close the **Schedules** window by clicking in the upper left corner of the **Schedules** window and selecting **Close** from the resulting menu.
- 13 Click the **Group Control** button.
- The **Group Control** window opens.
- 14 Click the **Start** button.
- A **Notice** window opens.
- 15 Click the **OK** button.
- The **Notice** window closes.
 - The regularly scheduled backup will still run (even though we are now doing a backup).
- 16 Close the **Group Control** window by clicking in the upper left corner of the **Group Control** window and selecting **Close** from the resulting menu.

- Status updates appear in the **nwadmin** window.
 - When the backup is complete, a **Finished** message will appear.
- 17** If the button for today in step 9 had an **i** on it, go to step 21.
- 18** Go to the **Customize** menu, select **Schedules**.
- The **Schedules** window opens.
- 19** Click and hold the button for today, select **Overrides** from the resulting menu, select **Full** from the next resulting menu.
- 20** Click the **Apply** button.
- 21** Close the **Schedules** window by clicking in the upper left corner of the **Schedules** window and selecting **Close** from the resulting menu.
- 22** Select **Exit** from the **File** menu to quit the NetWorker Administrative program.
- The **nwadmin** window closes.
- 23** At the UNIX prompt for the **machine to be backed up**, type **exit**, then press **Return**.
- **Root** is logged out.
- 24** Type **exit** again, then press **Return**.
- You are logged out and disconnected from the **machine to be backed up**.

Table 3.3-2 presents the **QUICK STEP** procedure required to perform an incremental backup.

Table 3.3-2. Perform Incremental Backup - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	ssh <i>BackedUpSystemName</i>	press Return
2	<i>YourPassphrase</i> or- (No entry)	press Return -or- (No action)
3	<i>YourPassword</i>	press Return
4	su	press Return
5	<i>RootPassword</i>	press Return
6	nwadmin	press Return
7	Click Client Click Client Setup Click Host Being Backed Up - Highlight the Group to be Backed Up	
8	Customize → Schedules	if i on today's button then go to step 9. Otherwise, click and hold today's button.
9	Overrides → Incremental	click Apply button
10	(No entry)	close Schedules window
11	(No entry)	click Group Control button
12	(No entry)	click Start button
12	(No entry)	click OK button
14	(No entry)	close Group Control window
15	(No entry)	if there was an i on today's button in step 8, go to step 17.
16	Customize → Schedules	click and hold today's button
17	Overrides → Full	click Apply button
18	(No entry)	close Schedules window
19	File → Exit	(No action)
20	exit	press Return
21	exit	press Return

3.3.2 Full Backup

Non-scheduled full backups can be requested at any time by submitting a for **Full Backup** to the OPS supervisor. The supervisor schedules the request with the OPR who performs the full backup. Afterwards, the OPR notifies the requester and supervisor that the full backup is complete.

The **Activity Checklist** table that follows provides an overview of the full backup processes.

Table 3.3-3. Full Backup - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Submit Request for Full Backup to OPS Supervisor.	(I) 3.3.2	
2	OPS Super	Schedule Full Backup with OPR	(I) 3.3.2	
3	OPR	Perform Full Backup.	(P) 3.3.2	
4	OPR	Notify Requester and OPS Super when Full Backup is Complete.	(I) 3.3.2	

Detailed procedures for tasks performed by the OPR are provided in the sections that follow.

The procedures assume that the requester's application for a full backup has already been approved by DAAC Management. In order to perform the procedure, the OPR must have obtained the following information from the requester:

- a. **Name of machine to be backed up**
- b. **Files/directories to be backed up** (optional)

To perform a full backup for the requester, execute the procedure steps that follow:

Note 1: If you run out of tapes at any time during this procedure, execute procedure 3.3.5.1 Labeling Tapes and then return to this procedure.

- 1** Log into the **machine to be backed up** by typing: `ssh BackedUpSystemName`, then press **Return**.
- 2** At the Passphrase prompt: enter *YourPassphrase*, then press **Return**.
 - Or press **Return** twice to get to Password prompt.
- 3** Enter *YourPassword*, then press **Return**.
 - Remember that *YourPassword* is case sensitive.
 - You are authenticated as yourself and returned to the UNIX prompt.
- 4** Log in as root by typing: `su`, then press **Return**.
 - A password prompt is displayed.
- 5** Enter the *RootPassword*, then press **Return**.
 - Remember that the *RootPassword* is case sensitive.
 - You are authenticated as root and returned to the UNIX prompt.
- 6** Execute the NetWorker Backup program by entering: `nwbackup &`, then press **Return**.
 - A **NetWorker Backup** window opens.
 - You are now able to perform a full backup.

- 7 Click Clients.
 - Click Client Setup
 - Click Host Being Backed Up
 - Highlight the group to be Backed Up
- 8 If no list of **files/directories to be backed up** was provided, i.e. the whole machine is to be backed up, then type / in the **Selection** field and click the **Mark** button.
 - / is designated for backup and has a check next to it.
- 9 If names of **files/directories to be backed up** were provided then select the **files/directories to be backed up** in the directory display and click the **Mark** button.
 - Drag scroll bar with mouse to scroll the list up and down.
 - Double click on directory name to list its contents.
 - To move up a directory level, type the path in the **Selection** field.
 - Clicking the **Mark** button designates the file for backup and puts a check next to it.
- 10 Click the **Start** button.
 - A **Backup Options** window opens.
- 11 Click the **OK** button.
 - The **Backup Options** window closes.
 - The **Backup Status** window opens providing updates on the backup's progress.
- 12 After the **Backup Completion Time** message appears in the **Backup Status** window, click the **Cancel** button.
 - The **Backup Status** window closes.
 - The backup is complete.
- 13 Select **Exit** from the **File** menu to quit the NetWorker Backup program.
 - The **NetWorker Backup** window closes.
- 14 At the UNIX prompt for the **machine to be backed up**, type **exit**, then press **Return**.
 - **Root** is logged out.
- 15 Type **exit** again, then press **Return**.
 - You are logged out and disconnected from the **machine to be backed up**.

To perform a full backup, execute the steps provided in the following table.

Table 3.3-4 presents the **QUICK STEP** procedure required to perform a full backup.

Table 3.3-4. Perform Full Backup - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	ssh <i>BackedUpSystemName</i>	press Return
2	<i>YourPassphrase</i> or- (No entry)	press Return -or- (No action)
3	<i>YourPassword</i>	press Return
4	su	press Return
5	<i>RootPassword</i>	press Return
6	nwbackup &	press Return
7	Click Client Click Client Setup Click Host Being Backed Up - Highlight the Group to be Backed Up	
8	to back up whole machine, place / in selection field	click Mark button
9	to back up certain files/directories, indicate the files/directories	click Mark button
10	(No entry)	click Start button
11	(No entry)	click OK button
12	(No entry)	click Cancel button
13	File → Exit	(No action)
14	exit	press Return
15	exit	press Return

3.3.3 File Restore

SINGLE OR MULTIPLE FILES RESTORE

From time to time, individual files or groups of files (but not all files) will have to be restored from an Incremental or Full backup tape(s) due to Operator error or system failure. This can be accomplished using the following file restoration procedure.

The File Restore process begins when the requester submits a request to the Operator. The Operator restores the file(s) and notifies the requester when complete.

The Activity Checklist table that follows provides an overview of the file restore process.

Table 3.3-5. File Restore - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Submit Request for File Restore to Operator	(I) 3.3.3	
2	Operator	Restore file(s).	(P) 3.3.3	
3	Operator	Inform Requester of completion.	(I) 3.3.3	
4	Operator	Complete System Restore/Partition Restore	(P) 3.3.3	

Detailed procedures for tasks performed by the Operator are provided in the sections that follow.

The procedures assume that the requester's application for a file restore has already been approved by the Ops Supervisor. In order to perform the procedure, the Operator must have obtained the following information from the requester:

- a. **Name of machine to be restored**
- b. **Name of file(s) to be restored**
- c. **Date from which to restore**
- d. **User ID of the owner of the file(s) to be restored**
- e. **Choice of action to take when conflicts occur. Choices are:**
 - **Rename current file**
 - **Keep current file**
 - **Write over current file with recovered file**

Table 3.3-6 represents the steps required to restore a file in a condensed manner. If you are already familiar with the procedure, you may prefer to use the quick-step table. If you are new to the system, or have not performed these tasks recently, you should use the detailed procedures presented below.

To restore a file for the requester, execute the procedure steps that follow:

- 1 Log into the **machine to be restored** by typing: **ssh** , then press **Return**.
 - 2 At the Passphrase prompt: enter *YourPassphrase*, then press **Return**.
 - Or press **Return** twice to get to the Password prompt.
 - 3 Enter *Your Password*, then press **Return**.
 - Remember that your password is case sensitive.
 - You are authenticated as yourself and returned to the Unix prompt..
- NOTE:** Before executing the NetWorker Recovery ensure, that you are in the `/data1/COTS/networker` directory.
- 4 Execute the **NetWorker Recovery** program by entering: **nwrecover &**, then press **Return**.
 - A window opens for the Networker Recovery program.
 - You are now able to perform the file restoration.
 - 5 Select **file(s) to be restored** and click the **Mark** button.
 - Drag scroll bar with mouse to scroll the list up and down.
 - Double click on directory name to list its contents.
 - Clicking the Mark button designates the file for restore and places a check in the box adjacent to the file or directory name.

- 6 Go to the **Change** menu, select **Browse Time**.
 - The Change Browse Time window opens.
- 7 Select the **date from which to restore**.
 - **NetWorker** will automatically go to that day's or a previous day's backup which contains the file.
- 8 Click the **Start** button.
 - The Conflict Resolution window opens.
- 9 Answer **Do you want to be consulted for conflicts** by clicking the **yes** button, then click the **OK** button.
 - If prompted with a conflict, choices of action will be: **rename current file, keep current file, or write over current file with recovered file**. Select the requesters **choice of action to take when conflicts occur**.
 - The Recover Status window opens providing information about the file restore.
 - If all the required tapes are not in the drive, a notice will appear. Click the **OK** button in the notice window.
 - If prompted for tapes, click cancel in the **Recover Status** window and execute procedure 3.2.5-2 Index Tapes.
- 10 When a recovery complete message appears, click the **Cancel** button.
- 11 Go to the **File** menu, select **Exit**.
 - The **NetWorker Recovery** program quits.
- 12 Type **exit**, then press **Return**.
 - The **owner of the file(s) to be restored** is logged out.
- 13 Type **exit** one last time, then press **Return**.
 - You are logged out and disconnected from the **machine to be restored**.

To restore a file, execute the steps provided in the following table.

Table 3.3-6. Restore a File - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	ssh to the <i>Machine to be Restored</i>	press Return
2	<i>Your Passphrase -or- (No entry)</i>	press Return -or- (No action)
3	<i>Your Password</i>	press Return
4	nwrecover &	press Return
5	file(s) to be restored	click the Mark button
6	Change → Browse Time	(No action)
7	date from which to restore	click the Start button
8	yes	click OK button
9	(No entry)	choose what action to take when notified of conflicts
10	(No entry)	click Cancel button
11	File → Exit	(No action)
12	exit	press Return
13	exit	press Return
14	exit	press Return

3.3.4 Complete System Restore

The Complete System Restore process begins when the requester has determined that a complete system restore is the only way to resolve the problem and has approval from the Operations Supervisor. Once notified of the request, the Operator performs restores of all partitions on the system. Afterwards, the Operator documents and logs all actions in the operator's log book and notifies the requester and Ops Supervisor that the system restore is complete.

The Activity Checklist table that follows provides an overview of the complete system restore process.

Table 3.3-7. Complete System Restore - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Trouble Shoot and Determine that a Complete System Restore is necessary.	(I) 3.3.4	
2	Operator	Restore all Partitions on the System	(P) 3.3.4	
3	Operator	Document and Log in operator's log book, and Inform Requester and Ops Supervisor of completion.	(I) 3.3.4	

Detailed procedures for tasks performed by the Operator are provided in the sections that follow. The procedures assume that the requester's application for a complete system restore has already been approved by Ops Supervisor. In order to perform the procedures, the Operator must have obtained the following information about the requester:

- a. **Name of system to be restored**
- b. **Date from which to restore**

A complete system restore involves restoring all partitions on that system.

Table 3.2-8 presents the steps required to restore a partition in a condensed manner. If you are already familiar with the procedure, you may prefer to use the quick-step table. If you are new to the system, or have not performed these tasks recently, you should use the detailed procedures presented below.

To restore a partition for the requester, execute the procedures steps that follow:

- 1** Log into the backup server by typing: **ssh *machine to be restored***, then press **Return**.
- 2** At the Passphrase prompt: enter ***YourPassphrase***, then press **Return**.
 - Or press **Return** twice to get to the Password prompt.
- 3** Enter ***Your Password***, then press **Return**.
 - Remember that ***Your Password*** is case sensitive.
 - You are authenticated as yourself and returned to the UNIX prompt.
- 4** Execute the **NetWorker Administrative** program by entering: **nwadmin &**, then press **Return**.
 - A window opens for the NetWorker Administrative program.
 - You are now able to perform restores of partitions.
- 5** Go to the **Save Set** menu, select **Recover Set**.
 - The **Save Set Recover** window opens.
- 6** Select the **Name of system to be restored** (referred to as **System** in the rest of this procedure) in the **Client** field's menu.
 - The **Save Set** listing updates. This is a listing of partitions on the **System**.
 - At this time, note the partitions listed for the **System**. To do a complete system restore, this procedure needs to be performed for each partition listed.
- 7** Select the **Save Set/partition** from the listing.
 - The **Instance** listing updates.
- 8** Select the appropriate **Instance**.
 - An Instance is a particular Networker client backup. A listing of Instances is a report detailed with the Networker client backups that have occurred.
 - Select an Instance based upon the Date from which to restore(referred to as Date in the rest of this procedure) and an appropriate level:

***NOTE 1:** To determine a base **Date**, you must consider the time of day that backups occur. For example, if the backups occur at 02:00 each morning, then a system corrupted at noon on June 6th would require a restoration of the June 6th backup. If the Backups are

full or incremental, perform the following actions: Select the most recent full backup that occurred on or prior to the **Date** and perform a partition restore. If the date of this full backup is not the same as the **Date**, perform a partition restore using each incremental backup, in chronological order, between this full backup and the day after the **Date**.

If the backups are of different numerical levels, follow these steps:

- 1) Select the most recent level **0/full backup** prior to or on the **Date** and perform a restore of the partition.
- 2) If a level **0/full backup** did not occur on the **Date**, select the most recent backup of the next highest level occurring after this level **0** and prior to or on the **Date**.
- 3) Perform a restore of the partition.
- 4) Continue to select the most recent backup of the next highest level occurring between the last used **Instance** and the day after the **Date** until reaching an instance on the **Date**.

- You can double click an **Instance** to see which tape is required.

9 Click the **Recover** button.

- The Save Set Recover Status window opens.
- Clicking the Volumes button will show which tapes are required.

10 Click the **Options** button.

- The **Save Set Recover** Options window opens.

11 Set **Duplicate file resolution** to **Overwrite existing file** by clicking its radio button.

12 Make sure that the **Always prompt** checkbox is not checked.

13 Click the **OK** button.

- The Save Set Recover Options window closes.

14 Click the **Start** button in the **Save Set Recover Status** window.

- Status messages appear in the Status box.
- If prompted for tapes, click the Cancel button in the **Save Set Recover Status** window and follow steps **1-18** of procedure **3.3.5.2** Index tapes(or steps 1-19 of procedures **3.3.5.2** Index Tapes Quick Steps)
- A **recovery complete** message appears when recovery is complete.

15 Click the **Cancel** button after the **recovery complete** message appears.

- The Save Set Recover Status window closes.

16 If additional partition restores are required, go to step **8**. Otherwise, select **Exit** from the **File** menu to quit the NetWorker Administrative program.

17 At the UNIX prompt for the backup server, type **exit**, then press **Return**.

18 Type **exit** again, then press **Return**.

To restore a partition, execute the steps provided in the following table.

Table 3.2-8. Restore a Partition - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	ssh to the host which requires partition restoration	press Return
2	Your Passphrase	press Return – or -
3	Your Password	press Return
4	nwadmin &	press Return
5	Save Set → Recover Set	(no action)
6	Client/System	(no action)
7	Save Set/partition	(no action)
8	Instance	click Recover button
9	(No entry)	click Options button
10	Overwrite existing file	deselect Always prompt
11	(No entry)	click OK button
12	(No entry)	click Start button
13	(No entry)	click Cancel button
14	(No entry)	go to step 7 -or- select File → Exit
15	exit	press Return
16	exit	press Return

3.3.5 Tape Handling

The following procedures demonstrate how to label tapes, index tapes, and clean tape drives. Each of these procedures contains detailed steps that explain how to complete the procedure properly. Each tape handling procedure is significant in maintaining a working backup system. DAAC scheduled backups depend on proper maintenance of tape media and tape drives. Listed are complete explanations of the procedures and their relevance to the Computer Operator position.

The Activity Checklist table that follows provides an overview of the tape handling process.

Table 3.3-9. Tape Handling - Activity Checklist

Order	Role	Task	Section	Complete?
1	Operator	Labeling Tapes	(I) 3.3.5.1	
2	Operator	Indexing Tapes	(P) 3.3.5.2	
3	Operator	Tape Drive Cleaning	(P) 3.3.5.3	

3.3.5.1 Labeling Tapes

The Tape Labeling process begins when the Operator is performing procedures 3.3.1 Incremental Backup or 3.3.2 Full Backup (or their associated Quick Steps) and runs out of tapes. The tape(s)

must be installed in the jukebox and labeled. NetWorker uses tape labels for identification. The label that NetWorker creates is on the tape media itself, rather than a sticker on the outside of the tape cassette. An index is kept by NetWorker associating tape labels with particular backups/data. When you select files to be recovered using the NetWorker Recovery window or view saved sets on a backup volume using the Volume Management window in NetWorker, you are viewing this index. After labeling the required tape(s), the Operator resumes procedure 3.2.1 or 3.2.2.

Table 3.3-10. Labeling Tapes - Activity Checklist

Order	Role	Task	Section	Complete?
1	Operator	Install Required Tape(s) in Jukebox	(P) 3.3.5.1.1	
2	Operator	Label 8mm Tapes	(P) 3.3.5.1.2	
3	Operator	Label DLT Tapes	(P) 3.4.5.1.3	

Detailed procedures for tasks performed by the Operator are provided in the sections that follow.

3.3.5.1.1 Install Required Tape(s) in Jukebox

The procedures assume that the Operator was previously executing procedure 3.3.1 or 3.3.2. In order to perform the procedures, the Operator must have obtained the following:

a. Blank tape(s)

All tapes are stored in the storage cabinet located in the control room. There are five tapes in each box, and every box of tapes has a unique number. To begin finding tapes for recycling to be labeled and installed in the Juke box, the lowest numbers of a tape or a box of tapes should be used. Do not recycle any tape or box of tapes that the numbers are higher or current.

3.3.5.1.2 8mm or D3 Tapes Labeling Process

Table 3.3.5-2 presents the steps required to label tapes in a condensed manner. If you are already familiar with the procedure, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the detailed procedure presented below.

To label tapes, execute the procedure steps that follow:

- 1 Log into the **backup server** by typing: *ssh appropriate server (i.e. gsfcsrvr7)*, then press **Return**.
- 2 At the Passphrase prompt: enter *YourPassphrase*, then press **Return**.
 - Or press **Return** twice to get to the Password prompt.
- 3 Enter *Your Password*, then press **Return**.
 - Remember that *Your Password* is case sensitive.

- You are authenticated as yourself and returned to the UNIX prompt.
- 4 Execute the **NetWorker Administrative** program windows by entering: **nwadmin &**, then press **Return**.
 - The **NetWorker Administrative** program windows displayed
 - Remove all non-blank tapes from the cartridge.
 - ***Dismount the drive(s) that will be used for tapes Labeling***
 - 5 Insert the blank tape(s) in the jukebox's cartridge, then install the cartridge in the jukebox.
 - 6 Click the **Label** button from the menu bar.
 - The **Jukebox Labeling** window opens.
 - 7 Enter **tape one** in the non-removable **Slot field**.
 - **Slot 1** is at the top of the cartridge, and it is a non-removable slot. **Slot 2** through **Slot 11** are removable slots. **Slot 11** contains a cleaning tape. Do not enter any tape in Slot 11 for labeling. The default setting is **1** through **10** for only the tapes that will be labeled and used for backup.
 - It is ok to have empty slots.
 - 8 Click the **OK** button.
 - A status message appears and updates.
 - Labeling a full cartridge of tapes takes about one and half hours. Nine Minutes per tape.
 - 9 When the status in the **Jukebox Labeling** window reads finished, click the **Cancel** button.
 - The **Jukebox Labeling** window closes.
 - 10 Go to the **File** menu, select **Exit**.
 - 11 Put a sticker on the outside of each tape cassette.
 - This is done in order for you to identify each tape.
 - 11 Resume procedure 3.3.1 or 3.3.2.

To label tapes, execute the steps provided in the following table.

3.3.5.1.3 Label DLT Tapes

The dlt tape labeling process is the same as the 8mm tape labeling scenarios, except for some few things that are additionally different. Steps to follow in labeling the dlt tapes as follow: Repeat Table **3.3.5.1** step 1 through step 9. Change default to **SPRDLT**, then click OK button. The system will display the beginning number of the tape label. Once again repeat step 11 through step 17 of Table **3.3.5.1**, tape labeling process to end the task.

Table 3.3-11. Label Tapes - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	ssh to appropriate server (i.e. <i>gsfcsrvr7</i>)	press Return
2	YourPassphrase	press Return – or -
3	Your Password	press Return
4	No Entry	press Return
5	nwadmin &	press Return
6	(No entry)	put blank tape(s) in cartridge and install cartridge in jukebox
7	(No entry)	click Label button
8	2	(No action)
9	11	click OK button
10	(No entry)	click Cancel button
11	File → Exit	(No action)
12	exit	press Return
13	exit	press Return
14	(No entry)	put a sticker on the outside of each tape
15	(No entry)	resume previous procedure

3.3.5.2 Indexing Tapes

The Indexing Tapes process begins when the Operator has finished performing procedures 3.3.5.1, (**Tape Labeling**). If the tape(s) is/are not *indexed/inventoried*, Networker will not be aware of it/them. After indexing the required tape(s), the Operator resumes procedure 3.3.1 or 3.3.2.

The Activity Checklist table that follows provides an overview of the indexing tapes process.

Table 3.3-12. Indexing Tapes - Activity Checklist

Order	Role	Task	Section	Complete?
1	Operator	Pull Required Tape(s) from Tape Storage.	(I) 3.3.5.2.1	
2	Operator	Index Tapes	(P) 3.3.5.2.2	

3.3.5.2.1 Pull Required Tape(s) from Tape Storage

In order to perform the procedure, the Operator must have obtained the following:

- a. **The required tape(s)**

3.3.5.2.2 Index Tapes

Detailed procedures for tasks performed by the Operator are provided in the sections that follow.

The procedures assume that the Operator has previously executed procedure 3.3.5.1, **Tape Labeling**.

Table **3.3-5-2** presents the steps required to index tapes in a condensed manner. If you are already familiar with the procedure, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the detailed procedure presented below.

To index tapes, execute the procedure steps that follow:

NOTE: You may proceed to step **8** if you are still logged into the backupserver.

- 1** Log into the **backup server** by typing: **ssh appropriate server (i.e. gsfcsvr7)**, then press **Return**.
- 2** At the Passphrase prompt: enter **YourPassphrase**, then press **Return**.
 - Or press **Return** twice to get to the Password prompt.
- 3** Enter **Your Password**, then press **Return**.
 - Remember that your password is case sensitive.
 - You are authenticated as yourself and returned to the Unix prompt.
- 4** Execute the **Networker Administrative** program by entering: **nwadmin &**, then press **Return**.
 - The Networker Administrative program windows is displayed.
 - You are now able to index tapes.
 - Click the Mount button to show what tapes **Networker** is currently aware of. The **Jukebox Mounting** windows opens. Once you have finished with this window, click the **Cancel** button.
- 5** Put the **required tape(s)** in the jukebox's cartridge, install the cartridge in the jukebox.
 - For instructions, refer to the jukebox's documentation.
- 6** Go to the **Media** menu, select **Inventory**.
 - The **Jukebox Inventory** window opens.
- 7** Enter **1** in the **First Slot** field, enter **10** in the **Last Slot** field.
 - Slot 1 is the non-removable slot within the jukebox.
 - Slot 2 is the first top of the removable cartridge and 11 at the bottom, and it contains a cleaning tape. A default setting 1 through 10.
 - It is OK to have empty slots or slots with tapes which have already been indexed.
- 8** Click the **OK** button.
 - A checking volume message appears and updates.
 - Performing an inventory on a full cartridge takes about forty minutes.

- 9 When the status in the **Jukebox Inventory** window says finished, click the **Cancel** button.
 - The **Jukebox Inventory** window closes.
- 10 Click the **Mount** button to verify that the indexing worked.
 - The Jukebox Mounting window opens.
 - The required tape(s) should be shown. If not, repeat from step 8.
- 11 Click the **Cancel** button.
 - The **Jukebox Mounting** window closes.
- 12 Go to the **File** menu, select **Exit**.
- 13 At the UNIX prompt for the *backup server*, type **exit**, then press **Return**.
- 14 Type **exit** again, then press **Return**.
- 15 Resume procedure 3.3.3 at step 12, procedure 3.3.3 at quick-step 11 - action part, procedure 3.3.4 at step 12, or procedure 3.3.4 at quick-step 11 - action part.

To index tapes, execute the steps provided in the table.

Table 3.3-13. Index Tapes - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	ssh appropriate server (i.e. gsfcsrvr7)	press Return
2	<i>Your Passphrase</i>	press Return - or -
3	<i>Your Password</i>	press Return
4	nwadmin	press Return
5	(No entry)	put required tape(s) in cartridge and install cartridge in jukebox
6	Media → Inventory	(No action)
7	2	(No action)
8	11	click OK button
9	(No entry)	click Cancel button
10	(No entry)	click Mount button
11	(No entry)	verify indexing
12	(No entry)	click Cancel button
13	File → Exit	(No action)
14	exit	press Return
15	exit	press Return
16	(No entry)	resume previous procedure

3.3.5.3 Tape Cleaning Process

The system will at times prompt for drive(s) cleaning. This happens usually during non processing periods, however during the course of the tape backup process period, the drive(s) may send a request for cleaning. Manual cleaning should be performed each time tapes are installed in the Juke Box. Maintaining clean drives can help prevent backup interruption which may occur due to unclean tape drive heads. If the system is prompted for drive(s) cleaning: Follow the details steps below:

- (1) Log into the Backup Server by typing: **ssh *appropriate server (i.e. gsfcsvr7)***, then press **Return**.
 - The system prompts for your Passphrase
- (2) Type yourPassphrase, then press **Return**.
 - Or press **Return** twice to get to the Password prompt.
- (3) Type your **password**, then press **Return**. Remember, your password is case sensitive.
- (4) Execute Net Worker by typing: **nwadmin &**, then press Return.
 - A NetWorker administrative program windows displayed.
- (5) Highlight the desirable drive(s) that the system has prompted for cleaning.
- (6) Click dismount from the menu bar and wait a few minutes for the drive to be dismounted completely. Repeat step 6 on the second drive until the both are dismounted.

To open the Exabyte door turn the key in the door counter clockwise. The last tape at the bottom of the cartridge is the cleaning tape. Remove it from the slot field and insert it gently into each drive below. Wait until the tape has been ejected and the flashing lights on the drive are off before removing the tape from the drive. Insure that the cleaning tape is still usable before each use. Cleaning tapes will expire after several uses. After each use mark the appropriate box on the surface of the tape to maintain a list of usage. Insert the cleaning tape back into the last slot and lock the Exabyte door.

3.4 User Administration

Note: User Administration procedures will be implemented through command-line and/or script entries. The Tivoli Management Environment (TME) will not be used for User Administration procedures.

3.4.1 Adding a User

The Adding a User process begins when the requester fills out a "User Registration Request Form" (located in Appendix A), and submits it to the site supervisor. The "User Registration Request Form" includes information regarding the user (User's Name, Group, Organization, etc.), as well as the user's explanation of why an account on the system is needed. The

requester's supervisor reviews the request, and if it is determined that it is appropriate for the requester to have UNIX and DCE accounts, forwards the request to the Operations Supervisor (OPS Super). The OPS Super reviews the request and forwards it to the System Administrator (SA). The SA verifies that all required information is contained on the form. If it is, the SA implements the request. (Incomplete forms are returned to the requester's supervisor for additional information.) After the user is registered, the SA provides the user with a password to use for logging onto their accounts. The SA also sends an e-mail message to the user's supervisor and the OPS Super, informing them that the user's accounts were created.

The **Activity Checklist** table that follows provides an overview of the adding a user process.

Table 3.4-1. Adding a User - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Complete User Registration Form and forward to the Supervisor.	(I) 3.4.1	
2	Super	Approve/Deny Request. If Approve, Forward Request to OPS Super.	(I) 3.4.1	
3	OPS Super	Review Request and Forward to SA.	(I) 3.4.1	
4	SA	Review User Registration Form for Completeness.	(I) 3.4.1	
5	SA	Add User.	(P) 3.4.1	
6	SA	Phone/e-mail User with Password. Notify Supervisor and OPS Super that user was added.	(I) 3.4.1	

Depending upon the script utilized, in order to add a new user the SA should obtain information such as the following about the requester:

- a. **Real name of the new user**
- b. **User name of the new user**
- c. **Office number of the new user**
- d. **Office phone number of the new user**
- e. **Home phone number of the new user**
- f. **Organization**
- g. **Group affiliation(s)**
- h. **Role(s) of the new user**

The SA creates a new user account with command-line/script entries. As an example, The Goddard Space Flight Center DAAC uses a script, *Newuser*, to add new users to the system. The script, which is available to other DAACs, walks the System Administrator through data input of

user information, checks for the same user in other systems, creates a User ID, synchronizes password files and creates home directories for new users.

3.4.2 Deleting a User

The Deleting a User process begins when the requester has determined that no useful files remain in the user's home directory and submits a request to delete the user's account to the user's supervisor. The supervisor approves or denies the request. Once approved, the request is forwarded to the OPS Super. The OPS Supervisor reviews the request and forwards it to the SA, who deletes the user's account. When the user has been deleted, the SA notifies the requester, supervisor and OPS Super.

The Activity Checklist table that follows provides an overview of the deleting a user account process.

Table 3.4-2. Deleting a User - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Determine that No Useful Files Remain in the User's Home Directory and Submit Request to user's Supervisor.	(I) 3.4.2	
2	OPS Super	Approve/Deny Request. If Approve, Forward Request to OPS Super.	(I) 3.4.2	
3	OPS Super	Review Request and Forward to SA.	(I) 3.4.2	
4	SA	Delete User.	(P) 3.4.2	
5	SA	Notify Requester, Supervisor and OPS Super that user was deleted.	(I) 3.4.2	

The process assumes that the requester's application for deleting a user has already been approved by DAAC Management. In order to perform the procedure, the SA must have obtained the following information from the requester:

- a. **UNIX login of the user to be deleted**
- b. **Role(s) of the user to be deleted**

The SA deletes a user with command-line/script entries. As an example, The Goddard Space Flight Center DAAC uses a script, *Lockdown*, to lock, unlock and delete user accounts. This script, which is available to other DAACs, walks the System Administrator through the steps necessary to delete a user account. It assists the System Administrator in locating the correct user account for deletion, deletes the user account and all associated file references. It also enables the System Administrator to lock or unlock accounts.

3.4.3 Changing a User Account Configuration

The Changing a User Account Configuration process begins when the requester submits a request to the OPS Supervisor detailing what to change about the account configuration and the reason for the change. The OPS Supervisor reviews the request and forwards it to SA who changes the user's account configuration. When the changes are complete the SA notifies the requester and OPS Supervisor.

The Activity Checklist table that follows provides an overview of the changing a user account configuration process.

Table 3.4-3. Change a User Account Configuration - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Submit Request to OPS Supervisor.	(I) 3.4.3	
2	OPS Super	Review and Forward to SA.	(I) 3.4.3	
3	SA	Change User Account Configuration.	(P) 3.4.3	
4	SA	Inform Requester and Supervisor of completion.	(I) 3.4.3	

The process assumes that the requester's application for changing a user account configuration has already been approved by the OPS Supervisor. In order to perform the procedure, the SA must have obtained the following information from the requester:

a. **What to change and new settings.**

Can be any of:

New Real User Name

New Login ID

New Office Number

New Office Phone Number

New Home Phone Number

New UNIX Group

New DCE Group

New DCE Organization

New Login Shell

b. **Current UNIX Login of the User**

The SA changes the appropriate configuration items manually in the users home directory.

3.4.4 Changing User Access Privileges

The Changing User Access Privileges process begins when the requester submits a request to the supervisor. The supervisor approves or denies the request. Once approved, the request is forwarded to the OPS Super. The OPS Super reviews the request and forwards it to the SA who changes the user's access privileges. When the changes are complete the SA notifies the requester, supervisor and OPS Super.

The Activity Checklist table that follows provides an overview of the changing user access privileges process.

Table 3.4-4. Changing User Access Privileges - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Submit Request to the Supervisor.	(I) 3.4.4	
2	Super	Approve/Deny Request. If Approve, Forward Request to OPS Super.	(I) 3.4.4	
3	OPS Super	Review Request and Forward to SA.	(I) 3.4.4	
4	SA	Change User Access Privileges.	(P) 3.4.4	
5	SA	Inform Requester, Supervisor and DAAC Mgr of completion.	(I) 3.4.4	

Detailed procedures for tasks performed by the SA are provided in the sections that follow.

The procedures assume that the requester's application for changing user access privileges has already been approved by DAAC Management and that the SA is an administrator. In order to perform the procedure, the SA must have obtained the following information about the requester:

- a. **Role(s) to which the user is to be added**
- b. **Role(s) from which the user is to be removed**
- c. **UNIX login of the user**

To change user access privileges for the requester, execute the procedure steps that follow:

3.4.5 Changing a User Password

The Changing a User Password process begins when the requester submits a request to the SA. The SA verifies that the requester is who s/he claims to be. Once verified, the SA changes the user's password. When the change is complete the SA notifies the requester.

The **Activity Checklist** table that follows provides an overview of the changing a user password process.

Table 3.4-5. Changing a User Password - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Submit Request to SA.	(I) 3.4.5	
2	SA	Verify that the Requester is Who S/he Claims to Be.	(I) 3.4.5	
3	SA	Change Password.	(P) 3.4.5	
4	SA	Inform Requester of completion.	(I) 3.4.5	

Detailed procedures for tasks performed by the SA are provided in the sections that follow.

The procedures assume that the requester's application for changing a user password has already been approved by DAAC Management and that the SA is a Tivoli administrator. In order to perform the procedure, the SA must have obtained the following information about the requester:

- a. **UNIX login of the user**
- b. **New password for the user**

To change a user password for the requester, execute the procedure steps that follow:

3.4.6 Checking a File/Directory Access Privilege Status

The Checking a File/Directory Access Privilege Status process begins when the requester submits a request to the SA. The SA checks the file/directory access privilege status and reports the status back to the requester.

The **Activity Checklist** Table 3.4-6 that follows provides an overview of the checking a file/directory access privilege status process.

Table 3.4-6. Checking a File/Directory Access Privilege Status - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Submit a Request to the SA.	(I) 3.4.6	
2	SA	Check a File/Directory Access Privilege Status.	(P) 3.4.6	
3	SA	Inform Requester of completion and Report the File/Directory Access Privilege Status.	(I) 3.4.6	

Detailed procedures for tasks performed by the SA are provided in the sections that follow. In order to perform the procedure, the SA must have obtained the following information about the requester:

- a. **full path of the file/directory on which privilege status is needed**

Table 3.4-12 contains a table which presents the steps required to check a file/directory access privilege status in a condensed manner. If you are already familiar with the procedure, you may

prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the detailed procedure presented below.

To check a file/directory access privilege status for the requester, execute the procedure steps that follow:

- 1 At a UNIX prompt, type **cd *Path***, press **Return**.
 - The ***Path*** is the full path up to but not including the file/directory on which access privilege status is needed. For example, if the requester wants access privileges status on directory /home/jdoe then type **cd /home** and press **Return**.

- 2 Type **ls -la | grep *FileOrDirectoryName***, press **Return**.

This command will return information like this:

```
drwxr-xr-x 19 jdoe user 4096 Jun 28 09:51 jdoe
-r-xr--r-- 1 jdoe user 80 Jun 22 11:22 junk
```

What this output means, from left to right, is:

The file type and access permissions:

The *first character* indicates what type of file it is:

d means that the file is a directory.

- means that the file is an ordinary file.

l means that the file is a symbolic link.

The *next three characters* indicate the owner privileges, in the order: **r** = read **w** = write **x** = execute. - is a place holder. **Example:** the owner (jdoe) of the file **junk** does not have *write* permissions, so a - appears rather than a w.

The *next three characters* indicate the group privileges, in the order: **r** = read **w** = write **x** = execute. - is a place holder. **Example:** the group (user) of the directory **jdoe** does not have write permissions, so a - appears rather than a w as the sixth character in the line.

The *next three characters* indicate the privileges that everyone else/other has, in the order: **r** = read **w** = write **x** = execute. - is a place holder. **Example:** other in the case of the directory **jdoe** does not have write permissions, so a - appears rather than a w as the ninth character in the line.

There are 19 links to the file/directory **jdoe**.

The owner of the file/directory is jdoe.

The file/directory's group is user.

The file/directory is 4096 bytes large.

The last time the file/directory was modified is Jun 28 at 09:51.

The name of the file/directory is jdoe.

- 3 Create a report of the file/directory's access privilege status by using the information produced by step 2 and by filling out this template:

full path of the file/directory: _____

owner: _____

group: _____

owner/user privileges: _____ read _____ write _____ execute

group privileges: _____ read _____ write _____ execute

everyone else/other privileges: _____ read _____ write _____ execute

To check a file/directory access privilege status, execute the steps provided in the following table.

Table 3.4-7. Check a File/Directory Access Privilege Status - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	<i>cd Path</i>	press Return
2	<i>ls -la grep FileOrDirectoryName</i>	press Return
3	(No entry)	generate a file/directory access privilege status report

3.4.7 Changing a File/Directory Access Privilege

The Changing a File/Directory Access Privilege process begins when the requester submits a request to the supervisor to have file/directory access privileges changed. The supervisor approves/denies the request. When approved, the request is forwarded to the OPS Supervisor who reviews the request and forwards it to the SA. The SA changes the file/directory access privileges and then notifies the requester, supervisor and OPS Supervisor of completion.

The **Activity Checklist** table that follows provides an overview of the changing a file/directory access privilege process.

Table 3.4-8. Changing a File/Directory Access Privilege - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Submit Request to the Supervisor.	(I) 3.4.7	
2	Super	Approve/Deny Request. If Approve, Forward Request to OPS Supervisor.	(I) 3.4.7	
3	OPS Super	Review Request and Forward to SA.	(I) 3.4.7	
4	SA	Change a File/Directory Access Privilege.	(P) 3.4.7	
5	SA	Inform Requester, Supervisor and OPS Supervisor of completion.	(I) 3.4.7	

Detailed procedures for tasks performed by the SA are provided in the sections that follow.

The procedures assume that the requester's application for changing a file/directory access privilege has already been approved by the supervisor. In order to perform the procedure, the SA must have obtained the following information about the requester:

- a. **full path of the file/directory on which access privileges will be changed**
- b. **new access privileges to set on the file/directory. Can be any of:**
 - New owner**
 - New group**
 - New user/owner privileges (read, write and/or execute)**
 - New group privileges (read, write and/or execute)**
 - New other privileges (read, write and/or execute)**

To change a file/directory access privilege for the requester, execute the procedure steps that follow:

- 1** At the UNIX prompt, type **su**, press **Return**.
- 2** At the **Password** prompt, type **RootPassword**, press **Return**.
 - Remember that **RootPassword** is case sensitive.
 - You are authenticated as root.
- 3** Type **cd Path**, press **Return**.
 - The **Path** is the full path up to but not including the file/directory on which access privileges will be changed. For example, if the requester wants access privileges changed on directory /home/jdoe then type **cd /home** and press **Return**.
- 4** If there is a **New owner** then type **chown NewOwner FileOrDirectoryName**, press **Return**.

- The *FileOrDirectoryName* is the name of the file/directory on which access privileges will be changed minus the path. For example, if the requester wants access privileges changed on directory /home/jdoe then type: (You must be /home) **chown NewOwner jdoe** and press **Return**.
- 5 If there is a **New group** then type **chgrp NewGroup FileOrDirectoryName**, press **Return**.
- The *FileOrDirectoryName* is the name of the file/directory on which access privileges will be changed minus the path. For example, if the requester wants access privileges changed on directory /home/jdoe then type: **chgrp NewGroup jdoe** and press **Return**.
- 6 If there are **New user/owner privileges** then type **chmod u=NewUserPrivileges FileOrDirectoryName**, press **Return**.
- The *FileOrDirectoryName* is the name of the file/directory on which access privileges will be changed minus the path. For example, if the requester wants access privileges changed on directory /home/jdoe then type: **chmod u=NewUserPrivileges jdoe** and press **Return**.
 - The *NewUserPrivileges* are **r** = read **w** = write **x** = execute. To give the user/owner read, write and execute privileges, type: **chmod u=rwx FileOrDirectoryName** and press **Return**.
- 7 If there are **New group privileges** then type **chmod g=NewGroupPrivileges FileOrDirectoryName**, press **Return**.
- The *FileOrDirectoryName* is the name of the file/directory on which access privileges will be changed minus the path. *Example:* if the requester wants access privileges changed on directory /home/jdoe then type: (You must be in /home) **chmod g=NewGroupPrivileges jdoe** and press **Return**.
 - The *NewGroupPrivileges* are **r** = read **w** = write **x** = execute. *Example:* to give the group read and execute privileges, type: **chmod g=rx FileOrDirectoryName** and press **Return**.
- 8 If there are **New other privileges** then type: **chmod o=NewOtherPrivileges FileOrDirectoryName**, and press **Return**.
- The *FileOrDirectoryName* is the name of the file/directory on which access privileges will be changed minus the path. For example, if the requester wants access privileges changed on directory /home/jdoe then type: **chmod o=NewOtherPrivileges jdoe**, and press **Return**.
 - The *NewOtherPrivileges* are **r** for read, **w** for write and **x** for execute. For example, to give other read privileges, type: **chmod o=r FileOrDirectoryName** and press **Return**.
- 9 Type **exit**, press **Return**.
- Root is logged out.

To change a file/directory access privilege, execute the steps provided in the following table.

Table 3.4-9 contains a table which presents the steps required change a file/directory access privilege.

Table 3.4-9. Change a File/Directory Access Privilege - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	su	press Return
2	RootPassword	press Return
3	cd Path	press Return
4	chown NewOwner FileOrDirectoryName	press Return
5	chgrp NewGroup FileOrDirectoryName	press Return
6	chmod u=NewUserPrivileges FileOrDirectoryName	press Return
7	chmod g=NewGroupPrivileges FileOrDirectoryName	press Return
8	chmod o=NewOtherPrivileges FileOrDirectoryName	press Return
9	exit	press Return

3.4.8 Moving a User's Home Directory

The Moving a User's Home Directory process begins when the requester submits a request to the OPS Supervisor. The OPS Supervisor approves or denies the request. Once approved, the request is forwarded to the SA who moves the user's home directory. When the changes are complete the SA notifies the requester and OPS Supervisor.

The Activity Checklist table that follows provides an overview of moving a user's home directory process.

Table 3.4-10. Moving a User's Home Directory - Activity Checklist

Order	Role	Task	Section	Complete?
1	Requester	Submit Request to OPS Supervisor.	(I) 3.4.8	
2	OPS Super	Approve/Deny Request in Accordance with Policy. Forward to SA if approved.	(I) 3.4.8	
3	SA	Move a User's Home Directory.	(P) 3.4.8	
4	SA	Inform Requester and OPS Super of completion.	(I) 3.4.8	

Detailed procedures for tasks performed by the SA are provided in the sections that follow.

The procedures assume that the requester's application for moving a user's home directory has already been approved by DAAC Management and that the SA is an administrator. In order to perform the procedure, the SA must have obtained the following information about the requester:

- a. **UNIX login of the user**
- b. **New location for home directory**

To move a user's home directory for the requester, execute the procedure steps that follow:

3.5 Security

ECS security architecture must meet the requirements for data integrity, availability, and confidentiality. ECS Security Services meets these requirements by incorporating a variety of mechanisms to establish and verify user accounts, issue and verify passwords, audit user activity, and verify and protect data transfer. To monitor and control access to network services, ECS Security Services uses the public domain tool, TCP Wrappers. Three other public domain COTS products — npassword, Crack, and SATAN — provide additional password protection for local system and network access. The tool, Tripwire, monitors changes to files and flags any unauthorized changes.

This section defines step-by-step procedures for M&O personnel to run the Security Services tools. The procedures assume that the requester's application for a Security process has already been approved by DAAC Management.

3.5.1 Generating Security Reports

3.5.1.1 Reviewing User Activity Data

A log is created to keep track of unsuccessful attempts to log into the computer. After a person makes five consecutive unsuccessful attempts to log in, all these attempts are recorded in the file `/var/adm/loginlog`. The procedures assume that the file has been created and the operator has logged on as root.

Reviewing User Activity Data Procedure

- 1 At the UNIX prompt, type `/usr/bin/logins [-admopstux] [-g group..] [-l login..]`, then press **Return/Enter**.
- 2 Type `logins -x -l username`, then press **Return/Enter**.
_ Displays login status for a user:
- 3 Type `/var/adm/loginlog`, then press **Return/Enter**. To enable login Logging, this creates the log file `loginlog`.
- 4 Type `chmod 600 /var/adm/loginlog`, then press **Return/Enter**. This sets read and write permissions for root on the file.
- 5 Type `chgrep sys /var/adm/loginlog`, then press **Return/Enter**. This sets the group to `sys`.

3.5.1.2 Monitoring and Reviewing User Audit Trail Information

The **audit_startup** script is used to initialize the audit subsystem before the audit daemon is started. This script is configurable by the System Administrator, and currently consists of a series of **auditconfig** commands to set the system default policy, and to download the initial events to class mapping. Type the following command to initialize the audit subsystem:

/etc/security/audit_startup

The **audit** command is the general administrator's interface to the audit trail. The audit daemon may be notified to read the contents of the **audit_control** file and re-initialize the current audit directory to the first directory listed in the **audit_control** file or to open a new audit file in the current audit directory specified in the **audit_control** file as last read by the audit daemon. The audit daemon may also be signaled to close the audit trail and disable auditing. The audit commands are input as shown:

Audit Commands Procedures

- 1** **audit -n**, then press **Return/Enter**.
 - _ Signals audit daemon to close the current audit file and open a new audit file in the current audit directory.
- 2** **audit -s**, then press **Return/Enter**.
 - _ Signals audit daemon to read the current audit file. The audit daemon stores the information internally.
- 3** **audit -t**, then press **Return/Enter**.
 - _ Signals audit daemon to close the current audit file, disable audit and die.
- 4** **praudit -sl filename**, then press **Return/Enter**.
 - _ Displays audit output. The print audit command converts the binary audit records into a variety of formats, depending on the options used with the commands. The format of audit files is included in the file `/usr/include/sys/audit.h`. By default, user IDs (UID) and group IDs (GID) are converted to their ACSII representation.

4. Database Administration

4.1 Overview of Database Administration

The Database Administrator or DBA, is the individual or group responsible for the installation, configuration, update, maintenance, and overall integrity, performance and reliability of the SQL Server database. In general, the DBA is concerned with the availability of the server, the definition and management of resources allocated to the server, the definition and management of databases and objects resident on the server, and the relationship between the server and the operating system.

4.1.1 ECS Database Environment

The database environment at ECS spans multiple databases serving numerous subsystems across several hosts. Figure 4.1.1-1 shows the system Baseline Hardware/Database Map for the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC). There are similar mapping diagrams for each of the other DAACs. The diagram, using ECS naming conventions, lists the Subsystem name (i.e., SUB – Subscription Server; SDSRV – Science Data Server; INGEST), the Host Platform (i.e., G0INS01, G0ACG01, G0ICG01), the Sybase Server designation (i.e., g0ins01_srvr, g0acg01_srver, g0icg01_srvr), the Database Names (i.e., SubServer, EcDsScienceDataServer1, Ingest), the various database component sizes (e.g., DB size, Log size, Index size), the Device Type (raw or filesystem) and the Database Owner Names (i.e., css_role, sdsrv_role)

The Hardware/Database Mapping document, 920-TDx-009-Revxx, along with many other key reference documents can be accessed through the Pete.hitc.com website: <http://cmdm.east.hitc.com>. Select the “ECS Baseline” link button, and then the “Technical Documents” button to view this wealth of system data.

In addition to the fundamental database design, ECS operates on a concept of mutually exclusive, functionally identical modes. The main mode that interacts with live data and customers is called the Operational mode (OPS). Other modes available at the DAACs are nominally called TS2, TS1, and SHARED. The SHARED mode contains files common to all modes. The TS2 and TS1 modes are used to implement and test new functionality for both COTS and CUSTOM code. After modifications are installed and successfully tested in a non-OPS mode, they are promoted to the next mode level and ultimately upgraded into the OPS mode. This concept enables uninterrupted operation for live data and user interaction while simultaneously field-testing new code. Figure 4.1.1-2 shows this multi-mode directory structure. The OPS mode is shown here and is identical for the TS2 and TS1 modes.

**Goddard Space Flight Center (GSFC) DAAC Baseline Hardware / Database Mapping
DROP 4PY and DROP 5A**

Subsystem	DAAC Platform	DAAC Sybase Server	DAAC Database Names (*)	DB Size	Log Size	Index Size	Device Type	DBO Names
CLS	N/A	N/A	No databases	N/A	N/A	N/A	N/A	N/A
CSS/IDG ACL	N/A	N/A	No databases	N/A	N/A	N/A	N/A	N/A
CSS/IDG SUB	G0INS01	g0ins01_srvr	SubServer SubServer_TS1 SubServer_TS2 tempdb master sybssystemprocs	120MB 40MB 40MB 100MB 50MB 60MB	60MB 20MB 20MB N/A N/A N/A	60MB 20MB 20MB N/A N/A N/A	raw raw raw filesystem raw filesystem	css_role css_role css_role
DMS	G0INS02	g0ins02_srvr	EcDmDictService EcDmDictService_TS1 EcDmDictService_TS2 tempdb master sybssystemprocs	360MB 120MB 120MB 100MB 50MB 60MB	180MB 60MB 60MB N/A N/A N/A	180MB 60MB 60MB N/A N/A N/A	raw raw raw filesystem raw filesystem	dms_role dms_role dms_role
DSS/DDIST	G01CG01	g01cg01_srvr	(Moved into STMGT database)	N/A	N/A	N/A	N/A	N/A
DSS/DDSRV	N/A	N/A	No databases	N/A	N/A	N/A	N/A	N/A
DSS/SDSRV	G0AC001	g0ac001_srvr	EcDsScienceDataServer1 EcDsScienceDataServer1_TS1 EcDsScienceDataServer1_TS2 tempdb master sybssystemprocs	4,800MB 1,600MB 1,600MB 1,000MB 50MB 60MB	1,200MB 400MB 400MB N/A N/A N/A	1,200MB 400MB 400MB N/A N/A N/A	raw raw raw filesystem raw filesystem	sdsrv_role sdsrv_role sdsrv_role
DSS/STMGT	G0AC001	g0ac001_srvr	stmgtdb1 stmgtdb1_TS1 stmgtdb1_TS2	600MB 160MB 160MB	300MB 80MB 80MB	300MB 80MB 80MB	raw raw raw	stmgt_role stmgt_role stmgt_role
INGEST	G01CG01	g01cg01_srvr	Ingest Ingest_TS1 Ingest_TS2 tempdb master sybssystemprocs	480MB 160MB 160MB 100MB 50MB 60MB	240MB 80MB 80MB N/A N/A N/A	240MB 80MB 80MB N/A N/A N/A	raw raw raw filesystem raw filesystem	ingest_role ingest_role ingest_role

Figure 4.1.1-1. Baseline Hardware/Database Map for the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC)

4.1.2 Sybase Adaptive Server Enterprise

The version of Sybase Adaptive Server Enterprise installed in drop 6A on the HP, SUN and SGI platforms is ASE 11.5.1. Version numbers for this COTS software and all other software products are published in the COTS SOFTWARE VERSION BASELINE REPORT, 910-TDA-003-Rev xx . A more complete listing of software and the individual host installation content is provided in the DAAC-specific Hardware/Software Map, document 920-TD x -002-Rev xx . As upgrades are released and installed, version status will be reflected in these documents.

4.1.3 Database Schemas

All database designs in ECS are thoroughly documented in the 311 Series of documents, <SUBSYSTEM> Database Design and Schema Specifications for the ECS Project. These individual subsystem documents provide the DBA with a complete description of each database including:

Physical Data Model Entity Relationship Diagram

Tables

Columns

Column Domains

Rules

Defaults

Views

Integrity Constraints

Triggers

Stored Procedures

The Schema documents also provide Performance and Tuning Factors, Database Security information, Scripts, and Entity Relationship Diagram Keys. Figure 4.1.3-1 is a portion of the Entity Relationship Diagram for the INGEST subsystem. To access this document, and the other subsystem 311 Series documents, use the following URL: <http://edhs1.gsfc.nasa.gov/>. From the ECS Data Handling Homepage select the “Document Catalog” link and then the “Design Documents and Specifications” link. From this point you can select the relevant subsystem document.

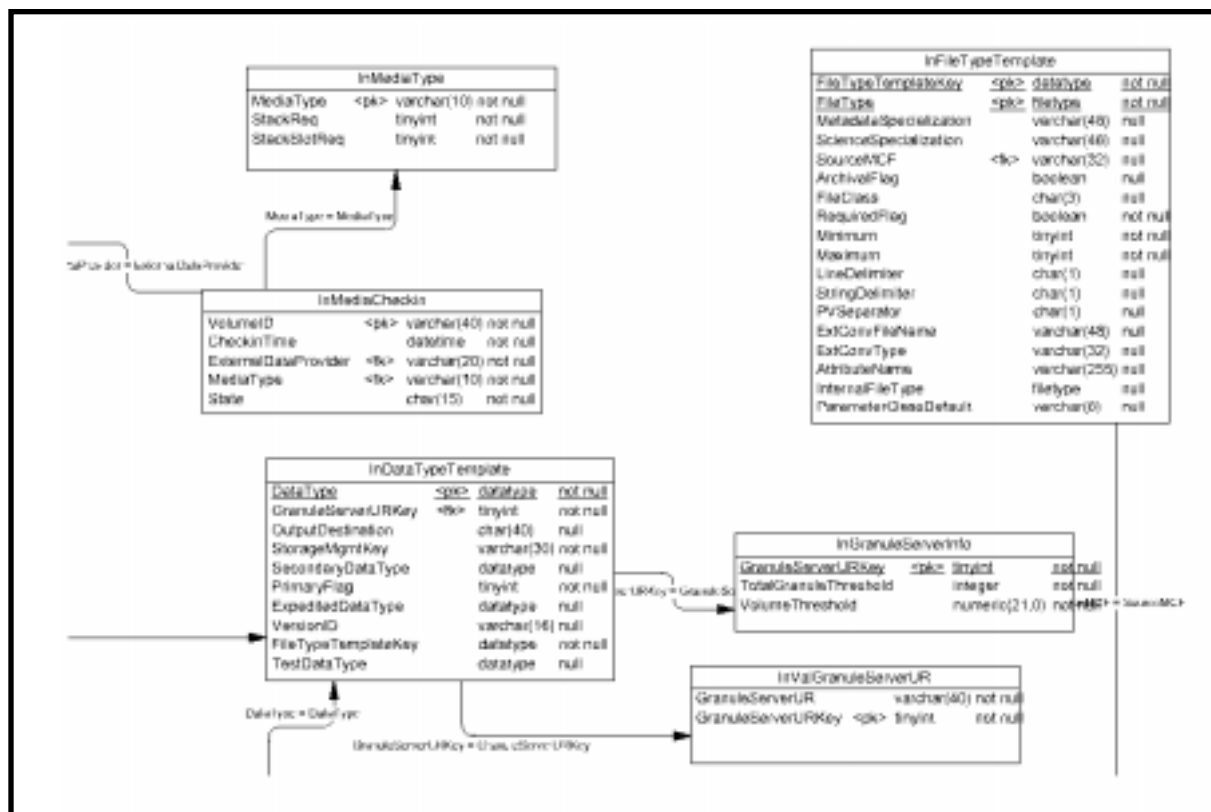


Figure 4.1.3-1. Partial Entity Relationship Diagram - INGEST

4.1.4 DAAC Database Configurations

The key factors that determine optimum performance for any database are its configuration parameters. A new document available on the Pete Server (<http://cmdm.east.hitc.com>), SYBASE SQL Server 11.0.x, ALL DAAC Database Configurations (910-TDA-021-Rev00), provides DBAs with detailed data and recommendations for Sybase configurable parameters. In addition to providing default values and the DAAC-specific parameter values for each host, it also describes the Sybase Segment naming conventions to be used at each site for assigning Sybase disk devices to databases. Future versions of this document will capture and baseline the disk devices at each DAAC and the interface file listings at each DAAC.

Figure 4.1.4-1 is an example of DAAC-specific configuration parameters for Goddard Space Flight Center on host g0msh08.

Host Name: g0msh08				
Parameter Name	Memory Used	Default Value	Configured Value	Run Value
number of devices	8	10	20	20
number of locks	469	5000	5000	5000
number of remote connections	33	20	20	20
number of remote logins	22	20	20	20
total memory	15000	7500	7500	7500
max online engines	355	1	1	1
number of user connections	2121	25	25	25
procedure cache percent	838	20	20	20
number of open databases	396	12	12	12
number of open objects	489	500	500	500
stack size	2075	34816	34816	34816

Figure 4.1.4-1. DAAC-Specific Configuration Parameters

4.1.5 Database Disk Partitioning

System documentation also provides graphic depictions of server disk partitioning for all of the hosts (e.g. Ingest, MSS, CSS, PDPS DBMS). The 922-TDx-0xx-Rev00 series of documents (available on the PETE server) provide a block diagram of the disk partitioning for each of the servers (Figure 4.1.5-1) and also secondary tables (Figure 4.1.5-2) describing the physical breakdown of the individual disks including Slice, Start Block, Total Blocks, Start MB, Total MB, XLV Name, Mount, and Type.

Ingest Server Disk Partitioning Diagram g0icg01 & g0icg02

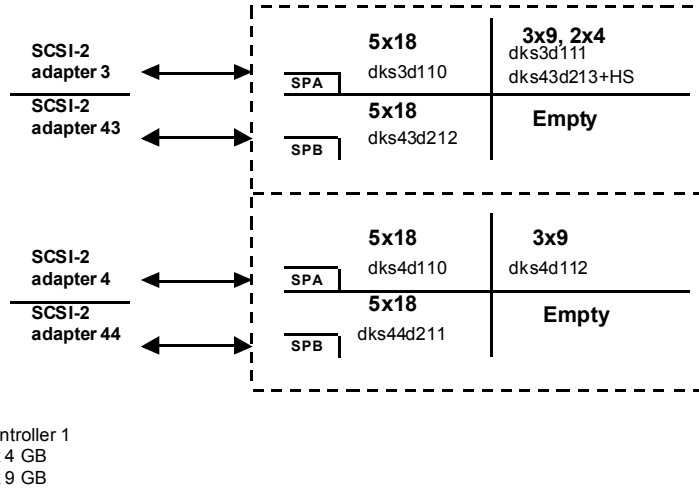


Figure 4.1.5-1. Server Disk Partitioning Block Diagram

dks3d111, 2x0 GB Raid Level 1, Mirrored							
Slice	Start Block	Total Blocks	Start MB	Total MB	XLV Name	Mount	Type
0	2048	1024000	1	1	ingestlog		xlvs
1	1026048	512000	501	501	sybsecurity		xlvs
2	1538048	256000	751	125	sybmaster		xlvs
3	1794048	512000	876	250	sybsecarchive		xlvs
4	2306048	512000	1126	250	ddistlog		xlvs
5	2814048	1024000	1376	500	stmglog		xlvs
6	3842048	5120000	1876	2500	sybase_dumps		xlvs
7	9862048	8264978	4376	4036	spare1		xlvs
8	0	2018	0	1	n/a		Volhdr
10	0	17227026	0	8412	n/a		volume

Figure 4.1.5-2. Ingest Server Disk Partitioning Diagram

4.2 SQL Server Environment

4.2.1 Naming Conventions,

As one of the most important, yet least applied concepts, naming conventions are presented in this chapter by examples according to the following rules.

Rule 1: Regardless of the length of the name, it should indicate the function and/or content of the object

Rule 2: Only easily understandable abbreviations should be used

Rule 3: Parts of names are separated by underscores “_”, only one optional suffix is permitted (appended to the name by a . “.”)

Rule 4: The full path of the object is considered to be part of the name

The names of the databases and tables themselves may or may not follow the above rules; these rules are specifically for the DBA to work with SQL Server objects, and files in the UNIX environment.

All **COTS** software is installed in the `/usr/ecs/OPS/COTS` directory.

All **SYBASE** software is located in the Sybase home directory (`$SYBASE`).

All backups are located in `$SYBASE/sybase_dumps` directory, which may or may not be on a separate physical disk.

Note:

It is strongly recommended that backups be stored on a separate physical disk.

The database dumps are kept for a period of 2 days and also stored on a disk by Networker everyday. The database dumps are named as follows:

`dbname.dat_YYMMDDHHMM.Z`

Where MMDDHHMM is the “sortable” eight digit month, day, hour, and minute. For example, on the date this chapter was written, a backup directory called `backups_for_99021100024.Z`

All SQL script files have the extension `.sql` as a suffix. Their names reference the objects they create or functions they perform, and are all located in `$SYBASE/scripts`.

SQL statement must follow precise syntactical and structural rules, and may include only SQL keywords, identifiers (names of databases, tables, or other database objects), operators, and constants. The characters that can be used for each part of a SQL statement vary from installation to installation and are determined in part by definitions in the default character set that version of the server uses.

For example, the characters allowed for the SQL language, such as SQL keywords, special characters, and Transact-SQL extensions, are more limited than the characters allowed for identifiers. The set of characters, which may be used for data, is much larger and includes all the characters that can be used for the SQL language or for identifiers.

The sections that follow describe the sets of characters that can be used for each part of a statement. The section on identifiers also describes naming conventions for database objects.

4.2.1.1 SQL Data Characters

The set of SQL data characters is the larger set from which both SQL language characters and identifier characters are taken. Any character in SQL Server's character set, including both single-byte and multibyte characters, may be used for data values.

4.2.1.2 SQL Language Characters

SQL keywords, Transact-SQL extensions, and special characters such as the comparison operators > and <, can be represented only by 7-bit ASCII values A- Z, a -z, 0-9, and the following ASCII characters:

4.2.1.3 Identifiers

Conventions for naming database objects apply throughout SQL Server software and documentation. Identifiers can be up to 30 bytes in length, whether or not multibyte characters are used. The first character of an identifier must be declared as an alphabetic character in the character set definition in use on Server.

The @ sign or _ (underscore character) can also be used. The @ sign as the first character of an identifier indicates a local variable.

Temporary table names must either begin with # (the pound sign) if they are created outside tempdb or be preceded by "tempdb..".

Table names for temporary tables that exist outside tempdb should not exceed 13 bytes in length, including the number sign, since SQL Server gives them an internal numeric suffix.

After the first character, identifiers can include characters declared as alphabetic, numeric, or the character \$, #, @, _, ¥ (yen), or £ (pound sterling). However, you cannot use two @@ symbols together at the beginning of a named object, as in "@@myobject." This naming convention is reserved for global variables, which are system-defined variables that SQL Server updates on an ongoing basis.

The case sensitivity of SQL Server is set when the server is installed and can be changed by a System Administrator. To see the setting for your server, execute this command: sp_helpsort

4.2.1.4 Delimited Identifiers

Delimited identifiers are object names enclosed in double quotes. Using delimited identifiers allows you to avoid certain restrictions on object names. You can use double quotes to delimit table, view, and column names; you cannot use them for other database objects.

Delimited identifiers can be reserved words, can begin with non-alphabetic characters, and can include characters that would not otherwise be allowed. They cannot exceed 28 bytes.

Before creating or referencing a delimited identifier, you must execute:

```
set quoted_identifier on
```

The names of database objects need not be unique in a database.

However, column names and index names must be unique within a table, and other object names must be unique for each owner within a database. Database names must be unique on SQL Server.

If you try to create a column using a name that is not unique in the table or to create another database object such as a table, a view, or a stored procedure, with a name that you have already used in the same database, SQL Server responds with an error message.

You can uniquely identify a table or column by adding other names that qualify it, that is, the database name, the owner's name, and, for a column, the table name or view name. Each of these qualifiers is separated from the next by a period:

```
database.owner.table_name.column_name
```

```
database.owner.view_name.column_name
```

The same naming syntax applies to other database objects. You can refer to any object in a similar fashion:

If the `quoted_identifier` option of the `set` command is on, you can use double quotes around individual parts of a qualified object name.

Use a separate pair of quotes for each qualifier that requires quotes.

For example, use:

```
database.owner."table_name"."column_name"
```

rather than:

```
database.owner."table_name.column_name"
```

The full naming syntax is not always allowed in create statements because you cannot create a view, procedure, rule, default, or trigger in a database other than the one you are currently in. The naming conventions are indicated in the syntax as:

```
[[database.]owner.]object_name or: [owner.]object_name
```

The default value for owner is the current user, and the default value for database is the current database. When you reference an object in SQL statements, other than create statements, without qualifying it with the database name and owner name, SQL Server first looks at all the objects you own, and then at the objects owned by the Database Owner, whose name in the database is "dbo." As long as SQL Server is given enough information to identify an object, you need not type every element of its name. Intermediate elements can be omitted and their positions indicated by periods:

database..table_name

You must include the starting element, in this case, database, particularly if you are using this syntax when creating tables. If you omit the starting element, you could, for example, create a table named ..mytable. This naming convention prevents you from performing certain actions on such a table, such as cursor updates.

When qualifying a column name and a table name in the same statement, be sure to use the same naming abbreviations for each; they are evaluated as strings and must match or an error is returned.

4.2.1.5 Identifying Remote Servers

You can execute stored procedures on a remote SQL Server, with the results from the stored procedure printed on the terminal that called the procedure. The syntax for identifying a remote server and the stored procedure is:

```
[execute] server.[database].[owner].procedure_name
```

You can omit the execute keyword when the remote procedure call is the first statement in a batch. If other SQL statements precede the remote procedure call, you must use execute or exec. You must give the server name and the stored procedure name. If you omit the database name, SQL Server looks for procedure_name in your default database. If you give the database name, you must also give the procedure owner's name, unless you own the procedure or the procedure is owned by the Database Owner.

If the server name in interfaces is in uppercase letters, you must use it in uppercase letters in the remote procedure call.

In all cases throughout this chapter, when actual examples are provided, those which reference UNIX commands will be preceded by a "%", and those that reference SQL statements will be preceded by a number and a ">" (e.g. 1>sp_help tablename).

The terms described in the following table will be used throughout this chapter.

Table 4.2.1-1. SQL Server General Definitions

Term	Definition
SQL Server	The server in the Sybase client/server architecture. SQL Server manages multiple databases and multiple users, keeps track of the actual location of data on disks, maintains mapping of logical data description to physical data storage, and maintains data and procedure caches in memory.
Client	SYBASE Open Client software located in the /tools/sybOCv(TBD) directory for SUN and HP platforms SYBASE Open Client software located in the /tools/sybOCv(TBD) directory for SGI platform
Backup Server	Similar to the dataserver, it uses a separate UNIX process to off load the cycles associated with DUMP and LOAD commands
backups	The set of UNIX files containing full database dumps, transaction log dumps, and dbcc output
dbcc	Database Consistency Checker - a utility program designed to check the logical and physical consistency of a database
sybase root directory	/usr/ecs/OPS/COTS/sybase, this is the home directory for all SYBASE software and related products and is referenced both in UNIX and in the rest of this document as \$\$SYBASE
interfaces file	Lists the names and access paths for all servers and backup servers. This file is located in the \$\$SYBASE
sa	System Administrator login, this is the superuser of the SQL Server
scripts	UNIX script programs located in \$\$SYBASE/scripts and related subdirectories {\${Secs_Home}/{mode}/custom/dbms/{subsystem}
showserver	A utility invoked at the UNIX command prompt to display active servers, located in \$\$SYBASE/install .
SQL scripts	SQL and command statements located in \$\$SYBASE/scripts and related subdirectories and /{\${Secs_Home}/{mode}/custom/dbms/{subsystem}
Server Name	The name of the database server for a specific application in different modes EX. - PDPS application database server in OPS mode EX.- Pdps_TS1 in TS1 mode EX. -pdps _TS2 in TS2 mode
Port Numbers	The port number to be utilized by the above listed servers.
Release Directory	\$\$SYBASE
SQL	Structured Query Language

4.2.2 SQL Server Directory Structure

The **sybase** directory structure is described in the following table. Subdirectories under the **scripts** can contain template files with easy to modify examples of SQL and SQL command syntax.

Table 4.2.2-1. SYBASE Directory Structure

Directory	Contains
\$SYBASE/bin	Utilities necessary to load, run, and access the server
\$SYBASE /install	Files used to start and initialize dataservers, backupserver and to record server messages (errorlogs)
\$SYBASE /lib	db-lib, ct-lib, and xa-lib client library files used by applications to gain access to the server (local to server) *Applications use automounted libraries.
\$SYBASE /scripts	Root directory for all script files executed on the server
\$SYBASE /sybase_dumps	Root directory that contains all backup subdirectories, it is recommended, but not required, that this directory be on a separate physical disk. Dumps both database and transaction logs. **Backups are stored on disk in the backup subdirectories.
backup subdirectories \$SYBASE /sybase_dumps/dumps \$SYBASE /sybase_dumps/trans \$SYBASE /sybase_dumps/dumps/logs \$SYBASE /sybase_dumps/trans/logs \$SYBASE /sybase_dumps/Week1 \$SYBASE /sybase_dumps/Week2 \$SYBASE /sybase_dumps/Week1/logs \$SYBASE /sybase_dumps/Week2/logs	A cron job is run at night to move data from the current (week1) directory to the previous (week2) directory. Then, a dump of the databases and transaction logs is executed and is stored in the current directory. All logs are written to the log directory. Files are saved using the following naming convention: dbname.dat.YYMMDDHHMM.Z - full database dumps dbname.tran.YYMMDDHHMM.Z - full transaction log dumpsdbname_backup.log. dbname_ERR.log.MMDDHHMM - Error log filesdbname_dbcc.log. MMDDHHMM
**xxdmh02 serves as a remote Backup Server	**xx are the 2 letter codes to identify a DAAC site (i.e., g0 = Goddard)

4.2.3 SQL Server Installation

SYBASE SQL Server Version (TDB) has been installed and configured by the ECS Installation Staff. Shared memory and disk resources have been allocated and configured by the System Administrator, and both the client and server portions have been set up by the DBA prior to shipment. The following table describes parameters and options used during installation.

Table 4.2.3-1. SQL Server Parameters and Options (1 of 2)

Parameters Name	Brief Explanation/Settings
Retry Count	5 seconds
Retry Delay	5 seconds
Master device	28 Mb raw partition
Master Device Location	
Backup Server Name	SYB_BACKUP

Table 4.2.3-1. SQL Server Parameters and Options (2 of 2)Ä

Parameters Name	Brief Explanation/Settings
sybserverprocs	\$\$SYBASE/devices/(MachineName)_sybserverprocs.dat, 19 Mb and on it's own device
Errorlog	\$\$SYBASE/install/mode.errorlog (mode indicates the application)
Current default language	us_english
Current default character set	iso_8859-1 (Latin-1)
Current sort order	Binary ordering, for the ISO 8859/1 or Latin-1 character set (iso_1).
Internal auditing	On
sybsecurity database size	175 Mb - Varies – depends on disk allocations
sybsecurity device	sybsecurity, positioned on a 175 Mb raw partition

The installation script files are located in the \$\$SYBASE/install directory. SQL Server installation is performed by an authorized user with the **sybinit** utility also located in the \$\$SYBASE/install directory. See your UNIX System Administrator and the SYBASE SQL Server Installation Guide.

4.3 Database Administrator Responsibilities

The following subsections detail the most common functions that a DBA will perform.

4.3.1 Startup of SQL Server

Use **startserver** to start an SQL Server and/or a Backup Server. This command can only be issued by the **Sybase** user.

Syntax: % **startserver** [-f runserverfile]

The "runserverfile" is contained in the \$\$SYBASE/install directory.

Note:

SQS server should be started after the SQL Server

4.3.2 Shutdown of SQL Server

Use **shutdown** to bring the server to a halt. This command can only be issued by the Sybase System Administrator (sa).

Syntax:1> **shutdown** [**backup_server_name**]] [with] [wait] [with nowait]

2> **go**

The "with wait" is the default option. This option brings SQL Server down gracefully.

The “with nowait” option shuts down the SQL Server immediately without waiting for currently executing statements to finish.

If you do not give a server name, shutdown shuts down the SQL Server you are using.

When you issue a shutdown command, SQL Server:

Disables logins, except for System Administrators

Performs a checkpoint in each database, flushing pages that have changed from memory to disk

Waits for currently executing SQL statements or procedures to finish

In this way shutdown minimizes the amount of work that automatic recovery must do when you restart SQL Server.

To see the names of the Backup Servers that are accessible from your SQL Server, execute

sp_helpserver. Use the value in the name column in the shutdown command. You can only shut down a Backup Server that is:

Listed in sysservers on your SQL Server, and

Listed in your local interfaces file.

Note 1:

It is recommended that "with wait" option be used. This allows executing statements to finish.

Also it is recommended that you perform a checkpoint of all database prior to shutdown.

Note 2:

SQLS server should be started after the SQL Server

4.3.3 Showing SQL Server(s)

Use **showserver** to determine whether the SQL Server(s) and/or Backup Server(s) are running.

Syntax: % **showserver**

The “**showserver**” is contained in the **\$SYBASE/install** directory

Example: UNIX processes running the various servers:

UID	PID	PPID	C	STIME	TTY	TIME	COMD
sybase	671	669	80	Apr 17	?	80:05	/usr/ecs/OPS/COTS/Sybase/bin/dataserver - d/dev/rdisk/c1t0d0s1 -g0sps06_svr
sybase	665	663	80	Apr 17	?	50:02	/usr/ecs/OPS/COTS/sybase/bin/backupserver -g0sps06_backup -e/usr/ecs/OPS

4.4 Allocation of Resources

SQL Server can make reasonable default decisions about many aspects of storage management, such as where databases, tables, and indexes are placed and how much space is allocated for each one. However, the System Administrator has ultimate control over the allocation of disk resources to SQL Server and the physical placement of databases, tables, and indexes on those resources.

4.4.1 Creating Logical Devices

A logical device is created when the UNIX System Administrator determines that new disk space is available for use by SYBASE software, databases, transaction logs, and/or backups. Either raw disk partitions or UNIX filesystem partitions can be used to create a logical device. The creation of a logical device is a mapping of physical space to a logical name and virtual device number (**vdevno**) contained in the SQL Server **master** database. The **disk init** command is used to initialize this space. After the disk initialization is complete, the space described by the physical address is available to SQL Server for storage, and a row is added to the **sysdevices** table in the **master** database.

A System Administrator initializes new database devices with the disk init command.

Disk Init does the following: Maps the specified physical disk device or operating system file to a database device name

Lists the new device in master..sysdevices

Prepares the device for database storage

Note:

Before you run disk init, see the SQL Server installation and configuration guide for your platform for information about choosing a database device and preparing it for use with SQL Server. You may want to repartition the disks on your computer to provide maximum performance for your Sybase databases.

Disk init divides the database devices into allocation units of 256 2K pages, a total of 1/2MB. In each 256-page allocation unit, the disk init command initializes the first page as the allocation page, which will contain information about the database (if any) that resides on the allocation unit.

Note:

After you run the disk init command, be sure to use dump database to dump the master database. This makes recovery easier and safer in case master is damaged. If you add a device and fail to back up master, you may be able to recover the changes with disk reinit.

Syntax: disk init

name = "device_name" ,

```
physname = "physicalname" ,  
vdevno = virtual_device_number ,  
size = number_of_blocks  
[, vstart = virtual_address ,  
  cntrltype = controller_number]
```

4.4.1.1 Example of Creating a Logical Device

A raw partition on a RAID device has been made available to SQL Server by the UNIX System Administrator. Essentially, the actual name of the raw device **c2t0d1s3** has had its ownership changed to **sybase** and its group changed to **user**.

1. In **\$SYBASE/scripts/create.devices**, DBA makes a script file from the template.

Syntax: % cd /usr/ecs/OPS/COTS/sybase/scripts/create.devices

```
% cp template.sql data_dev1.sql
```

2. Appropriate items are modified so that the script file resembles the following:

```
1> disk init
```

```
2> name = "data_dev1",
```

```
3> physname = "/dev/rdisk/c2t0d1s3",
```

```
4> vdevno = 3,
```

```
5> size = 128000
```

```
6> go
```

```
7> sp_helpdevice data_dev1
```

```
8> go
```

3. DBA runs the script from the UNIX command prompt:

Syntax: % isql -Usa -Sservername -idata_dev1.sql -odata_dev1.out

4. DBA checks the data_dev1.out file for success

4.4.2 Creating and Altering Databases

A user database is created by the DBA with a script containing the **create database** command. A database is created on one or more physical devices. Specifying the device is optional - but highly recommended. When indicating the device, you use the logical name you specified as part of a **disk init** (described above). Unlike the **disk init** command, the size of the database data and log components is specified in MB instead of 2K pages.

4.4.2.1 Example of Creating a Database

The logical device **data_dev1** has been created (as above) along with another device called **tx_log1** (for transaction logging).

1. In **\$SYBASE/scripts/create.databases** directory, DBA makes a script file from the template.

```
Syntax: % cd /usr/ecs/OPS/COTS/sybase/scripts/create.databases
        % cp template.sql userdb.sql
```

2. Appropriate items are modified so that the script file resembles the following:

```
1> create database UserDB on data_dev1 = 100 log on tx_log1 = 50 [with override]
2> go
3> sp_helpdb UserDB
4> go
```

3 DBA runs the script from the UNIX command prompt:

```
Syntax: % isql -Usa -Sservername -iuserdb.sql -ouserdb.out
```

4 DBA checks the userdb.out file for success

4.4.2.2 Example of Altering a Database

The user database **UserDB** has run out of space and it has been determined that it should be increased by 50MB.

1 In **\$SYBASE/scripts/create.databases**, DBA creates a script file containing the ALTER DATABASE command (named alter_userdb.sql)

```
Syntax: Alter database UserDB on data_dev3 = 50
```

2 DBA runs the script from the UNIX command prompt:

```
Syntax: % isql -Usa -Sservername -ialter_userdb.sql -oalter_userdb.out
```

3 DBA checks the alter_userdb.out file for success

4.4.2.3 Data Placement - Segmentation

Segments are named subsets of the database devices available to a particular SQL Server database. Segment names are used in **create table** and **create index** commands to place tables or indexes on specific database devices. Using segments allows the DBA to better control the size of database objects and may improve performance by spreading i/o more evenly across devices.

Once the database device exists and is available, the segment can be defined with the system stored procedure **sp_addsegment**.

Syntax: `sp_addsegment segname, dbname, devname`

After the segment has been defined in the current database, the **create table** or **create index** commands use the optional clause “on segment_name” to place the object on a particular segment.

Syntax: `create table table_name (column_name datatype ...) [on segment_name]
create [clustered | nonclustered] index index_name on table_name (columns)`

Use **sp_helpdb** database_name to display the segments defined for that database.

Use **sp_helpsegment** segment_name to list the objects on the segment and show the mapped devices.

4.4.2.3.1 Example of Creating a Segment

The DBA receives a request to create a segment for the storage of the DATA_INFO table indexes in the pdps_db_ops database, on a separate physical disk. Two devices **data_dev1** and **data_dev2** have already been created and are located on different physical disks.

1. In `$$SYBASE/scripts/create.segments` directory, DBA makes a script file from the template.

Syntax: `% cd /usr/ecs/OPS/COTS/sybase/scripts/create.segments
% cp template.sql segments_dev1.sql`

2. The script file is modified so that it resembles the following:

```
1> sp_addsegment seg1_dev1, pdps, data_dev1  
2> sp_addsegment seg1_dev2, pdps, data_dev2  
3> go
```

3. DBA runs the script from the UNIX command prompt:

Syntax: `%isql -Usa -Sservername -ipdps_db_ops_segments.sql \
-opdps_db_ops_segments.out`

4. DBA checks the pdps_segments.out file for success

5. When the table and indexes are created according to the instructions in section 4.4.6, the “on seg1_dev1” must be appended to the DATA_INFO.sql **create table** statement, and the “on seg1_dev2” must be appended to the DATA_INFO_indexes.sql **CREATE INDEX** statement.

Syntax: **create index** DATA_INFO_IDX on DATA_INFO (DI_ID) on SEG1_DEV2

4.5 Loading a database you have created into a different database:

Occasionally, you may want to create an exact copy of a database of your system. First, dump the existing database. Then create a database to load with this dump. The database does not have to be the same size as the original. The only requirement is that the destination database must be at least as large as the dumped database and have the same beginning fragments as the original database. This information can be obtained from saved database creation scripts, or by running the following command:

```
select segmap,'Size in MB'=size/512 from sysusages where dbid= db_id("database_name")
```

Example:

suppose your database was created with the following statement:

```
create database dbname on datadevice1 = 1000,
```

```
log on Logdevice1 = 200
```

```
go
```

```
alter device dbname on datadevice2 = 500 running:
```

```
select segmap,'Size in MB'=size/512 from sysusages
```

```
where dbid= db_id("dbname")
```

would return:segmap Size in MB

```
3 1000
```

```
4 200
```

```
3 500
```

You could create a 3GB database as follows and load your database into it (using "for load" option will shorten database load time):

```
create database newdatabase on datadevice3 = 1000 log on logdevice3 = 200
```

```
for load
```

```
go
```

```
alter database newdatabase on datadevice 3=500 for load go
```

```
alter database newdatabase on datadevice4=300 for load go
```

```
alter database newdatabase on datadevice5=1000 for load go
```

```
load database newdatabase from dbname_dump go
```

4.6 Monitoring Space Usage

4.6.1 Thresholds

Thresholds are defined on segments to provide a free space value at which a procedure is executed to provide a warning or to take remedial action.

Use **sp_addthreshold** to define your own thresholds:

sp_addthreshold database_name, segment_name, free_space, procedure_name

where free_space is the number of free pages at which the threshold procedure executes; procedure_name is the stored procedure which the threshold manager executes when the number of free pages falls below the free_space value. Please see the section on Auditing later in this chapter for an example of Thresholds.

Example of Threshold Commands mentioned above:

```
Sp_addthreshold CustomerDB, "default", 10230, CustDefaultSegWarn
```

4.7 Creating Database Objects

For special cases, creation (and modification) scripts are stored in **\$\$SYBASE/scripts/scriptname**. There should be a template for each type of object to be created.

4.7.1 Example of Creating a User Table

The DBA has received a request to create a new table in the pdps_db_ops database called **PGE_Statistics** which has three columns, pge_id, pge_statistic_type, and pge_statistic.

1. In the **\$\$SYBASE/scripts/create.db_objects** directory, DBA creates a script file from the proper template.

```
Syntax: % cd /usr/ecs/OPS/COTS/sybase/scripts/create.db_objects
```

```
% cp table_template.sql PGE_Statistics_table.sql
```

2. Appropriate items are modified so that the script file resembles the following:

```
1> create table PGE_Statistics (
```

```
2> pge_id                int,
```

```
3> pge_statistic_type int,
```

```
4> pge_statistic          float )
```

```
5> go
```

```
6> sp_help PGE_Statistic
```

```
7> go
```

3. DBA runs the script from the UNIX command prompt:

```
Syntax:      %isql -Usa -Sservername -iPGE_Statistics_table.sql \  
-oPGE_Statistics_table.out
```

4. DBA checks the PGE_Statistics_table.out file for success

Other objects are created in like manner but are not included here due to space considerations.

4.8 Creating and Managing Logins and Roles

Earlier versions of SQL Server administrative responsibilities needed to be executed by and individual logged in –literally- as sa. Now specific user logins can be assigned components of administrative responsibility, enabling you to track and audit administrative activities.

The three roles are sa_role (systems administrator) for administrative tasks, sso_role(site security officer) for security tasks, and oper_rol (operator) for backup and recovery tasks.

In order to connect to a SQL Server a login must be created by the System Administrator or a system security officer. Login details are stored in the syslogins table in the **master** database.

The system stored procedure **sp_addlogin** adds new login names to the server but does not grant access to any user database.

```
Syntax: sp_addlogin login_name, password, [,default database ,language, fullname]
```

In order to gain access to a database, the System Administrator, system security officer, of the specific database owner must “add” the user with the **sp_adduser** system stored procedure.

```
Syntax:      1> sp_adduserlogin_name [ username, group_name]  
2> go
```

4.8.1 Example of Creating a Login and Granting Database Access

The DBA has received a request to authorize John Q. Public to the pdps_db_ops database.

***It is a good practice to have a default_db, when you create a user account.**

1. In the `$$SYBASE/scripts/create.users` directory, DBA creates a script file containing the `sp_addlogin` command (named `public.sql`)

Syntax: `% cd /usr/ecs/OPS/COTS/sybase/scripts/create.users`
 `% cp template.sql public.sql`

2. DBA modifies appropriate fields so that the script resembles the following:

1> `sp_addlogin jpublic,jpublic, default_db`

2> `go`

3> `use pdps (OPS mode)` 4> `go`

5> `sp_adduser jpublic`

6> `go`

7> `sp_helpuser`

8> `go`

3. DBA runs the script from the UNIX command prompt:

Syntax: `% isql -Usa -Sservername - public.sql -opublic.out`

4. DBA checks the `public.out` file for success

4.9 Permissions

Permissions are used to control access within a database. The DBA uses the **grant** and **revoke** statements to accomplish this. There are two types of permissions within a database, **Object** and **Command**. In general, **Object** privileges control select, insert, update, delete, and execute permissions on tables, views, and stored procedures. **Command** permissions control access to the **create** statements for databases, defaults, procedures, rules, tables, and views.

The syntax for the **grant** and **revoke** statements are quite similar:

grant {all [privileges] | command_list }

to { public | name_list | role_name }

revoke {all [privileges] | command_list }

from { public | name_list | role_name }

4.9.1 Example of Granting Privileges to a Specific User

The DBA receives a request that John Q. Public should be able to read the DATA_INFO table and read and update the SUBSCRIPTION_NOTIFICATION TABLE.

```
Syntax:      1> grant select on DATA_INFO to jpublic
              2> grant select, update on SUBSCRIPTION_NOTIFICATION to jpublic
go
```

Note: It is recommended that the DBA store these command in a “.sql” file in the **\$SYBASE/scripts/create.db_objects** directory, along with their results.

4.10 Backup and Recovery

Table 4.10-1. Backup and Recovery Definitions

Term	Definition
Backup Script Components	Located in the \$SYBASE directory, they include: sybasedump, dmpdb_trns, copy_daily_dumps_to_week1, copy_daily_dumps_to_week2
Backup files	Defined in Table 4.2-2, the location of these files has been determined during server setup
Backup Statements	Generated from the sql in sybasedump these include calls to dbcc, Dump Database, and Dump Transaction commands
Backup Subdirectory	The only directory level underneath of the Backup Directory, defined in Table 4.2-2.
Backup Summary	An extraction of the successful Dump messages along with any errors generated by the Backup Statements stored in the Backup Subdirectory.

4.10.1 Automatic Backups

The following are the list of all procedures and scripts files that are currently being used for Sybase backups. There are cron jobs running at all sybase **servers** that have SQL server installed. All dump files are currently written to LOCAL machine. The site DBA is responsible for configuring the backup dump to the REMOTE sybase directory.

To check if the crontab is up and running, enter:

```
> crontab -l
```

Example of the output:

```
019 * * 1-6 /usr/ecs/OPS/CUSTOM/dbms/COM/DBAdmin/EcCoDbSyb_DumpDb
012 * * 1-6 /usr/ecs/OPS/CUSTOM/dbms/COM/DBAdmin/EcCoDbSyb_DumpTran
021 * * 1-5 /usr/ecs/OPS/CUSTOM/dbms/COM/DBAdmin/EcCoDbSyb_CkErrorLog
```

NOTE:

If the crontab is not running enter:

```
> crontab /usr/ecs/OPS/COTS/sybase/run_sybcron
```

The following files will be installed by EcCoAssist to the /usr/ecs/OPS/CUSTOM/dbms/COM/DBAdmin directory:

EcCoDbSyb_README
EcCoDbSyb_DumpDb
EcCoDbSyb_DrumpTran
EcCoDbSyb_DbStat
EcCoDbSyb_SedFile
EcCoDbSyb_DboMail
EcCoDbSyb_SetupKsh
EcCoDbSyb_CkErrorLog
EcCoDbSyb_tran_log.awk

SCRIPTS

EcCoDbSyb_SetupKsh

EcCoDbSyb_DumpDb

EcCoDbSyb_DumpTran

EcCoDbSyb_SedFile

EcCoDbSyb_DboMail

EcCoDbSyb_DbStat

DESCRIPTIONS

This file contains the SYBASE and DSQUERY (server) environment setup. This file is call by EcCoDbSyb_DumpDb, EcCoDbSyb_DrumpTran, and EcCoDbSyb_CkErrorLog scripts. This script contains the code to dump the databases. First, it checks for any DBCC error on the master database, if there is any error on the master, the script sends an email to the DBA and exit the program. If the master database dump was successfull, then the rest of the databases are dumped. Each database has a DBCC check, if there is any error on the database then the database is NOT dumped and an email is send to the DBA. At the end, an status email is send, providing all the database names that were sucefully dumped

This script contains the code to dump the transaction logs. This dumps the transaction logs for each database, it check the error log file, if the error Msg is 4207 or 4221 it will do a dump of the database firt, then it will do the trasaction dump. If there is any other error Msg then the transaction dump will fail and email will be send. At the end, an status of the transaction log dumps is email to the DBA

This file contains all the database that don't need to be dump (i.e., temp, model, etc.)

This file contains the email list of all the DBA's.

This script updates the index table of a database. This script is called from EcCoDbSyb_DumpDb after each successfully database dump.

(Continued)

EcCoDbSyb_CkErrorLog This script checks for specific database error messages from the Sybase Error Log File every hour and emails the error messages to the DBA's in the EcCoDbSyb_DboMailfile.

EcCoDbSyb_tran_log.awk This script matches the current hour with the hour the error messages were enenerated in the Error Log File. If errors found, the messages are saved in a mailfile and sent to DBA's.

THE FOLLOWING FILES MUST BE MODIFIED BEFORE RUNNING ANY OF THE ABOVE SCRIPTS:

EcCoDbSyb_SetupKsh Make user you have the SYBASE files under /usr/ecs/OPS/COTS/sybase

EcCoDbSyb_SedFile Add any other database that might not need to be backed up. The databases that are listed in this file do not need to be backed up.

EcCoDbSyb_DboMail Add/delete the email of the DBA and any other email that might need to be added/deleted. All the errors and status will be send to them.

run_sybcron The following is an example on the crontab file that should be run by a sybase user. The first one will run the EcCoDbSyb_DumpDb script that dumps the databases at midnight from Monday to Saturday. The second one, EcCoDbSyb_DumpTran script that dumps the transaction logs will run tree times a day, 10AM, 1PM and 4PM from Monday to Saturday. The Third one, EcCoDbSyb_CkErrorLog that check the SYBASE error log file will run every hour from Monday to Saturday.

```
0 0 * * 1-6 /usr/ecs/OPS/CUSTOM/dbms/COM/DBAdmin/EcCoDbSyb_DumpDb
```

```
0 10,13,16 * * 1-6 /usr/ecs/OPS/CUSTOM/dbms/COM/DBAdmin/EcCoDbSyb_DumpTran
```

```
0 * * * 1-6 /usr/ecs/OPS/CUSTOM/dbms/COM/DBAdmin/EcCoDbSyb_CkErrorLog
```

NOTE: Make sure there is an OPS mode directory with all script files.

All these scripts reside in “/usr/ecs/OPS/CUSTOM/dbms/COM/DBAdmin” directory. The assigned site DBA will be responsible for maintaining, modifying and applying necessary changes that are applicable to their site as for (security, and backup schedule).

SQL Server backups are performed nightly by a **cron** job which runs the **run_sybcron** program located in the **\$SYBASE/** directory. The following table of definitions will be used throughout the rest of this section.

Table 4.10.1-1. Automatic Backup Components

Component Name	Function(s)
run_sybcron	File added with the crontab -e command, contains several executable cron commands. Example: 00 19 * * 1-6 /data1/COTS/sybase/sybasedump
EcCoDbSyb_DumpDb	Controlling script that performs the following functions: run isql to create the Backup Statements run isql to execute the Backup Statements record the results of the Backup Statements in Backup Files copy the Backup Files to the Backup Subdirectory create the Backup Summary “greps” successful Dump statements along with any errors generated, sends e-mail to the DBA and writes them to the backup_summary file
sp	SQL Server password file - contains password for backup role

No intervention in the Automatic Backup Process is required by the DBA, though periodic checks of the Backup Subdirectories are recommended.

4.10.2 Manual Backups

Manual backups can be performed at any time by the System Administrator and are recommended for the following situations:

Any change to the **master** database - this includes new logins, devices, and databases

Any major change to user databases - a large ingest or deletion of data, definition of indexes

Other mission-critical activities - as defined by the DAAC Operations Supervisor.

Both the **dump database** and **dump transaction** command processing are off-loaded to the backup server, and will not affect normal operations of the database. These commands are performed by the System Administrator on appropriate databases as follows:

Syntax:

```
1> dump database master to
"/usr/ecs/OPS/COTS/sybase/sybase_dumps/dumps/dbname.dat.MMDDHHMM."
go
```

After dumping the database, compress the dump file by executing:

```
%compress
/usr/ecs/OPS/COTS/sybase/sybase_dumps/dumps/dbname.dat.MMDDHHMM.
```


Syntax:

```
dump transaction pdps_db_ops to  
"/usr/ecs/OPS/COTS/sybase/sybase_dumps/trans/pdps_OPS.tran.YYMMDDHHMM"  
  
go
```

4.10.3 Manual Recovery

Manual recovery of a user database is performed by the System Administrator by the use of the **load database** and **load transaction** commands. For issues concerning the **master** database, please consult your System Administrator's Guide for assistance. It is recommended that any user database to be recovered be dropped and created with the **for load** option. The **databasename.sql** along with any **alter.databasename.sql** scripts can be , combined into one script which will re-create the user database with the **for load** option. This will insure the success of the **load database** and **load transaction** commands.

4.10.4 The BulkCopy Utility

The **bcp** utility is located in the **\$SYBASE/bin** directory and is designed to copy data to and from SQL Server databases to operating system files.

4.10.4.1 Requirements for Using bcp

In general, you must supply the following information for transferring data to and from SQL Server:

Name of the database and table

Name of the operating system file

Direction of the transfer (in or out)

In order to use **bcp**, you must have a SQL Server account and the appropriate permissions on the database tables and operating system files that you will use. To copy data **into** a table, you must have **insert** permission on that table. To copy data **out** to an operating system file, you must have select permission on the following tables:

The table being copied

sysobjects

syscolumns

sysindexes

bcp Syntax

```
bcp [[database_name].owner.]table_name {in | out} datafile [-e errfile] [-n] [-c]
    [-t field_terminator] [-r row_terminator] [-U username] [-S server]
```

4.10.4.2 Example of User Database Recovery

The database **UserDB** was created using the following script excerpt: (stored in home/scripts/create.databases/userdb.sql)

```
create database UserDB on data_dev1 = 100 log on tx_log1 = 50 [with override]
```

and was modified using the following script excerpt: (home/scripts/create.databases/alteruserdb.sql)

```
Alter database UserDB on data_dev1=50
```

For the purposes of this example, the full database backup and transaction log dumps were successful and located in /usr/ecs/OPS/COTS/UserDB.dat and UserDB_tx.dat

1. In the **\$SYBASE/scripts/create.databases** directory, DBA makes a script file from the template.

```
Syntax: % cd /usr/ecs/OPS/COTS/sybase/scripts/create.databases
```

```
    % cp template.sql userdb_for_load.sql
```

2. Appropriate items are modified so that the script file resembles the following:

```
1> create database UserDB on data_dev2=100 log on tx_log2=50 for load
```

```
2> go
```

```
3> alter database UserDB on data_dev3=50
```

```
4> go
```

3. DBA saves the script in **\$SYBASE/scripts/create.databases/userdb_for_load.sql**

4. DBA runs the script from the UNIX command prompt.

```
Syntax: % isql -Usa -Sservername -iuserdb_for_load.sql -ouserdb_for_load.out
```

5. DBA checks the userdb_for_load.out file for success

6. DBA loads the database from the full backup.

Syntax: 1> load database UserDB from

```
“/usr/ecs/OPS/COTS/sybase/sybase_dumps/week1/dbname.dat.MMDDHHMM”
```

```
go
```

7. DBA loads the transaction file from the transaction file dump.

Syntax: 1> load transaction UserDB from

```
“/usr/ecs/OPS/COTS/sybase/sybase_dumps/week1/dbname.tran.MMDDHHMM”
```

```
3> go
```

4.11 Database Performance and Tuning

Once your application is up and running, the DBA monitors its performance, and may want to customize and fine-tune it. Use the following software tools provided by SQL Server:

Setting query processing options with the **set** command

Setting database options with **sp_dboption**

Monitoring SQL Server activity with **sp_monitor**

Using **update statistics** to ensure that SQL Server makes the best use of existing indexes

Changing system variables using **sp_configure** and the **reconfigure** command

Placing objects on segments to spread i/o, improve throughput, etc. as described in section 4.4.4

For a complete discussion of issues related to SQL Server performance and tuning, refer to your SYBASE SQL Server Performance and Tuning.

4.12 Installation of the Applications

DBA should have physical devices configured before installing either autosys or remedy. Both applications use Sybase as their database.

4.12.1 Installation of the Application Database

The installation of the application databases has been automated using ECS Assistant. The application databases are created using the DbBuild script which can only be invoked through ECS Assistant or the Command Line. Scripts that ECS Assistant invokes are:

DbBuild - Create new empty database and loads with initial data

DbPatch - Upgrade to new schema while retaining existing data.

4.12.2 The AUTOSYS Application and other Configuration Issues

The AUTOSYS application works in tandem with PDPS/DPSs to schedule the jobs that run on Science Processor. Autosys installation is performed in /usr/ecs/OPS/COTS by the auto install program located in the autosys/install directory. The results of the installation are stored in an autosys_install.scr file located in the AUTOSYS home directory (/use/ecs/OPS/COTS/autosys). For pdps to run properly with AUTOSYS, the following activities are completed:

A user is defined named **autosys**

autosys user is added to the pdps database (OPS mode)

The autosys server is added to the syssservers table with **sp_addserver**

The server is added to the syssservers table on the AUTOSYS server with **sp_addserver**

4.12.3 Spatial Query Server (SQS)

SQS is a multi-threaded, Sybase Open Query database engine, which is required by the Science Data Subsystem (SDSRV). This product allows definition of spatial data types, spatial operators, and spatial indexing. SQS communicates with Sybase SQL Server to process SDSRV requests to push and pull metadata. SDSRV database server resides on an SGI machine. SQS also, reside on the same machine as SDSRV Sybase SQL Server.

Named X1acg01 - where X is the DAAC specific identifying character.

pathname - /usr/ecs/OPS/COTS/sqs222/bin/sqsserver

Should have one dedicated CPU per instance running. Defaults to one instance now, but may require additional instances later for performance reasons.

Requires one entry in the Sybase "interfaces" file per instance of the SQS server to be run.

Consult startup scripts in /etc/init.d/sybase and /etc/init.d/sqs_222

SQS requires a Sybase login with SA or sa_role and associated password to start. SQS environment variables requirements:

SYBASE = Location of the Sybase home directory. Example: /tools/sybOCv(TBD)

PATH = Must include in this order - /usr/bin; /usr/sbin; \$SYBASE/bin

DSQUERY = Name of SQL Server to which to connect. From the \$SYBASE/intefaces file.
Examples - g0acg01 _srvr

DSLISTEN = Name of SQS server to use. Example - g0acg01_ srvr

SQSUSER = Name of the user (SA or sa_role) for system connection.

SQSPASSWORD = Password for the system connection login

The SQS startup script requires the following information:

SQSHOME = location of sqsserver binaries.

The following is a list of options that can be imbedded in the startup script, these options are beneficial, but they are not required.

4.12.3.1 SQS STARTUP OPTIONS:

-e path of the SQS server logfile. Example /usr/ecs/OPS/COTS/sqs222/sqs/bin/sqs_222.log

-u number of concurrent SQS connections. Recommend minimum of 125. Example -u 125

Usually started with a delay, after the SQL Server is started. This delay be sufficient for the SQL server to recover and come-up.

```
$SQSHOME/bin/sqsserver -e $SQSHOME/sqs_222.log -u $USER &
```

SQS has dependencies on Sybase, such as:

Sybase must be running prior to starting SQS

SQS user id that starts SQS, which is different from the application user ID must have admin privileges

SQS opens a connection to Sybase's because it writes to the Sybase System tables

SQS server thread runs under the userid sa. In order to avoid confusion when monitoring this thread, it is best to:

create a separate login and userid specifically to monitor SQS

grant sa_role authority to the userid created to monitor SQS

```
EXAMPLE: 1> sp_adduser sqs_mon
```

```
grant sa_role to sqs_mon
```

```
go
```

4.13 Configuration of XLV partitions for Sybase partitions .

In order to successfully convert the raw partitions into XLV, the following steps are to be strictly adhered to.

BACKUP all databases.

Bcp the syslogins table from master.

```
bcp master..syslogins out file.out -Usa -P -c
```

```
bcp master..sysloginroles out file.out -Usa -P -c
```

Save all information regarding the sysdevices and database options by executing the following command:

sp_helpdb db_name -- each database

sp_helpdevice

sp_helpdb

Shutdown the backup and sql servers.

After the partitions have been updated to XLV, chown the sybase disks to sybase:users. Also, change the /etc/init.d/sybase script.

Cleanup some old sybase files from \$SYBASE/devices and \$SYBASE/install.

Execute sybinit to initialize a NEW sql server/backup (same server name).

Initialize sybssystemprocs database, as well.

Change sa password. (sp_password NULL,newpass)

Up the number of devices. (sp_configure "number of devices",20)

alter the database for master and tempdb.

Change sysservers to name the server, as well as the new backup server.

sp_addserver nodename_srvr,local,nodename_srvr

sp_addserver SYB_BACKUP,local,nodename_backup

execute scripts to initialize the devices and to create databases (for load).

load database dumps. Verify that database data and log are not on same device. If on same device, update sysusages by deleting the log that uses the data device and then update the size of the data device to the full size (plus the one used by the log).

uncompress the load file, manually.

online database.

BCP in the syslogins table.

BCP in the sysloginroles table.

Change the DB dbo.

Reset all DB options.

Dump all databases.

4.13.1 Backout Procedure

This is an addendum to the technical directive that was previously sent out, dated September 28,1999. The backout procedure is executed only if it is necessary to restore the old SQL server

because of a XLV conversion failure. Please give me a call if you have any questions in following the procedures.

After restoring the sybase raw disk partitions from XLV partitions (normally done by the System Administrators), change the ownership of the devices to sybase:user. This step has to be executed by someone with root access.

Login as sybase, and cd to the \$SYBASE/install directory.

Execute sybinit and configure a new sql server. Use the same configurations that were used from original sql server, ie. Port numbers.

Once you have configured a new server, get in to isql and execute the following:

change sa password

alter database master to same size as before

modify the sysservers with the sql and backup names

shutdown sql server and bring it up in single user mode (-m option)

uncompress the master database dump (do not load at this time)

cd to /usr/ecs/OPS/COTS/sybase/devices and copy the old sybssystemprocs.dat to the new one

load the dump of the master database (after the load, it would automatically shut down the sql server, so, start it up as normal and not as single user)

Now, at this point, all your databases should recover. If not, your databases would be marked as suspect. Then, check your devices and load each database from the dumps. Just follow the following steps:

Check all the devices and make sure that they do exist

Drop the databases using dbcc repair (dbname,dropdb) option

Re-create the databases with a "for load" option

Load each of the databases and do an online command after

Verify that your db options were set properly, as well as all the users on each database

Once, everything is back to its original state, do a complete backup of all your databases!

This completes the backout process.

4.14 Passwords Security

Security has become a sensitive issue throughout the IT Industry. The ECS program is also concern about security and the risks associated with security. As a result the following directive is issued to all DAACs.

All System Administrators and Database Administrators at the sites are responsible for reasonable security measures when installing ECS custom software. This means:

Changing the permissions of online secure files to the minimum level required .

Backing up secure file(s) to removable media (floppy or tape) and removal of secure files immediately after installation is complete.

1. The media should then be kept in a secure location.
- 2.

The following file is affected as result of this requirement on the ECS program.

- A. /usr/ecs/<MODE>/CUSTOM/dbms/<SUBSYSTEM>/Ec<server>SybaseLogins.sql
- B. Set permissions to 711 (user read, write, execute, group and other read only)

Figures 4.14-1 and 4.14-2 are the Technical Directives issued by the Director of Systems Engineering.

Raytheon
Systems

ECS Project
Engineering Technical Directive DRAFT

No. 98-XXX

Subject: Ftp account password distribution
The following directive is issued to all DAACS and labs.

January 15, 1999

Issue: Ftp accounts are required for ECS custom software to function. Accounts and passwords have been distributed together via public means (such as electronic mail) that presents an unacceptable security risk.

Fix: When communicating sensitive information such as accounts and passwords, do not put them together in the same document.

Testing: N/A

Implementation: For distribution of account information when it is not hand carried:

1. Send the account information in one document.
2. Send the password information in a different document in inverted order (the first password entry is matched to the last account entry).

NOTE: It is not required but it is recommended to encrypt ftp account information using the UNICrypt command when sending via electronic means. If crypt is used, the password used should be contained in a third document.

Point of Contact:

Approved By: M. McBride
Director, Systems Engineering

Reference CCR: 98-XXXX

-----End of Directive-----

Figure 4.14-1. Technical Directive

The following directive is issued to all DAACS and labs.

Issue: System verification testing has revealed that passwords are being written in clear text to log files.

Implementation:

1. This practice presents an unacceptable security risk to ECS.
2. Names of system accounts may be written to logs. However, logs that are so written must have file permissions on the log file changed to 770 with the cm<MODE> account being the owner and cm<MODE> group being the group. If logs are retained on the host, they must be encrypted using the UNIX crypt command and a locally agreed upon password. One such password per location is acceptable but the password may not be kept in clear text on any system.

Point of Contact: Byron Peters, Chair, TSIWG, email – bpeters@eos.hitc.com,
phone 301/883-4077

Approved By: M. McBride
Director, Systems Engineering

Reference CCR: 98-XXXX

-----End of Directive-----

—

Figure 4.14-2. Technical Directive

4.15 Database NCR/TroubleTicket WorkArounds

4.15.1 OPS:5A.03:EGS-10:No graceful way of stopping MODAPS Ingest

Ticket-Id : SMC000000001859

Unique-Identifier : EDC000000003826

Long-Description : In order to support periodical Sybase backups along with any other planned system shutdown, OPS needs a procedure for gracefully shutting down MODAPS ingest that doesn't cause us to lose any data.

Problem Type : Software

Related CCR : NCR 25302

Resolution Log (End User Sees) :

Short Description : OPS:5A.03:EGS-10:No graceful way of stopping MODAPS Ingest

Software Information : Create

Software Resource :

Submitter Home DAAC : EDC

Submitter ID : bbates

Subject: Ingest shutdown

Author: **Bryn Ardanuy at 11-ECS-2**

Date: 1/13/00 2:47 PM

Cheryl,

In order to shut down Ingest gracefully, first the front ends needs to be shut down - Auto and Polling. And also, don't start any new media ingests from the GUI. Then once the requests have all completed, the Request Manager and Granule Servers can be shut down.

If there is not enough time to do a graceful shutdown, then all of the Ingest servers can be brought down. When they are warm started, the requests which were active before the shutdown, should restart and go to completion.

4.15.2 PLS: PLS should not submit more than 1 subscription for one ESDT

NCR ID: ECSed24368 Status: ASSIGNED-IMPLEMENT Submitted: 991007

NCR Class: OPERATIONS Project: OPS_Documentation Enclosures: 7

NCR TITLE...

PLS: PLS should not submit more than 1 subscription for one ESDT

PROBLEM INFORMATION...

Build Name[*]: Drop 5A.03

Test Site[*]: GSFC DAAC

Detection Method[*]: Acceptance Test

Detected-In-Phase[*]: Integration

Test Case ID:

Machine Name:

Severity (1=Showstopper)[*]: 2

Mission-Criticality (Admin Use Only): 0

Mode [*]: OPS

Trouble Ticket:

DAAC Trouble Ticket:

ANALYSIS INFORMATION...

Evaluate Engineer: xihaihu

Assigned To: rodney

Analysis Due Date (yymmdd):

COST ANALYSIS INFORMATION...

Cost[*]: MEDIUM

Estimated Fix Time(hrs): 20

Estimated Fix Date(yymmdd): 991015

Workaround Available? Y

TO BE FIXED INFORMATION...

SUBMITTER INFORMATION...

Submitter: xihaihu

Problem type[*]: source code

Recommended change[*]: source code

Implement Due Date (yymmdd):

Page 1/2

NCR Class: OPERATIONS

Project: OPS_Documentation

Forwarded 991209

FORWARDING INFORMATION...

Old class: OPERATIONS

Old project: OPS_PLS

Forwarded by: Shiela Barriere

Page 2/2

***** **Problem** *****

Please describe the problem you are experiencing below, including what you did, what you expected to happen, and what actually happened:

During MOSSIII test at GSFC, it was found SubMgr has multiple subscriptions on insert events for one ESDT. This force SubMgr to process one granule multiple times which slows down the system significantly.

***** **Analysis** *****

Please describe your Analysis:

When it comes to subscribe to an insert event for a certain ESDT for SubMgr, PRE first look up PDPS DB, where a subscription ID is stored if the subscription has been placed previously. If a subscription ID is found, PRE will use it to confirm its validity with subscription server, if it gets confirmed, it will not submit the subscription again. However, if PDPS DB gets reset, the subscription ID is lost from PDPS DB, and PRE will submit subscription without checking.

We need to prevent this from happening by checking existing subscriptions in subscription server database based on ESDT only (because we don't have the subscription ID).

Based on conversation with Dawei, subscription server

does not have existing interface to check subscription based on ESDT and userID. CSS needs to add interface in order to make this work.

***** **Workaround** *****

Please describe the workaround to the problem:

Removed extra subscriptions for SubMgr using subscription server GUI.

***** **Op Procedure (Added 991115 by xihaihu)** *****

The operational procedure to correctly "reset" PDPS database is:

"Whenever PDPS database is reset(not including database cleanup by running EcPIDbClean script), the operator is also responsible to remove all the PLS subscriptions in CSS subscription server database(subscriber ID is SubsMgr). This can be done through running "EcSbSubServerGUI".

NOTE: AFTER PDPS DATABASE IS RESET, AND THE ABOVE PROCEDURE IS FOLLOWED, NO SUBSCRIPTION NOTIFICATION WILL COME THROUGH FOR EXISTING JOBS IN THE NEWLY LOADED DATABASE. ONLY NEW JOBS GENERATED BY PRE WILL WORK NORMALLY REGARDING SUBSCRIPTIONS."

By following this procedure, the problem described in this NCR will not happen.

***** **Resolution** *****

Please describe your resolution to this problem:

Document the enclosed "Op Procedure" for PDPS database reset.

***** **Previous Merge Build IDs** *****

Please enter any related Merge Build ID(s) information:

***** Back to R (Added 991209 by sbarrier) *****

The NCR Board moved this back to R at the T scrub on 12/9/99 so that the documentation aspects can be addressed.

***** History *****

xddts 991007 123558 Submitted to OPS_PLS by xihaihu
xddts 991007 123725 Enclosure "Problem" added by xihaihu
xddts 991007 123732 N -> A (Assign-Eval to xihaihu) by xihaihu
xddts 991007 123831 Enclosure "Analysis" added by xihaihu
xddts 991007 123853 Enclosure "Workaround" added by xihaihu
xddts 991007 123853 A -> B (Cost-Analyzed) by xihaihu
xddts 991007 124537 enclosure "Analysis" edited by xihaihu
xddts 991007 124548 B -> R (Assign-Implement) by xihaihu
xddts 991007 130622 enclosure "Analysis" edited by xihaihu
xddts 991115 134030 Enclosure "Op Procedure" added by xihaihu
xddts 991116 095822 enclosure "Op Procedure" edited by xihaihu
xddts 991116 113401 Enclosure Resolution added by xihaihu
xddts 991116 113404 Enclosure Previous Merge Build IDs added by xihaihu
xddts 991116 113404 R -> M (Merged) by xihaihu
xddts 991116 113408 Fields modified by xihaihu
xddts 991116 113436 Fields modified by xihaihu
xddts 991116 113525 enclosure "Resolution" edited by xihaihu
xddts 991116 113536 M -> T (In-Test) by xihaihu
xddts 991209 112542 Forwarded from OPS_PLS to OPS_Documentation by sbarrier
xddts 991209 112550 T -> R (Assign-Implement) by sbarrier
xddts 991209 112554 Fields modified by sbarrier
xddts 991209 112638 Enclosure "Back to R" added by sbarrier

Bryn

4.15.3 Sybase BACKUP SCRIPTS

NCR ID: ECSed22290 Status: ASSIGNED-IMPLEMENT Submitted: 990421
NCR Class: OPERATIONS Project: OPS_DBDM Enclosures: 4

NCR TITLE...

Sybase BACKUP SCRIPTS - TO BE FORWARDED TO

PROBLEM INFORMATION...

Build Name[*]: Drop 4PY

Test Site[*]: EDC DAAC

Detection Method[*]: Customer Use

Detected-In-Phase[*]: DAAC Activity

Test Case ID:

Machine Name:

Severity (1=Showstopper)[*]: 3

Mission-Criticality (Admin Use Only): 0

ANALYSIS INFORMATION...

Evaluate Engineer: mmuganda

Assigned To: hcolglaz

Analysis Due Date (yymmdd):

COST ANALYSIS INFORMATION...

Cost[*]: LOW

Estimated Fix Time(hrs): 40

Estimated Fix Date(yymmdd): 990831

DDM will work with EDC and all DAACs to establish a maintenance window.

Until maintenance window is established. DAAC dba should manually execute backup scripts for any database where error log shows that backup chron job failed.

***** Workaround (Modified 990614 by gsloan) *****

Please describe the workaround to the problem:

EDC DBA should manually execute backup script for and SQL server were error log indicates that backup chron job aborted.

***** Unacceptable workaround (Added 000121 by rockvam) *****

EDC DAAC management has found this workaround to be not acceptable as it requires 3 4-hour down times per week.

John Daucsavage
EDC 1/21/00
Per G.Sloan

***** History *****

bugs 990317 000000 Submitted by Remedy via ddts@eos.hitc.com
xdds 990504 122219 N -> A (Assign-Eval to mmuganda) by mmuganda
xdds 990608 182236 Enclosure "Analysis" added by mmuganda
xdds 990608 182316 Enclosure "Workaround" added by mmuganda
xdds 990608 182316 A -> B (Cost-Analyzed) by mmuganda
xdds 990608 182353 B -> R (Assign-Implement) by mmuganda
batchbug 990614 141518 Fields modified by gsloan
batchbug 990614 141518 Enclosure "Workaround" modified by gsloan
batchbug 000121 161514 Enclosure "Unacceptable workaround" added by rockvam

4.16 ECS Sybase Replication Server Administration Overview

Sybase Replication Server will be used for the ECS Project starting in release 6A. Implementation of Replication Server for Earth Observing System Distributed Information System (EOSDIS) Core System (ECS) will require the support of the Management Subsystem (MSS). The deployment of the Sybase Replication software and its support tools that distributes data across distributed active archive center (DAAC)s imposes additional operational requirements beyond original concept of a stand-alone DAAC operations. This new concept will

allow all science users to register only once at their specified Home-DAAC and be able to request data from all DAAC sites.

In release 6A Sybase Replication Server's most basic model "primary copy model" be implemented. In this model, database transactions are replicated from the primary database (located at the System Monitoring Center) to a replicate database via one or more replication servers. The model assumes 'ownership' of the data by the primary database. This means, the data can only be updated by clients (local DAACs) connected to the primary database and that clients connected to the replicate database have read-only access to the data.

The transactions are continuously replicated asynchronously from the primary to the replicate database. Replication is transparent to client applications that submit database transactions to the primary database. However, this feature creates a latent period (the time it takes to propagate the transaction across the network) during which data in the primary and replicate databases are inconsistent with each other. Client programs using these databases must account for this latency.

Sybase Replication Server implements this model using replication definitions for tables at the primary database and subscriptions for tables at the replicate database. The replication definitions specify the location of the primary data while the subscription specifies the location of the replicate data. The replication definition and subscriptions are specified at the table or stored procedure level. (Only table replication is implemented for the release 6A) Replication does not require replicating all tables in a database.

The primary copy model can be viewed as a building block to create other models. The model attempts to prevent data inconsistencies that would be created by updating and replicating copies of the same data in two databases simultaneously. The model stipulates that inserts, updates, and deletes to the data can only occur at the primary database, while select statements may occur at either the primary or the replicate database. The model assumes the enforcement of data ownership using custom developed database triggers, client code, or operational procedures.

The deployment of software that distributes data across distributed active archive centers (DAAC (s)) imposes additional operational requirements beyond stand-alone DAAC operations. These enterprise level requirements conflict with the requirements for autonomous DAAC operations in two major areas: 1) capabilities that rely on database replication will be temporarily disabled between DAACs if the databases and/or software are at different schema/drop levels; 2) administration of replicated databases requires coordination between DAACs.

This document focuses on the operations and administration of a replication system in a multi-site configuration by examining several operation scenarios involved in replication software installation and Replication Server administration. Although Sybase Replication Server supports same-site replication for warm-standby or load balancing needs, this document will focus exclusively on the issues involved in administering Sybase Replication Server for cross-site data distribution.

4.16.1 Cross DAAC Primary Copy Model Components

Figure 4.16.1-1 illustrates the components used in a primary copy model that uses two replication servers. This example is for illustrative purposes only. The ECS implementation will be described in the next section.

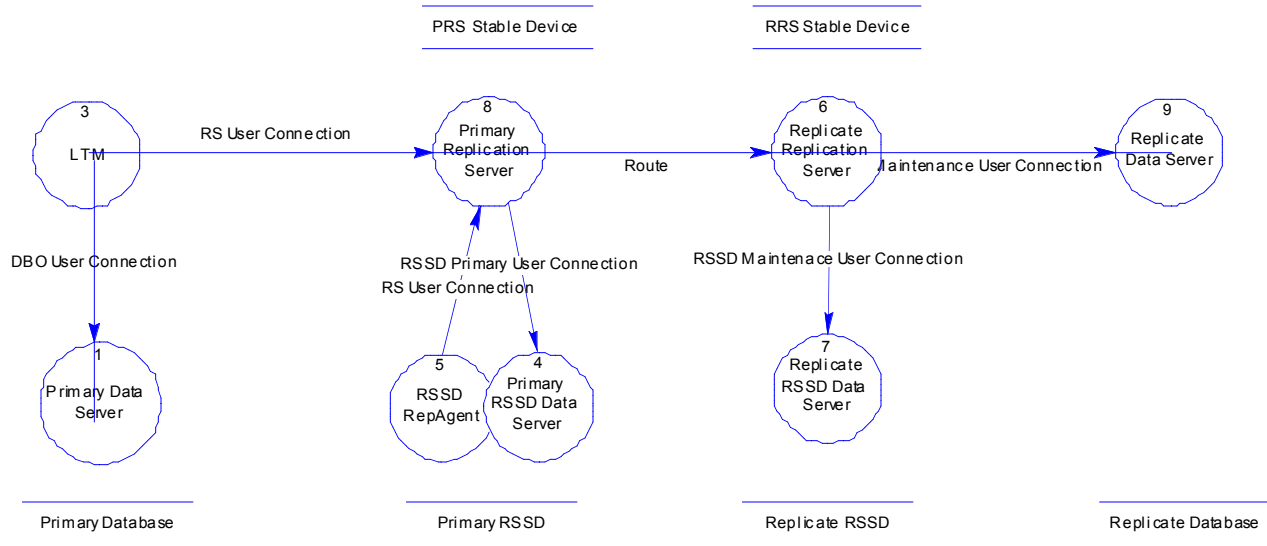


Figure 4.16.1-1. Replication Server Components

Components:

DAAC Component	Description
Primary Data Server	The primary data server is the Sybase SQL server that maintains the primary copy of data that is being replicated.
Primary Database	Contains the copy of data that can be updated by application programs.
LTM	The log transfer manager (LTM) is a Sybase Open Server application that transfers replicate database transactions to a primary replication server and moves the secondary truncation point in the primary database transaction log. The LTM connects to the primary data server as the primary database DBO and to the primary replication server as specified when the primary database is added to the domain.
Primary Replication Server	The primary replication server (PRS) is responsible for forwarding replicate database transactions to the replicate database. The PRS maintains connections to the replicate replication servers (route) and maintains a connection to its database, the Replication Server System Database (RSSD).
Primary RSSD Data Server	The primary RSSD data server maintains the primary RSSD.

Components: (Continued)

RSSD RepAgent	The RSSD RepAgent is a thread in the primary RSSD data server that transfers replicate RSSD database transactions to the PRS. The RSSD RepAgent connects to the PRS as specified when the PRS is added to the domain.
Primary RSSD Database	The RSSD houses the information required by the replication servers to operate.
PRS Stable Device	The PRS stable Device contains a FIFO queue for each primary and replicate database. Transactions are transferred from a primary database queue to a replicate database queue after the LTM sends the transaction's commit. Once a transaction is moved to the replicate database queue, the primary replication server sends the transaction to the replicate replication server.
Replicate Replication Server	The replicate replication server (RRS) is a replication server that receives replicate transactions from a primary replication server and applies the transaction to a replicate database. The RRS maintains a maintenance user connection for each replicate database.
Replicate RSSD Data Server	This server houses the RSSD for the RRS.
Replicate RSSD	This database contains information that is required for the RRS to apply replicate database transactions to a replicate database.
RRS Stable Device	The RRS stable device is a file system that contains a FIFO queue for each replicate database. Replicate database transactions are pushed into the queue before being applied to the replicate database.
Replicate Data Server	This server houses the replicate database and is updated by the RRS.
Replicate Database	The database that contains the replicate data.

4.17 Release 6A Overview

The release 6A design implements several important changes from the original ECS concept. The first and most obvious change is that the System Monitoring Center SMC database becomes the primary database for all records. This means that all account request, profile creation, and profile modification activities must take place at the SMC. The second change will use Sybase replication to automatically send database changes from the SMC to the other sites once they are committed. This will generally lead to a significant decrease from the time a change is made to the time in which that change is propagated to other sites. These changes also require modifications both to the database configurations and to custom code.

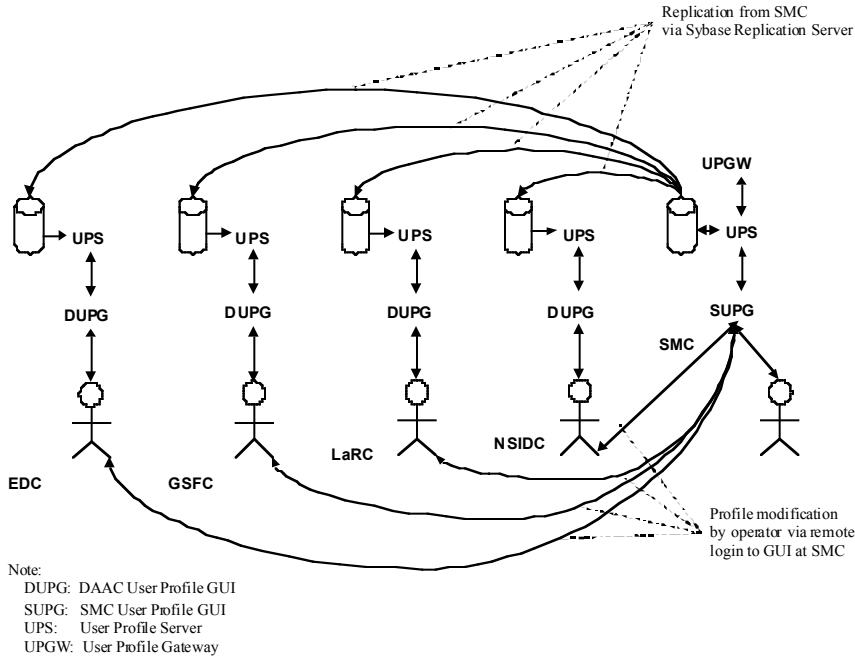


Figure 4.17-1. Drop 6A DAAC Operator User Profile Data Interactions

4.17.1 GDS Order Tracking

The GDSGW will be located at System Monitoring Center (SMC) and will support Aster GDS submitted cross-DAAC product requests and product request status queries. Product requests will be routed to and processed by the appropriate DAAC. The DAAC filling the request will update a local copy of the request tracking data. The request tracking data will be replicated to EDC to support the product request status queries submitted via the GDSGW.

Since a product order may contain several requests, the order and request information stored at SMC will contain all requests processed at one or more DAACs. On the other hand, the DAAC processing the request will contain only its portion of the request(s) for the order.

This requirement imposes an inconsistency in the order data between sites, since the order data is a summation of requests. GDS order tracking has a requirement to preserving the order information, independent of individual DAAC operations. The requirement stipulates that request delete transactions are **not** replicated back to EDC.

4.17.2 User Profile Distribution and User Registration Interaction Flow Diagram

Figure 4.17.2-1 depicts the User Registration Interaction Flow as it is anticipated to be during the initial deployment of Release 6A. As the figure suggests, a science user who wishes to become a

registered user associated with a particular DAAC (the Home DAAC) submits a New User Request (A.1). The user employs the User Registration Tool to submit the request to the User Registration Server at the SMC (A.2) The New User Request is retrieved by the User Services Representative at DAAC operations, logged in to the SMC remotely and using the Account Management tool (A.3). Note that the representative sees only requests specifying that representative's DAAC as Home DAAC are available to that representative for review. The representative reviews the information in the request and completes the User Profile (A.4). Upon completion of the User Profile at the SMC, the system sends confirmation to the user (A.5). With secure transmission of information, it is possible to send information electronically for printing of the User Profile information, including password, to the DAAC, so that the information can be printed and sent to the user by surface mail (A.6). The replication process (A.7) ensures that each DAAC has the entire User Profile database available on the local User Registration Server for viewing.

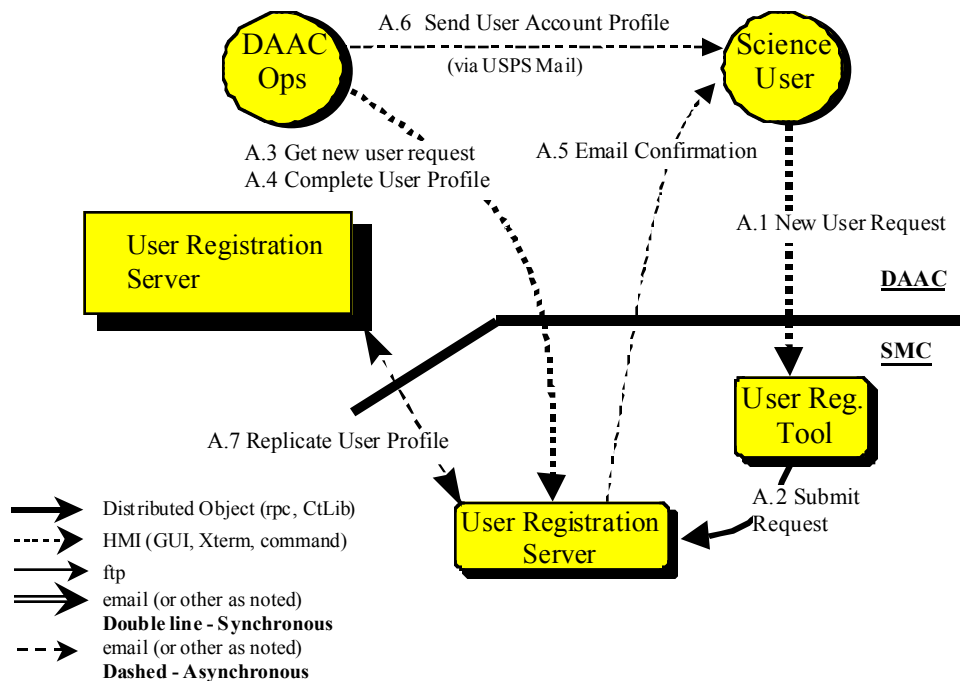


Figure 4.17.2-1. User Registration Interaction Flow Diagram

4.17.2.1 User Registration Interaction Table - High-Level Operational View

Table 4.17.2.1-1 provides the Interaction - High-Level Operational View: User Registration.

**Table 4.17.2.1-1. Interaction Table - High-Level Operational View:
User Registration (1 of 2)**

Step	Event	Interface Client	Interface Provider	Data Issues	Step Preconditions	Description
A.1	New User Request	Science User	User Registration Tool	None	None	Science user loads User Registration Tool, via its URL, from a favorite Web Browser. Science user fills out form with initial registration information. This information includes: user name, address, telephone number, email address and user verification key (for security confirmation). Request is queued at the SMC.
A.2	Submit Request	User Registration Tool	User Registration Server	None	None	User Registration Tool submits the new user's request. The request is queued at the SMC, awaiting the DAAC User Services staff from the user's selected home DAAC to confirm the new user.
A.3	Get New User Request	DAAC User Services Representative	User Registration Server	None	None	DAAC User Services Representative (periodically) checks for new user registration requests. In this case the request for our new user is found. User Services staff checks the information provided.
A.4	Complete User Profile	DAAC User Services Representative	User Registration Server	None	None	DAAC User Services Representative completes the new user's User Profile. The request is marked as confirmed and accepted. DAAC User Services Representative may call Science User for any further information or clarification. The Representative may authorize any special privileges (e.g., access to restricted granules, submission of ASTER Data Acquisition Requests) at this time.

**Table 4.17.2.1-1. Interaction Table - High-Level Operational View:
User Registration (2 of 2)**

Step	Event	Interface Client	Interface Provider	Data Issues	Step Preconditions	Description
A.5	Email Confirmation	User Registration Server	Science User	None	None	User Registration Server e-mails confirmation of the user's registration request.
A.6	Send User Account Profile	DAAC User Services Representative	Science User	None	None	DAAC User Services Representative sends complete user account profile, including user name and password, to Science User via USPS mail.
A.7	Replicate User Profile	Sybase	Sybase	None	None	The user profile is replicated at each DAAC. Each DAAC is capable of browsing user profiles locally. User profiles can only be created or modified at the SMC by operators from the user's home DAAC (who logs in remotely) or by select SMC operators.

4.17.2.2 User Registration Component Interaction Table

Table 4.17.2.2-1 provides the Component Interaction: User Registration. The information in this table provides more detail on specific interactions among ECS components for each of the main elements identified in Table 4.17.2.1-1 for those interested in what is occurring between ECS software configuration items and their components during user registration processes.

**Table 4.17.2.2-1. Component Interaction Table: User Registration
(1 of 2)**

Step	Event	Interface Client	Interface Provider	Interface Mech	Description
A.1.1	Startup User Registration Tool	Science User	EcCIDtUser ProfileGateway	Web Browser	Science User invokes the configured Web Browser with the URL of the User Registration Tool.
A.1.2	Input User Registration Information	Science User	EcCIDtUser ProfileGateway	Web Browser	The Science User populates forms with ECS registration information. This information includes: user name, address, telephone number, email address and user verification key (for security confirmation). The user then submits this information.
A.2.1	Submit User Registration Request	EcCIDtUser ProfileGateway	EcMsAcReg UserSvr	Distributed Object	The User Registration Tool submits the User Registration Request to the User Registration Server for approval.
A.2.2	Store a User Registration Request	EcMsAcReg UserSvr	Sybase	CtLib	The User Registration Request is saved for approval by DAAC User Services.
A.3.1	Startup User Registration Server GUI	DAAC Ops - User Services	EcMsAcReg UserGUI	Xterm	DAAC operations remotely start the SMC User Registration Server GUI after logging into the SMC.
A.3.2	Review New User Request	DAAC Ops - User Services	EcMsAcReg UserGUI	Xterm	On a periodic basis (based on DAAC policy), User Services checks for any new User Registration Requests.
A.3.3	Get New User Requests	EcMsAcReg UserGUI	EcMsAcReg UserSvr	Distributed Object	Request all new User Registration Requests. The GUI connects to the Registration Server at the SMC.
A.3.4	Retrieve User Registration Requests	EcMsAcReg UserSvr	Sybase	CtLib	All pending User Registration Requests for the operator's home DAAC are retrieved from the database.
A.4.1	Update User Request	EcMsAcReg UserGUI	EcMsAcReg UserSvr	Distributed Object	DAAC User Services completes the User Profile from the request. Updated information includes V0Gateway User name, group and password.

**Table 4.17.2.2-1 Component Interaction Table: User Registration
(2 of 2)**

Step	Event	Interface Client	Interface Provider	Interface Mech	Description
A.4.2	Create User Profile	EcMsAcRegUserGUI	EcMsAcRegUserGUI	Distributed Object	User Registration Server takes the completed User Registration Request and makes a User Profile, registering the user.
A.4.3	Store a User Profile	EcMsAcRegUserSvr	Sybase	CtLib	The User Profile is saved in the SMC User Profile Database.
A.5.1	Send E-mail	EcMsAcRegUserSvr	CsEmMailRelA (to Science User)	e-mail	A Confirmation message is sent to the new ECS Science User, via CSS infrastructure mail services (CsEmMailRelA).
A.7.1	Replicate User Profile	Sybase	Sybase	EcMsRsDb	The user profile is replicated at each DAAC via the Sybase Replication Server.

4.17.3 User Registration Tools

For the initial Release 6A period, a user may access the web-based ECS User Registration Tool (URT) from a link on the EOSDIS Home page to apply for an ECS Account. Figure 4.17.3-1 illustrates the top portion of the URT. Figure 4.17.3-2 illustrates the URT scrolled down to show the bottom portion of the window.

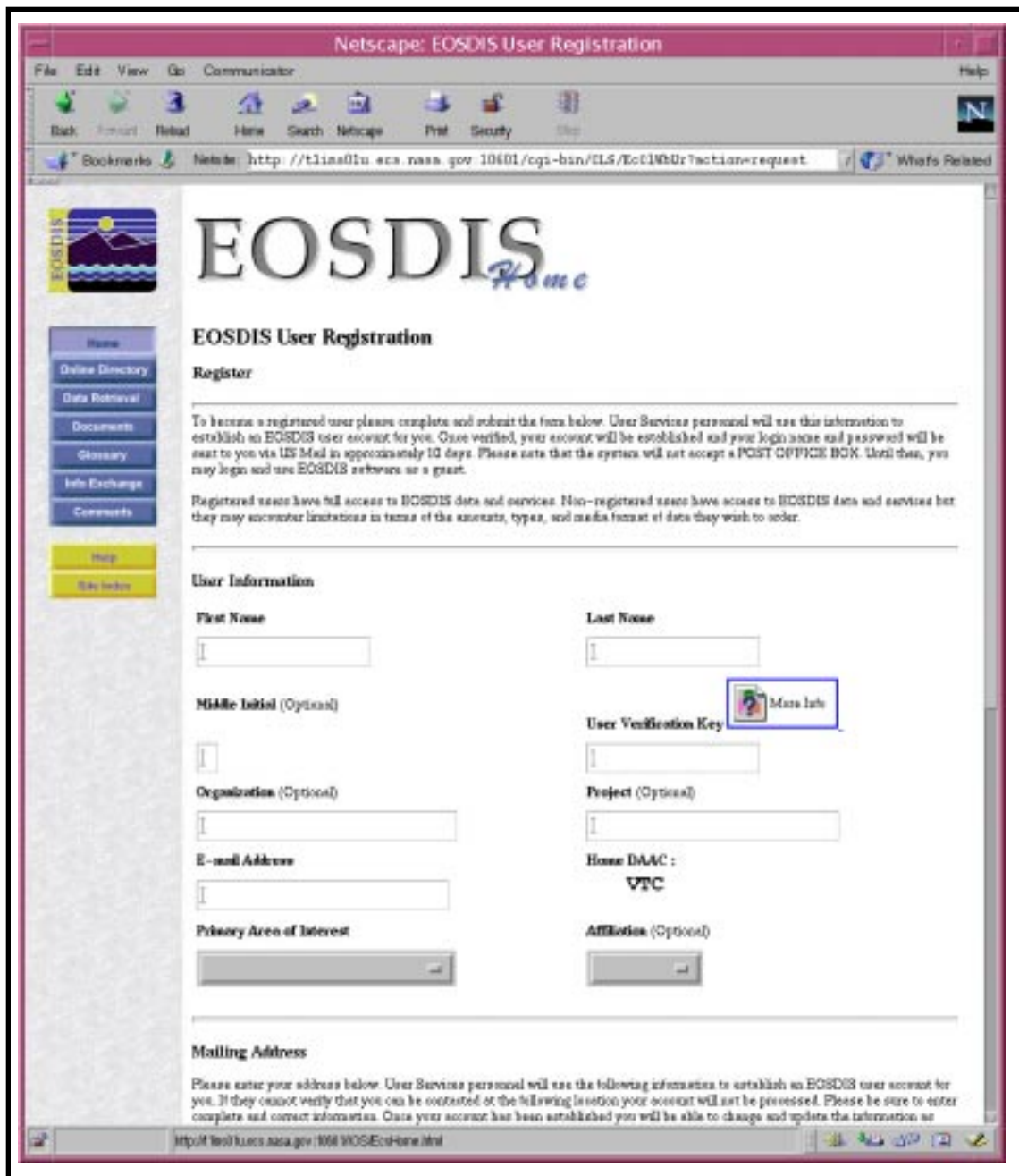


Figure 4.17.3-1. User Registration Tool, Top Portion

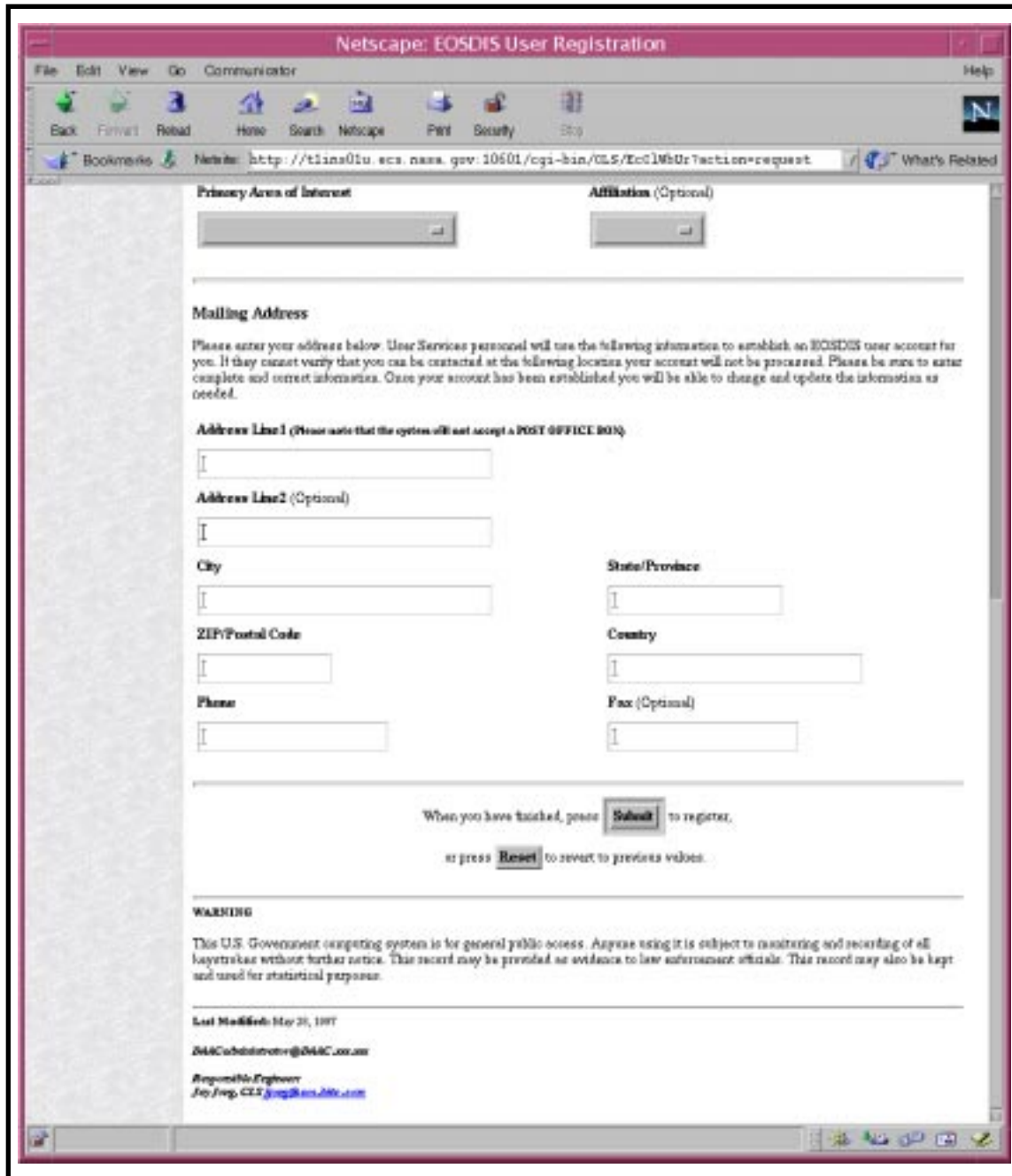


Figure 4.17.3-2. URT Scrolled Down to Show the Bottom of the Window

The function of this URT will be supplanted by a patch later in the deployment of Release 6A that permits a user to apply for registration using the EOS Data Gateway Web Client. At that time, entering user profile data once will register a user for access to Version 0 products and services and application for an ECS account -- a "seamless" application to both communities.

At initial deployment of Release 6A, user registration is accomplished from the Request Account screen of the ECS User Account Management tool, accessed remotely at the SMC. Figure 4.17.3-3 shows the Account Information tab of this screen.

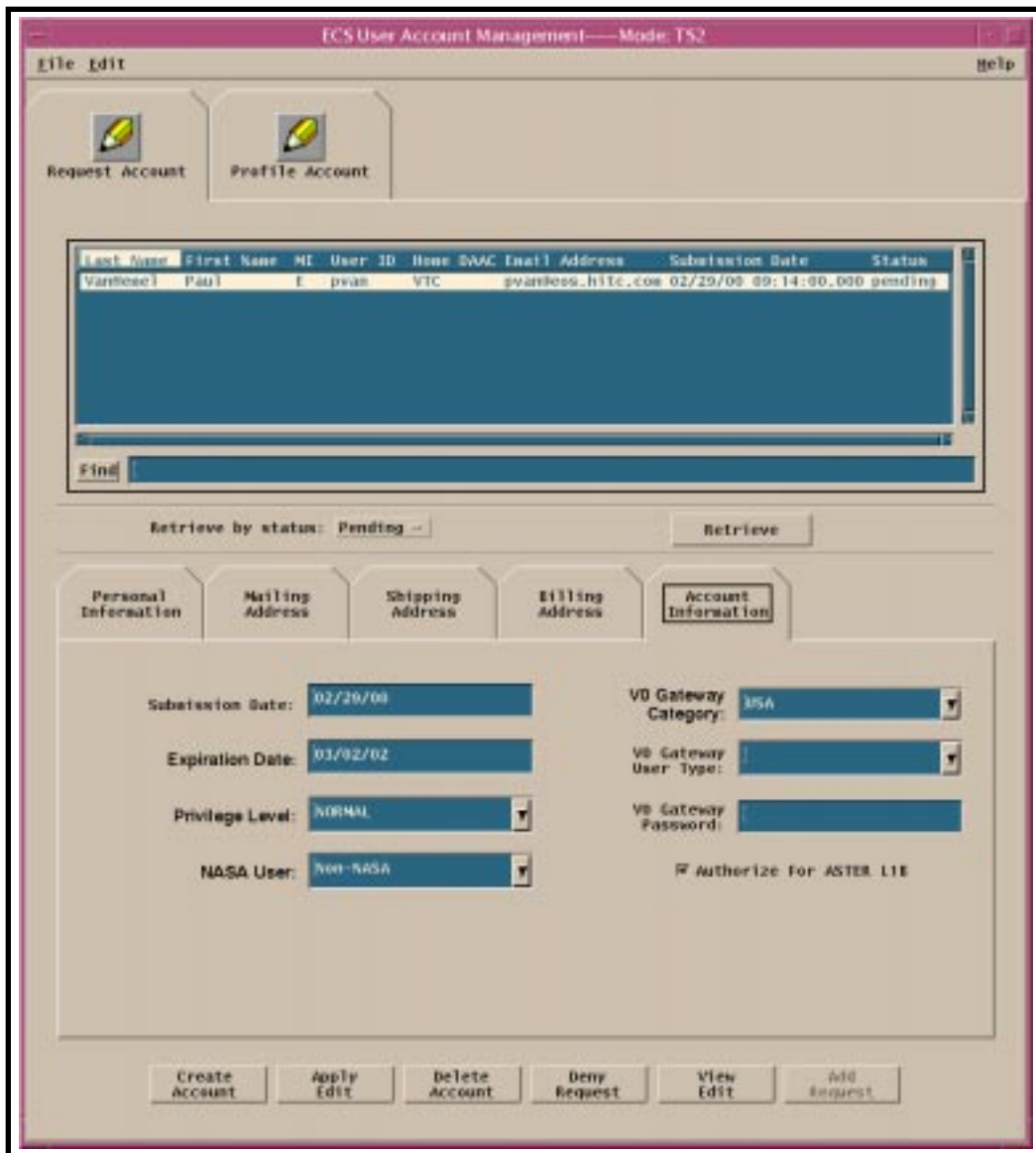


Figure 4.17.3-3. Request Account, Account Information Tab (Note: Control buttons at the bottom of the screen appear only on the tool accessed at the SMC.)

The next block of data to be entered is user's personal information. If you have just entered the account information, the "Request Account" folder is still open. To add the user's personal information, you will need the "Personal Information" tab of this folder (Figure 4.17.3-4). If the user has applied using the URT, these fields will already be populated.



Figure 4.17.3-4. Request Account, Personal Information Tab (Note: Control buttons at the bottom of the screen appear only on the tool accessed at the SMC.)

Mailing address, shipping address, and billing address information are entered using similar windows, or, if the user has applied for an account using the URT, these fields will already be populated.

To complete the creation of a new account, the pending account is selected and a click on the Create Account button results in the creation of the new account. It also results in automatic

dispatch of an e-mail message to the user's e-mail address with notification that the account has been created. The User Services representative will complete the account registration process by providing the user with the initial ECS account password. The password dissemination is done in accordance with local DAAC policy.

Once the account is created, it will appear in the list accessible by clicking on the **Profile Account** tab, as illustrated in Figure 4.17.3-5 showing the Personal Information and Account Information sub-tabs of this screen. (*Note: The figure illustrates the screen with control buttons at the bottom. These buttons appear only on the Account Management tool at the SMC; the tool at your site does not include these buttons, but is otherwise the same.*)

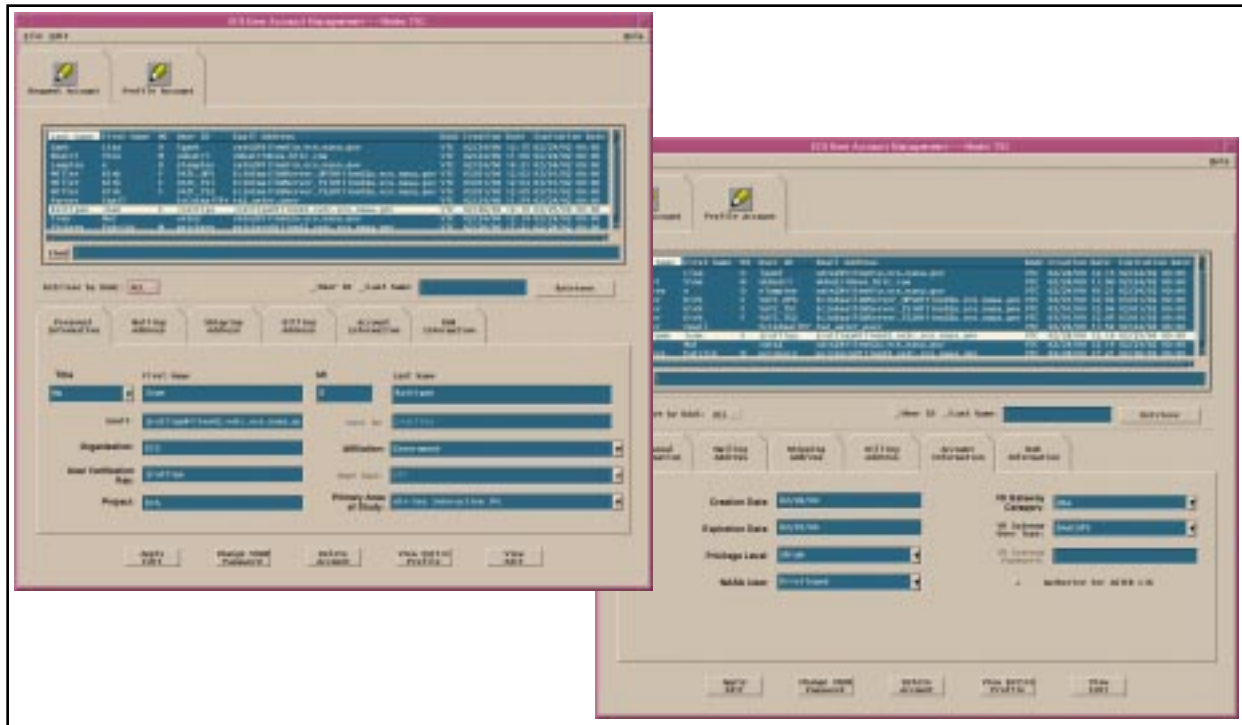


Figure 4.17.3-5. Profile Account Screens, Personal and Account Information
(Note: Control buttons at the bottom of the screen do not appear on the local tool.)

The account can then be replicated to the User Profile databases at the DAACs, where it is accessible using the local Account Management GUIs. These local GUIs are read-only tools that do not display the control buttons for creating or modifying an account. If a user requires a change (e.g., new mailing address), the change is accomplished through the Account Management GUIs at the SMC, using secure remote access by the User Services representative.

4.18 Sybase Replication Server

The concept of a domain is useful when describing a replication system. Briefly, a domain is a set of replication servers and their associated components that communicate with each other. A

domain can be one replication server that replicates data from a local primary database to another local replicate database (as in a warm standby application) or a domain can contain many replication servers distributed over a wide area network (WAN) as will be the case for the MSS.

Each domain requires one, and only one, ID server. An ID server is a replication server that is specified as such when it is installed. An ID Server assigns unique identifiers to domain components. The ID server must be the first replication server installed in a domain and must be accessible when any component is added to the domain.

When a replication server is installed (including the ID Server), the following components are created:

- A database called the Replication Server System Database (RSSD) (the data server housing the RSSD must already exist)
- A stable device (queue)
- An interface (connection) to the RSSD data server
- A RepAgent for the RSSD

The RSSD contains system tables that are used by the replication server. In a mutli-server domain that implements consolidated distributed primary fragments, the RSSDs must also be replicated. The RSSD contains information about each domain component, component login ids and passwords, application specific objects such as replication definitions, replicate transaction identifiers, routes and connections, and replicate transaction errors.

The RSSD data model is documented in the manual *Replication Server Reference Manual*.

As additional replication servers are added to a domain, the replication system administrator creates replication server interfaces (RSI), or routes, between the replication servers. Routes allow replicate transactions to “flow” from a primary replication server to a replicate replication server.

Finally, application databases are added to a domain. For each database added to the domain the following components are created:

- For primary databases, an log transfer manager (LTM), which transfers database transactions from the primary database to the replication server
- For replicate database an interface from the replicate replication server to the replicate database

4.19 Replication System Administrator (RSA)

Administering the replication system is primary the role of the Replication System Administrator (RSA). The Replication System Administrator installs, configures, and administers the replication system. Given the distributed nature of the MSS implementation this role may be performed by different people at different locations. If this is the case, various tasks for administering Replication Server may require coordination between Replication System Administrators.

The Replication System Administrator has sa user permissions, which provides that person with the ability to execute nearly all commands in the replication system. In managing the system, the Replication System Administrator may need to coordinate with DBAs for both local and remote databases.

Replication System Administrators should be experienced Sybase DBAs and should have taken the Sybase training classes Replication System Administration and Replication Disaster Recovery Workshop. They should also have read and understood the manuals: *Replication Server Administration Guide*, *Replication Server Configuration Guide for UNIX Platforms*, *Replication Server Reference Manual*, and *Replication Trouble Shooting Guide*.

4.19.1 Replication System Administrator Task

The tasks shown in Table 4.19.1-1 are required to maintain a replication system:

Table 4.19.1-1. Replication System Administrator Task (1 of 2)

Task	Roles
Installing Replication Server	Replication System Administrator (RSA)
Adding or removing a Replication Server	RSA
Starting up and shutting down Replication Server.	RSA
Configuring Replication Server	RSA
Maintaining Routes (Creating and modifying)	RSA
Managing the RSSD	RSA
Adding a primary and replicate database.	RSA
Adding login names, database users, and administering appropriate permissions	RSA
Adding replicated tables or changing table schemas. Creating and modifying replicated tables Creating and modifying replication definitions Creating and materializing subscriptions at replicate sites.	RSA
Defining data server function-string classes and function strings.	RSA

Table 4.19.1-1. Replication System Administrator Task (2 of 2)

Task	Roles
Applying database recovery procedures.	RSA
Maintaining and monitoring database connections	RSA
Monitoring Replication Server	RSA
Perform Database Rebuilds	RSA
Perform Database Patches	RSA
Processing rejected transactions	RSA
Quiescing Replication Server	RSA
Reconciling database inconsistencies.	RSA

DAAC DBA Replication Roles and Tasks

The Database Administrator (DBA) plays a subsidiary role by supporting some Replication Server administrator task. The following are tasks that the DBA administrators will performed at the local DAACs with respect to replication server administration.

Table 4.19.1-2. DAAC DBA Replication Roles and Tasks

Task	Roles
Installing Replication Server	Database Administrator (DBA)
Managing the RSSD	DBA
Adding a primary and replicate database.	DBA
Perform Database Rebuilds	DBA
Perform Database Patches	DBA
Adding login names, database users, and administering appropriate permissions	DBA
Adding replicated tables or changing table schemas. Creating and modifying replicated tables Creating and modifying replication definitions Creating and materializing subscriptions at replicate sites.	DBA
Defining data server function-string classes and function strings.	DBA
Applying database recovery procedures.	DBA
Processing rejected transactions	DBA
Quiescing Replication Server	DBA
Reconciling database inconsistencies.	DBA

4.20 Sybase Replication Server Installation and Setup

4.20.1 Sybase Replication Server 11.5.1

The Sybase Replication server software that will be delivered to the DAACs must be installed on the MSS primary machines. Other than copying the software to the directories specified in the PSR, no further action for configuring the COTS product is necessary. This installation makes the rs_subcmp utility available to the CUSTOM scripts.

4.20.2 CUSTOM Installation

The replication package must be installed onto the appropriate mode/machines. Instructions will be delivered with the software drop.

The following software will need to be run:

- MSS db patch
- rs_UsrInstall

4.20.2.1 MSS database patch

Since replication will only occur between tables sharing the same schema, the MSS must be run for replication to occur successfully. The database patches will add the Sybase login mss_acct_db_maint for replication to/from the SMC in addition to bringing the database into compliance with database schema requirements.

4.20.2.2 rs_UsrInstall script

The rs_UsrInstall script will need to be configured and executed at each site. Instructions will be delivered with the software drop. The DAAC installers will need to coordinate with the SMC as to setting password, servername, and database name parameters for the replication script. This script creates the script rs_UsrMain and its associated files based on the parameters entered by the installer.

The rs_UsrMain script is the script that will need to be run for replication to occur with the SMC.

Lastly, email addresses for the replication administrators (i.e. staff who need to be notified of error conditions) will need to be added to the email notification file located in the .../CUSTOM/dbms/COM/DBAdmin directory.

4.21 Other Installation

The Sybase administrator will need to update the Sybase Interfaces files on the MSS primary servers.

4.21.1 Sybase Replication for Subsequent Database Builds

4.21.1.1 Build Process

- 1) If Sybase replication already exists in the database mode. The replication subscriptions at the replicated site must be dropped, then the replication definition at the primary site must be dropped prior to running the build script.
- 2) The table schema must be the same at the primary and replicated sites for the tables that will be contain replicated data.

4.21.1.2 Database Access

- 1) The “sa” user passwords must be the same on the replication servers and SQL Servers at the primary and replicated sites prior to subscribing to the replicated data.
- 2) The maintenance user must exist in the primary and replicated databases and have grant all permissions on the replicated tables. The maintenance user should have been added during the database build process.
- 3) All other sybase logins, database users and database permissions must have created successfully.

4.21.1.3 Enabling Sybase Replication

4.21.1.3.1 Preconditions:

- The direct routes bewteen the replication servers included in the replication system must be up.
- The RepAgent and Database Server Interface (DSI) threads must be up for the Replication Server System Databases (RSSD) included in the replication system.
- The database that will contain replicated data must be known to the replication system.
- The RepAgent and DSI threads must be up for the databases included in the replication system.

4.21.1.3.2 Customized Scripts to Support Replication:

- 1) The customized scripts to install replication components must be run successfully.
- 2) Reference the Sybase Replication Installation and Configuration instructions that were delivered with the software drop.

4.21.2 Sybase Replication for Database Patches

4.21.2.1 Patch Process

- 1) If the table schema at the primary site for the replicated data will be changed during the patch process. The replication subscriptions at the replicated site must be dropped, then the replication definition at the primary site must be dropped prior to running the patch script.
- 2) The database patch script must be run successfully for the primary and replicated databases.
- 3) The table schema must be the same at the primary and replicated site for the tables that will be contain replicated data.

4.21.2.2 Database Access

- 1) at the primary and replicated sites prior to subscribing to the replicated data.

- 2) The “sa” user passwords must be the same on the replication servers and SQL Servers. The maintenance user must exist in the primary and replicated databases and have grant all permissions on the replicated tables. The maintenance user should have been added during the database build process.
- 3) All other sybase logins, database users and database permissions must have been created successfully.

4.21.2.3 Enabling Sybase Replication

4.21.2.3.1 Preconditions:

- The direct routes between the replication servers included in the replication must be up.
- The RepAgent and Database Server Interface (DSI) threads must be up for the Replication Server System Databases (RSSD) included in the replication system.
- The database that will contain replicated data must be known to the replication system.
- The RepAgent and DSI threads must be up for the databases included in the replication system.

4.21.2.3.2 Customized Scripts to Support Replication:

- 1) If the replication definition was modified to support a table schema change, then the script to install the revised replication definition must be run at the primary site. After the replication definition has been installed successfully, then the script to install the replication subscription must be run at the replicated site.
- 2) Reference the Sybase Replication Installation and Configuration instructions that were delivered with the software drop. Any function string class and error class that were installed as part of replication will NOT have to be reinstalled.

4.22 Error Conditions

The output of the rs_subcmp utility is logged to EcMsRepSubCmp.log in the ../CUSTOM/logs directory. If an error condition is detected (by grepping the log after completion of the script) an email is sent to the addresses listed in the email notification file.

4.23 DAAC/SMC Coordination Issues

The DAACs should coordinate the following issues with the SMC and vice/versa.

- MSS Database Schema Versions
- Changes to the Sybase password for login mss_acct_db_maint

4.23.1 MSS Database Schema Version

When the SMC or a DAAC executes a database patch that changes the MSS User Profile table schema, the rs_UsrMain script will prevent execution of the rs_subcmp utility and this condition will be logged and email notification will be sent. Database patches to the MSS database should be coordinated through the SMC.

4.23.2 MSS login maintenance

If the password of the mss_acct_db_maint login is changed at the SMC, then the configuration files associated with rs_UsrMain will need to be updated at the SMC and at the DAACs to reflect the change.

If a DAAC changes the password of the user id, then that DAAC and SMC will need to update the configuration files associated with the rs_UsrMain script.

4.24 Replication Administration Software

Some of the Replication Server administration tasks will be supported by COTS and/or custom software (scripts). The COTS consists of the Sybase products Replication Server Manager (RSM) and Sybase Central, a GUI based administration tool.

Scripts will be developed for the following administration tasks in support of installing and configuring Replication Server and for installing replication server objects that are specific to the MSS application.

- Creating Routes
- Managing the RSSD
- Adding login names, database users, and permissions
- Creation of replication definitions, subscriptions, function strings and error classes
- Subscription materialization

4.24.1 Monitoring

The Sybase Central/RSM products will be used for the following tasks:

- Configuring Replication Server
- Modifying Routes
- Maintaining and monitoring database connections
- Monitoring Replication Server

Scripts that will be executed by the RSM will be developed to notify the RSA of the following events:

<i>Component</i>	<i>Event</i>
Servers	Active, Quiesed, Suspect, Hung, Shutdown, Dead, Unknown, Invalid
Routes	Change in status
Connection	Change in status
Partition	State change, size threshold exceeded
Queues	Latency threshold exceeded, size threshold exceeded
Database	Latency threshold exceeded

4.25 Recovery

Scripts will be developed to restore the RSSD or to bring application databases to a consistent state.

RSSD Recovery

- dumpdb
- dumptran
- logsegment threshold
- data segment threshold

MSS Database Recovery

- last chance logsegment threshold modification to disable secondary truncation point
- rs_subcmp scripts for each subscription in the domain

Sybase Central/RSM will be used for the following recovery tasks:

- Processing Rejected Transactions
- Quiescing Replication Server

4.26 Network and Security Requirements

The Sybase interface files used by the Replication Servers at each DAAC will need to be modified to locate all Sybase Replication and Data Server in the replication domain. Additionally, subscription materialization requires the same user id and password for the replicate replication server and the primary and replicate data servers. Replication server userid and password maintenance must be coordinate across sites. Replication server supports password encryption, and this feature will.

4.27 A DAAC is added to the replication domain.

EROS DATA Center (EDC) is added to the domain, which before its installation includes, GSF, LAR, and NSC.

Task	Role	Site
The replication server software is copied to the local host.	RSA	EDC
Replication servers and MSS SQL servers are added to the interfaces files	RSA, DBA	All
The replication server executable, and its RSSD is created.	RSA, DBA	EDC
create route SMCF to EDC	RSA	EDC
The routes are verified at each site by executing the rs_helproute command on each DAAC's RSSD ASE server.	RSA	All
The rs_init utility is executed to add EDC's mss_acct_db to the operational domain. The utility connects to the ID server at SMC to obtain unique id information for the database. The rs_init utility creates an LTM start file and starts the LTM.	RSA	EDC
Create replication definition MsAcUsrProfile	RSA	EDC
Create replication definition EcAcRequest	RSA	EDC
Create, verify, and materialized subscription MsAcUsrProfile_SMC_EDC	RSA	EDC

4.28 Fault Recovery Scenarios

4.28.1 General Faults

In general, Sybase Replication Server is fault tolerant. Replicate database transactions start in the primary database's transaction log, are transferred from the log to the primary replication server's queue, then to the replicate replication server's queue before being applied to the replicate databases. Database transactions are not removed from a log or a queue until the transaction has successfully moved to its next destination.

During temporary system faults, the transaction remains in its log or queue, until the fault is recovered. For example, if the replicate Sybase Server at NSC is shutdown for maintenance, replicate transactions from other DAACs are stored in the NSC's stable queue until the Sybase Server is brought back online. When NSC's replication server re-establishes its connection to the Sybase Server, the queued transactions will be applied to the replicate database in the order received. This approach is followed for all component failures.

When a failure occurs for an extended period or is of the type that causes a loss of replicate transactions (e.g. the failure of a devices supporting a queue or log), additional recovery steps must occur between sites.

4.28.2 EDC experiences an LTM failure.

The transaction log of the mss_acct_db at EDC is half full when the EDC's LTM suddenly, and expectedly, crashes. Meanwhile, a large number of orders are requested and the database's transaction log reaches its last-chance threshold. The threshold-stored procedure fires and forces a truncation of the transaction log. The stored procedure will log an error message in the SQL Server error log to serve notice that the truncated transactions have not been replicated. The threshold-stored procedure prevents the mss_acct_db database from 'freezing'; however, a recovery procedure will need to be used to forward the lost transactions to other DAACs.

The following tasks must occur:

Task	Role	Site
All client connections to the EDC SQL Server are suspended. Any transaction coming into EDC from other DAACs is queued in the EDC replication server stable device.	RSA, DBA	EDC
The EDC Replication Server's stable device is cleared of any open transactions.	RSA	EDC
The EDC mss_acct_db transaction log is dumped.	DBA	EDC
After verifying that EDC's transactions in the GSF stable queue have been processed, the rs_subcmp utility is executed to update EDC's primary fragment at GSF.	RSA	GSF
After verifying that EDC's transactions in the LAR stable queue have been processed, the rs_subcmp utility is executed to update EDC's primary fragment at LAR.	RSA	LAR
After verifying that EDC's transactions in the NSC stable queue have been processed, the rs_subcmp utility is executed to update EDC's primary fragment at NSC.	RSA	NSC
The LTM at EDC is started.	RSA	EDC
Set the secondary truncation point at EDC to valid.	DBA	EDC
Resume client application connections to the EDC SQL Server.	DBA, RSA	EDC
Resume the DSI connection at EDC.	RSA	EDC

4.28.3 The GSF MSS database becomes corrupt and needs to be restored from backup.

The GSF mss_acct_db database was dumped at 12:00am. A database transaction dump executed successfully at 8:00 am. At 12:00pm, GSF's database logs become corrupt and the SQL server takes the database off-line and suspends client connections using the database.

Task	Role	Site
The LTM is shutdown.	RSA	GSF
Restart the GSF Replication Server in standalone mode.	RSA	GSF
The command admin get_generation, data_server, database is executed on the GSF Replication Server.	RSA, DBA	GSF
The command set log recovery for data_server.database is executed.	RSA	GSF
A checkpoint is issued in the mss_acct_db database.	DBA	GSF
The GSF LTM is started with the for_recovery option.	RSA	GSF
The 12:00 am database dump and the 8:00am transaction dump are loaded.	DBA	GSF
The GSF LTM is shutdown.	RSA	GSF
The command rs_zeroltm, e0mss20_srvr, mss_acct_db is executed.	RSA	GSF
The command dbcc settrunc('ltm', 'gen_id', <new_number>) is executed.	DBA	GSF
The rs_subcmp utility is executed to synchronize EDC's copy of GSF's user profile primary fragment.	RSA	EDC
The rs_subcmp utility is executed to synchronization EDC's copy of GSF's EcAcRequest primary fragment.	RSA	EDC
The rs_subcmp utility is executed to synchronize LAR's copy of GSF's user profile primary fragment.	RSA	LAR
The rs_subcmp utility is executed to synchronize NSC's copy of GSF's user profile primary fragment.	RSA	NSC

(Continued)

Task	Role	Site
Restart the GSF Replication Server in normal mode.	RSA	GSF
The LTM is started	RSA	GSF
Connections are resumed at the GSF SQL Server	DBA	GSF

4.28.4 EDC RSSD becomes corrupt and needs to be restored.

RSSD recovery is different depending on the activity that occurred since the RSSD was dumped. There are four increasingly severe levels of RSSD failure with increasingly complex recovery requirements.

Activity Since Last RSSD Dump	Procedure
No DDL activity	Basic RSSD Recovery Procedure
DDL activity, but no new routes or subscriptions created	Subscription Comparison Procedure
DDL activity, no new routes created	Subscription Re-Creation Procedure
New routes created	Deintegration/Reintegration Procedure (involves removing and reinstalling replication server)

This scenario assumes that no DDL activity occurred since the last RSSD dump. DDL commands in replication command language (RCL) include those for creating, altering, or deleting routes, replication definitions, subscriptions, function strings, functions, function-string classes, or error classes.

Tasks for Basic RSSD Recovery Procedure:

Task	Role	Site
Shutdown all RepAgents and LTM that connect to the Replication Server.	RSA	EDC
Shutdown the Replication Server if it is not down.	RSA	EDC
Restore the RSSD by loading the most recent RSSD database dump and transaction dumps.	RSA, DBA	EDC
Restart the Replication Server in standalone mode.	RSA	EDC
Log into the Replication Server and get the generation number for the RSSD.	RSA	EDC
Rebuild the Replication Server queues.	RSA	EDC
Start all RepAgents and LTMs in recovery mode.	RSA	EDC
Check the loss messages in the Replication Server log, and in the logs of all Replication Servers with direct routes from the current Replication Server. (GSF, LAR, NSC) If a loss is detected, see the recovery procedure for scenario The GSF MSS database may have become corrupt and may need to be restored from backup.	RSA	All
Shutdown the LTM managed by the current Replication Server.	RSA	EDC
Execute the dbcc settrunc command at the Adaptive Server for the restored RSSD. Move up the secondary truncation point.	RSA, DBA	EDC
Execute the dbcc settrunc command at the Adaptive Server for the restored RSSD to set the generation number to one higher than the number returned in step 5.	RSA, DBA	EDC
Restart the Replication Server in normal mode.	RSA	EDC
Restart the RepAgents for the RSSD and the LTM in normal mode.	RSA	EDC

ASF is now part of replication domain.

4.29 Reference Document

The following are Reference documents and other information that will be help in the administration of Sybase Replication Server.

Name	Web site Address
Sybase Web Site	http://www.sybase.com/
Points of Contact web site Address	http://m0mss01.ecs.nasa.gov/smc/
Replication Server Reference Manual	http://www.sybase.com/products/datamove/
Sybase Central Installation Instruction	http://cmdm.east.hitc.com
Replication Sever Manager Installation Instruction	http://cmdm.east.hitc.com
609-CD-500-001, Release 6AA Operations Tools Manual (5/99)	http://edhs1.gsfc.nasa.gov/waisdata/catalog/rel5cat.html
Database Administrators	http://www.sybase.com
Configuration Parameter Document	http://cmdm.east.hitc.com
DBA/RSA Points of Contact at web site Address	http://m0mss01.ecs.nasa.gov/smc/
313-CD-500-001, Release 6A ECS Internal Interface Control Document for the ECS Project (5/99)	http://edhs1.gsfc.nasa.gov/waisdata/catalog/rel5cat.html
625-CD-513-001, Release 6A, ECS Project Training Material Volume 13: User Services (7/99)	http://edhs1.gsfc.nasa.gov/waisdata/catalog/rel5cat.html

5. Security Services

ECS security architecture must meet the requirements for data integrity, availability, and confidentiality. ECS Security Services meets these requirements by incorporating a variety of mechanisms to establish and verify user accounts, issue and verify passwords, audit user activity, and verify and protect data transfer. Security logs will be monitored and security reports generated by the System Administrator as required. Several OPEN SOURCE products provide tools for authentication and network and system monitoring: SATAN, Crack, anpasswd, TCP Wrappers, and Tripwire. The commercially supported version of F-Secure Secure Shell which provides authentication and encryption connection services is being implemented. The Open Software Foundation's Distributed Computing Environment (OSF/DCE) employs Kerberos for authenticating user requests for network services. (DCE administration tools are discussed in Section 3 of this document.) The OPEN SOURCE product, SATAN, is used to scan networks to find system security vulnerabilities. Three OPEN SOURCE products — Crack and anpasswd provide brute force password cracking and password checking respectively for local system and network access. ECS Security Services use TCP Wrappers to monitor and limit access to network services,. Tripwire monitors for intruders by noting changes to files. F-Secure Secure Shell provides strong authentication access and session encryption for ECS from external, non-trusted networks as well as internally within a DAAC or M&O to DAAC. Security Services also supports detection of, reporting, and recovery from security breaches.

The following section defines step-by-step procedures for M&O personnel to run the Security Services tools. The procedures assume that the requester's application for a Security process has already been approved by DAAC Management. It is recommended that access to these tools be controlled through the **root access only**.

5.1 Scanning Network Vulnerabilities

The Security Administrator Tool for Analyzing Networks (SATAN) is a testing and reporting tool that collects a variety of information about networked hosts. SATAN gathers information about specified hosts and networks by examining network services (for example, finger, NFS, NIS, ftp). SATAN also gathers general network information (network topology, network services run, types of hardware and software being used on the network). The data is used to point out system vulnerabilities. Data can be reported in a summary format. Problems are described briefly and pointers provided to patches or workarounds.

Periodically, the System Administrator will run SATAN as **root**. The procedures are provided below. SATAN need not be installed on a permanent basis on a host.

- 1 Make sure that **DISPLAY** is set on your workstation.
- 2 From **/usr/local/solaris/satan-1.1.1** type **./satan**.
- 3 From the **SATAN Control Panel**, select **SATAN Configuration Management**. Set all variables or use the default values.

- 4 Go back to the SATAN Control Panel.
- 5 From the **SATAN Control Panel**, select **SATAN Data Management**. Create the SATAN database if it does not exist. When you create the database for the first time, you will see a warning message concerning password disclosures. Take no action and continue. The database is stored as **satan-data** in the directory **/satan-1.1.1/results**.
- 6 You will be notified when the SATAN finishes creating the database and scans the system (network or cluster) for vulnerabilities.
- 7 From this screen, you can click on "Continue with Reporting and Analysis" or you can return to the **SATAN Control Panel**, to make this selection. Select the reports that you want to review.

5.2 Ensuring Password Integrity

One aspect of system security is discretionary access control based on user passwords. Passwords should be so unique that they are virtually impenetrable to unauthorized users. Two products provide utilities to create effective password practices. "Crack" detects weak passwords that could be easily bypassed. It works in "batch" mode. Anlpassword enforces strong password rules as the user is changing their password.

Crack and anlpasswd provide comprehensive dictionary, which can be shared. These "source" dictionaries provide lists of words, which if used, would create vulnerable passwords. You can add other dictionaries, for example, acronym lists, to eliminate commonly used terms from being used as passwords.

Both products are installed in a secure location, that has, **root access only**. Such precautions are particularly apt when running Crack, which gives the administrator access to everyone's password that he/she penetrates.

5.2.1 Detecting Weak Passwords

Running Crack against a system's password file will enable a system administrator to assess how vulnerable the file is to unauthorized users and how well authorized users select secure passwords. Crack is designed to find standard Unix eight-character DES-encrypted passwords by standard guessing techniques.

Crack takes as its input a series of password files and source dictionaries. It merges the dictionaries, turns the password files into a sorted list, and generates lists of possible passwords from the merged dictionary or from information gleaned about users from the password file. It does not attempt to remedy the problem of allowing users to have guessable passwords, and it should NOT be used in place of getting a really good, secure password program replacement.

The instructions provided in the following sections are general in nature because how you configure Crack is DAAC specific. M&O personnel should be familiar with these tasks to:

1. Configure the Crack shellsript and config.h files based on the README file and on requirements established for your site. See the Section on “Configuring Crack” below.
2. Run Crack based on requirements established for your site. See “Running Crack”, below.
3. Customize the dictionaries. See Section “Creating Dictionaries”, below.

5.2.1.1 Configuring Crack

Although Crack should already be configured for your system, the instructions are provided should you have to reconstruct the makefile as a result of file corruption. Crack has two configuration files: the Crack shellsript, which contains all the installation-specific configuration data, and the file Sources/conf.h, which contains configuration options specific to various binary platforms.

- 1 In the Crack shellsript, edit the CRACK_HOME variable to the correct value. This variable should be set to an absolute path name through which the directory containing Crack may be accessed on ALL machines on which Crack will be run. (Path names relative to username are acceptable as long as you have some sort of csh.)

There is a similar variable, CRACK_OUT, which specifies where Crack should put its output files — by default, this is the same as \$CRACK_HOME.

- 2 Edit the file Sources/conf.h and establish which switches to enable. Each #define has a small note explaining its purpose. Portability of certain library functions, should not be a problem.
- 3 If using Crack-network (see Section Options, below), generate a Scripts/ **network.conf** file. This file contains:
 - a list of hostnames to rsh/ssh to
 - their binary type (useful when running a network Crack on several different architectures)
 - an estimate of their relative power (take your slowest machine as unary, and measure all others relative to it)
 - a list of per-host flags to add to those specified on the Crack command line, when calling that host.

There is an example of such a file provided in the Scripts directory.

- 4 To specify a more precise figure as to the relative power of your machines, play with the command **make** tests in the source code directory. This can provide you with the number of fcrypt(s) that your machine can do per second, which is a number that you can plug into your **network.conf** as a measure of your machines' power (after rounding the value to an integer).

5.2.1.2 Running Crack

Crack is a self-installing program. Once the necessary configuration options for the Crack shellscrip and config.h have been set, the executables are created via **make** by running the Crack shellscrip.

Notes for Yellow Pages (NIS) Users:

To get Crack running from a YP password file, the simplest way is to generate a passwd format file by running:-

```
ypcat passwd > passwd.yp
```

and then running Crack on this file.

To launch Crack:

- 1 Change directory:

```
# cd /usr/local/solaris /crack
```

- 2 To execute the program, type:

```
# ./Crack
```

- 2 For the single platform version:

```
# ./Crack [options] [bindir] /etc/passwd [...other passwd files]
```

- 3 To execute over the network, type:

```
# ./Crack -network [options] /etc/passwd [...other passwd files]
```

For a brief overview of the [options] available, see Section “Options”, below. Section “Crack Support Scripts” briefly describes several very useful scripts.

5.2.1.3 Creating Dictionaries

Crack works by performing several individual passes over the password entries that are supplied. Each pass generates password guesses based upon a sequence of rules, supplied to the program by the user. The rules are specified in a simplistic language in the files gecoss.rules and dictss.rules, located in the Scripts directory (see Section “Crack Support Scripts”, below).

Rules in Scripts/gecoss.rules are applied to data generated by Crack from the pw_gecoss and pw_gecoss entries of the user's password entry. The entire set of rules in gecoss.rules is applied to each of these words, which creates many more permutations and combinations, all of which are tested. After a pass has been made over the data based on gecoss information, Crack makes further passes over the password data using successive rules from the Scripts/dictss.rules by loading the whole of Dicts/bigdict file into memory, with the rule being applied to each word from that file. This generates a resident dictionary, which is sorted and made unique so as to prevent wasting time on repetition. After each pass is completed, the memory used by the resident dictionary is freed up, and re-used when the next dictionary is loaded.

Crack creates the Dicts/bigdict dictionary by merging, sorting, and making unique the source dictionaries, which are to be found in the directory DictSrc and which may also be named in the Crack shellscript, via the \$STDDICT variable. (The default value of \$STDDICT is /usr/dict/words.)

The file DictSrc/bad_pws.dat is a dictionary which is meant to provide many of those common but non-dictionary passwords, such as 12345678 or qwerty.

To create your own dictionary:

- 1 Copy your dictionary into the DictSrc directory (use compress on it if you wish to save space; Crack will unpack it while generating the big dictionary).
- 2 Delete the contents of the Dicts directory by running Scripts/spotless. Your new dictionary will be merged in on the next run.

5.2.1.4 Options

- f** Runs Crack in foreground mode, i.e., the password cracker is not put into the background, and messages appear on stdout and stderr as you would expect. This option is only really useful for very small password files, or when you want to put a wrapper script around Crack.

Foreground mode is disabled if you try running Crack-network -f on the command line, because of the insensibility of rsh'ing to several machines in turn, waiting for each one to finish before calling the next. For more information, read the section about Network Cracking without NFS/RFS in the README.NETWORK file.
- v** Sets verbose mode, whereby Crack will print every guess it is trying on a per-user basis. This is a very quick way of flooding your filestore, but useful if you think something is going wrong.
- m** Sends mail to any user whose password you crack by invoking Scripts/nastygram with their username as an argument. The reason for using the script is so that a degree of flexibility in the format of the mail message is supplied; i.e., you don't have to recompile code in order to change the message.
- nvalue** Sets the process to be nice()ed to value, so, for example, the switch -n19 sets the Crack process to run at the lowest priority.
- network** Throws Crack into network mode, in which it reads the Scripts/network.conf file, splits its input into chunks which are sized according to the power of the target machine, and calls rsh to run Crack on that machine. Options for Crack running on the target machine may be supplied on the command line (for example, verbose or recover mode), or in the network.conf file if they pertain to specific hosts (e.g., nice() values).

-r<pointfile>

This is only for use when running in recover mode. When a running Crack instance starts pass 2, it periodically saves its state in a point file, with a name of the form Runtime/P.* This file can be used to recover where you were should a host crash. Simply invoke Crack in exactly the same manner as the last time, with the addition of the **-r** switch (for example, **-rRuntime/Pfred12345**). Crack will startup and read the file, and jump to roughly where it left off. If you are cracking a very large password file, this can save a lot of time after a crash.

5.2.1.5 Crack Support Scripts

The Scripts directory contains a small number of support and utility scripts, some of which are designed to help Crack users check their progress. The most useful scripts are briefly described below.

Scripts/shadmrg

This is a small script for merging /etc/passwd and /etc/shadow on System V style shadow password systems. It produces the merged data to stdout, and will need to be redirected into a file before Crack can work on it.

Scripts/plaster

This is a simple frontend to the Runtime/D* diefiles that each copy of the password cracker generates. Invoking Scripts/plaster will kill off all copies of the password cracker you are running, over the network or otherwise. Diefiles contain debugging information about the job, and are generated so that all the jobs on the entire network can be called quickly by invoking Scripts/plaster. Diefiles delete themselves after they have been run.

Scripts/status

This script rsh's to each machine mentioned in the Scripts/network.conf file, and provides some information about processes and uptime on that machine. This is useful when you want to find out just how well your password crackers are getting on during a Crack - network.

Scripts/{clean,spotless}

These are really just front ends to a makefile. Invoking Scripts/clean tidies up the Crack home directory, and removes probably unwanted files, but leaves the pre-processed dictionary bigdict intact. Scripts/spotless does the same as Scripts/clean but obliterates bigdict and old output files, too, and compresses the feedback files into one.

Scripts/nastygram

This is the shellscript that is invoked by the password cracker to send mail to users who have guessable passwords, if the **-m** option is used. Edit it to suit your system.

Scripts/guess2fbk

This script takes your out* files as arguments and reformats the 'Guessed' lines into a slightly messy feedback file, suitable for storing with the others. An occasion where this might be useful is when your cracker has guessed many peoples' passwords, and then died for some reason (a crash?) before writing out the guesses to a feedback file. Running Scripts/guess2fbk out* >> Runtime/F.new will save the work that has been done.

5.2.1.6 Checking the Log

Crack loads dictionaries directly into memory, sorts and makes them unique, before attempting to use each of the words as a guess for each users' password. If Crack correctly guesses a password, it marks the user as done and does not waste further time on trying to break that user's password.

Once Crack has finished a dictionary pass, it sweeps the list of users looking for the passwords it has cracked. It stores the cracked passwords in both plain text and encrypted forms in a feedback file in the directory **Runtime**. Feedback files have names of the form **Runtime/F***. The purpose of this is so that when it is next invoked, Crack can recognize passwords that it has successfully cracked previously, and filter them from the input to the password cracker. This provides an instant list of crackable users who have not changed their passwords since the last time Crack was run. This list appears in a file with name **out*** in the **\$CRACK_OUT** directory, or on **stdout**, if foreground mode (**-f**) is invoked (see Section "Options", above).

Similarly, when a Crack run terminates normally, it writes out to the feedback file all encrypted passwords that it has NOT succeeded in cracking. Crack will then ignore all of these passwords next time you run it.

Obviously, this is not desirable if you frequently change your dictionaries or rules, and so there is a script provided, **Scripts/mrgfbk**. This script sorts your feedback files, merges them into one, and optionally removes all traces of "uncrackable" passwords, so that your next Crack run can have a go at passwords it has not succeeded in breaking before.

mrgfbk is invoked automatically if you run **Scripts/spotless** (see Section "Crack Support Scripts", above).

5.2.2 Configuring AnlPasswd

anlpasswd was written by Argonne National Laboratory. There is no install script and installation is by hand. anlpasswd consists of a setuid C program that is used to call the anlpasswd Perl script. The Perl script uses several standard include files that come with Perl and other files that are included with anlpasswd. Additionally, a dictionary file is used to match attempted passwords against possible bad passwords that are in the dictionary file.

It is assumed that Perl 5.003 is properly installed in /tools/bin/perl5 for each platform that anlpasswd is to be used on. The binary ypstuff most likely be placed in a NFS shared directory (/tools/bin). The actual Perl program that does the work should be placed in /usr/local/anlpasswd and chmod to 600. This can't be placed in a NFS directory since /tools/bin/ usually isn't "root equivalent" on all machines and this script should be set to root read only. The Perl includes and dictionary file should also be NFS mounted and placed in /tools/lib/anlpasswd.

The remainder of the installation will need to be completed on each individual machine (moving passwd and ypasswd, creating a SUID program, creating the links, etc.)

The following should be done on each machine (as root):

This assumes that the /tools/bin and /tools/lib directories are already setup as directed above.

Execute the following commands on each host from root:

```
# cd /usr/bin
# mv passwd passwd.orig
# chmod 644 passwd.orig
# mv ypasswd ypasswd.orig
# chmod 644 ypasswd.orig
```



```

# cd /usr/local
# mkdir anpasswd
# cd anpasswd
# cp {source install directory}/anpasswd .
# chmod 600 anpasswd
# ln -s anpasswd passwd
# ln -s anpasswd ypasswd
# cd /usr/bin
# cp {source install directory}/bin.{ARCH}/suidwrap passwd
# chmod 4111 passwd
# ln -s passwd ypasswd

```

Below are the original installation instructions as provided by ANL.

5.2.2.1 Installing anpasswd

1. Copy and modify the anpasswd Perl script. This is located in the "anpasswd/perl" directory of the distribution, and is called (logically enough) "anpasswd". The configuration section of the code is located near the beginning of the script, and is labeled "Configs". Here are the lines you need to be concerned with changing:

```
@legal_shells = ('/bin/sh, /bin/csh');
```

This is an array containing the valid shells available on your system. Note that this may not necessarily be the same as the information listed in /etc/shells. For example, on some machines, /bin/csh and /bin/sh don't have to be listed in /etc/shells. This is not the case with anpasswd; you should set @legal_shells to contain a list of all valid login shells. If you add new login shells to your systems, you need to update this array.

It is very important that the shells listed here are available on all of the machines on your YP network; otherwise, a user may change his/her shell to one that doesn't exist on one of your machines, and therefore will be unable to log in to that machine.

```
unshift(@INC, "/tools/lib/anpasswd");
```

These are additional locations for Perl to look for the include files that came with the anpasswd distribution. These are currently set for our local configuration. If you decide to put the Perl libraries in this distribution (im_prompt2.pl, encrypt_passwd) in locations other than the main Perl include directory, you should add those locations to the include file search path (@INC) as shown above.

Otherwise, you can just delete these lines.

```

# $bigdict = large list of words
$dictdir = "/tools/lib/anpasswd"; # location of dictionaries
$bigdict = "$dictdir/bigdict";   # large list of words
$ypstuffdir = "/tools/bin";      # location of ypstuff executable
$BADPATS = "$dictdir/badpats";   # location of added bad patterns

```

These are the locations of other files that anpasswd needs. Change these to reflect the location of your dictionaries, the location of the main dictionary (bigdict.sorted, in this case), and the location of the "ypstuff" program. Again, if you're using this package over a networked system,

the dictionaries must be located on some filesystem cross-mounted on all of your machines; otherwise this won't work.

There is a `badpats` file in the `perl` directory to use as an example.

Again, the location of the file is installation specific, but it is recommended to put it in with the big dictionary.

Finally, edit the definition of the `@dictlist` array to contain the names of the additional dictionaries (if any) you want to use.

2. Decide where you want to put the `anlpasswd` script, and copy it there. If you are installing this on a network of machines, this location must be on a filesystem cross-mounted on all machines. Since Perl disallows running `setuid` Perl scripts, the `anlpasswd` script is not executed directly. Instead, a `setuid` C wrapper is used to call the `anlpasswd` script. The Perl script should not be executable or `setuid`, and should not be located in anyone's path. You should probably

```
# chmod 600 anlpasswd"
```

to be safe.

3. Make a link to `anlpasswd` called "`passwd`", i.e.

```
# ln -s anlpasswd passwd
```

If you are using YP, make another link for `yppasswd`:

```
# ln -s anlpasswd yppasswd.
```

4. Decide where you want the `passwd` executable to reside. This is a C wrapper running `setuid` to root which calls the `anlpasswd` script. This will probably be in `/bin` or `/usr/local/bin`.

You should keep a copy of the original `passwd` program around somewhere, in case something breaks, but it should not be executable. A good idea would be to do the following:

```
# cd /usr/bin (or wherever the original passwd program was kept)
```

```
    # mv passwd passwd.orig
```

```
    # chmod 644 passwd.orig
```

5. Modify `anlpasswd/c-routines/suidwrap.c` to suit your local configuration. The `PASSWD_ACTUAL` constant contains the location of the "`passwd`" link to `anlpasswd`. Similarly the `YPPASSWD_ACTUAL` constant contains the location of the "`yppasswd`" link. You should change these to reflect the locations you chose in steps 2 and 3. The current settings assume the `yppasswd` and `passwd` executables can be located in `/bin` or `/usr/local/bin`. You should modify these to reflect the location(s) you chose in step 4.

6. Run "`make`" in `anlpasswd.ARCH/c-routines`. This will compile the `suid` wrapper and the `ypstuff` executable. In the `SGI` directory, manually run the lines in the `makefile` that are commented out.

7. Copy " suidwrap" to the location you chose in step 4, and rename this copy as " passwd". (Be sure you saved your original passwd program in a safe place). Change this to be executable by all users, and set it to run suid to root (you must be logged in as root to do this). Make a link to this file called "yppasswd".

For example,

```
# cp suidwrap passwd_exec_dir/passwd
# cd passwd_exec_dir
# chmod 4111 passwd
# ln -s passwd yppasswd
```

Unless the location you have chosen for the passwd executable is on a partition cross-mounted on all machines, you will have to repeat this procedure on every machine (or architecture) on your network. (Don't confuse the executable C wrapper with the Perl anpasswd script; there should only be one copy of the Perl script, on a partition accessible by all the machines on your network.)

7. Copy anpasswd.ARCH/c-routines/ypstuff to the location you chose for it in step 1.

8. Put the large dictionary file in the location you chose in step 1. There is a C program and instructions to do this in dictionary-create.

That should be all that is needed to get this program up and running. If there are any problems or inaccuracies in this documentation, or have any improvements or bug fixes, please send email to "support@mcs.anl.gov"

5.3 Secure access

The security risks involved in using "R" commands such as rlogin, rsh, rexec and rcp are well known but their ease of use has made their use tempting in all but the most secure of environments. Ssh is an easy-to-use, drop in replacement for these commands developed by Tatu Ylonen. Ssh is a "user" level application. No changes to the host kernel are required. The UNIX server implements the commercial version of F-Secure. Both the SSH version 1 and SSH Version 2 version are included in pre-compiled, OS-specific packages

As of the ECS Secure Shell 2.0 release in May, 2000, all of the files needed to function are loaded locally on each UNIX host in /usr/local/bin.

- ssh - replaces rsh, rlogin and rexec for interactive sessions
- scp - replaces rcp for interactive file transfer
- ssh-add - add access to a specific ssh host
- ssh-keygen - generates keys for the local host based on a passphrase (long password)
- sftp - secure ftp

The host daemons are in /usr/local/sbin which include:

- sshd1 - the ssh version 1 daemon
- sshd2 - the ssh version 2 daemon

Several files are generated on installation and when running and are installed locally:

- /etc/ssh_config - system-wide configuration for the ssh client
- /etc/ssh_host_key - contains the long number used for one of the keys
- /etc/ssh_host_key.pub - contains the key known to the public
- /etc/ssh_random_seed - base number used in generating keys
- /etc/sshd.pid - the process number of the sshd currently running
- /etc/sshd_config - defines the local security policy
- /etc/ssh2/ssh2_config - system-wide configuration for the ssh2 client
- /etc/ssh2/hostkey - contains the long number used for one of the ssh2 keys
- /etc/ssh2/hostkey.pub - contains the ssh2 key known to the public
- /etc/ssh2/random_seed - base number used in generating keys
- /etc/ssh2/sshd2_config - defines the local ssh2 security policy
- /etc/sshd2_22.pid (Solaris/SGI) - the process id of the ssh2 daemon currently running
- /var/run/sshd2_22 (HP) - the process id of the ssh2 daemon currently running

The amount of disk space that the programs and the configurations require is less than 25 MB.

5.3.1 The SSH Encryption Mechanism¹

Each host has a host-specific RSA key (normally 1024 bits) used to identify the host. Additionally, when the daemon starts, it generates a server RSA key (normally 768 bits). This key is normally regenerated every hour if it has been used, and is never stored on disk.

Whenever a client connects the daemon, the daemon sends its host and server public keys to the client. The client compares the host key against its own database to verify that it has not changed. The client then generates a 256 bit random number. It encrypts this random number using both the host key and the server key, and sends the encrypted number to the server. Both sides then start to use this random number as a session key which is used to encrypt all further communications in the session. The rest of the session is encrypted using a conventional cipher. Currently, IDEA, DES, 3DES, and ARCFOUR are supported. Within ECS, 3DES is used by default. The client selects the encryption algorithm to use from those offered by the server.

Next, the server and the client enter an authentication dialog. The client tries to authenticate itself using .rhosts authentication, .rhosts authentication combined with RSA host authentication, RSA challenge-response authentication, or password based authentication.

Rhosts authentication is disabled within the DAACS because it is fundamentally.

If the client successfully authenticates itself, a dialog for preparing the session is entered. At this time the client may request things like allocating a pseudo-tty, forwarding X11 connections,

¹ From the *sshd* man page

forwarding TCP/IP connections, or forwarding the authentication agent connection over the secure channel.

5.3.2 How a User uses Secure Shell

The simplest way

To login, use the command:

```
% slogin defiant
```

```
Enter the passphrase for the key (lotsofstuffhere): br0wn cow 3ats grass
```

```
Last login: Sun Feb 22 06:50:59 1998 from echuser.east.hitc.com
```

```
No mail.
```

```
%
```

NOTE: The first time you login to a host the following message will pop up asking if you want to continue. In response, type yes and [enter]:

```
Host key not found from the list of known hosts.
```

```
Are you sure you want to continue connecting (yes/no)? yes
```

```
Host 't1acg01' added to the list of known hosts.
```

To transfer a file, use the command:

```
% scp hostone:/etc/info info
```

```
Enter the passphrase for the key (lotsofstuffhere):: br0wn cow 3ats grass
```

This will copy the file /etc/info from hostone to your local host. Note that your passphrase is needed to initiate the transfer.

IMPORTANT NOTE: The default directory on the *target* host is always the users HOME directory.

Also, one may send/receive file recursively using "-r" such as:

```
% scp -r ~/files/* hostone:~/files
```

will send what is in the home directory files subdirectory to the target host hostone in the home files directory.

To execute a command remotely, use the command:

```
% ssh whoisonfirst ps -ef
```

```
Enter the passphrase for the key (lotsofstuffhere):: br0wn cow 3ats grass
```

A layer of convenience

If you are already a user of "r" commands, you probably know about the .rhost file. Ssh will allow a user to setup the .rhost equivalent called .shost in one's home directory. .Rhost and .shost contain the names of the hosts to which one normally connects. The nice thing about using it is one need not enter one's passphrase. Unlike "r" commands, however, ssh commands use long strings of numbers to authenticate the client, which makes it quite difficult for an intruder to impersonate a legitimate user. One word of caution, however. If you leave your terminal while logged on, a passerby could logon to any host in your .rhost/.shosts file and potentially cause malicious damage to you and your colleagues work. Be aware!

NOTE: ssh checks the mode of .shost, so change permission on .shost by typing:

```
% chmod 600 /home/JohnDoe/.shost
```

where you must substitute your own home directory for /home/JohnDoe.

Multiple connections

If you open multiple connections, it is more convenient to keep your keys in system memory. To do this requires executing two commands:

```
% ssa
```

```
Enter the passphrase for the key (lotsofstuffhere):
```

```
Enter passphrase: br0wn cow 3ats grass
```

```
Identity added: /home/JohnDoe/.ssh/identity (bpeters@nevermor)
```

```
%
```

Now, one may make connections (slogin, scp, ssh) to hosts that are running ssh without being prompted for a passphrase.

Secure FTP

As of this release, a secure version of ftp is included. Use the command:

```
% sftp user@remotehost
```

```
Enter the passphrase for the key (lotsofstuffhere): MY PASSPHRASE <enter>
```

```
local directory - /home/user
```

```
remote directory - /home/user
```

```
sftp> get thisisafilename
```

```
sftp> quit
```

Other notes

IMPORTANT: Ssh will automatically "tunnel" X sessions without user involvement even through multiple hops. However, it is important to NOT change the DISPLAY parameter or X will not use the ssh tunnel!

5.3.3 Configuration of Secure Shell

Local setup

Most users will start from the same host whether from an X terminal, a UNIX workstation, or a PC. Running the sshsetup script generates long strings called keys that make ssh work. One set of keys is needed for each home directory.

The only thing you need to know before executing the script is to pick a good passphrase of at least 10 characters. You can and should use spaces and multiple words with numbers, misspellings and special characters. Note that passwords are NOT echoed back to the screen.

PLEASE DO NOT USE THE PASSWORDS/PASSPHRASES USED HERE OR IN ANY OTHER DOCUMENTATION!

Using the script sshsetup should look like:

```
% sshsetup <enter>

Use a passphrase of at least 10 characters which should include numbers
or special characters and MAY include spaces

New passphrase: This is a silly test <enter>

Retype new passphrase: This is a silly test <enter>

Generating ssh1 keys. Please wait while the program completes...

Generating ssh2 keys. This can take up to 240 seconds...

Done with sshsetup!

%
```

You are on the way!

NOTE: If you have accounts in the PVC, VATC and/or the EDF, do sshsetup in EACH environment.

Remote Setup

If you need to access a host with a different home directory, you will need to run the sshremote script. This script sets up the destination host with the new set of keys and transfers the source

(local) key to the destination and the destination key to the source. A new capability is to use different user names on the source and target hosts. This should look something like:

```
% sshremote
Remote user name (default: yourusername):
Do you want to setup for:
1 VATC
2 PVC
3 GSFC DAAC
4 SMC
5 GSFC M and O
6 EDC DAAC
7 EDC M and O
8 LaRC DAAC
9 LaRC M and O
10 NSIDC DAAC
11 NSIDC M and O
x Exit from script
Select:
2
Working...
Accepting host p0spg07.pvc.ecs.nasa.gov key without checking.
yourusername@p0spg07.pvc.ecs.nasa.gov's password:
Authentication complete. Continuing with sshremote...
Downloaded remote keys.
Uploaded local keys.
Keys concatenated.

Enter next site (press the enter-key and then x enter-key to exit)

Remote user name (default: yourusername): <enter>

Do you want to setup for:
1 VATC
2 PVC
3 GSFC DAAC
4 SMC
5 GSFC M and O
6 EDC DAAC
7 EDC M and O
8 LaRC DAAC
9 LaRC M and O
10 NSIDC DAAC
11 NSIDC M and O
x Exit from script
Select:
x <enter>
bye!
%
```

Changing your Passphrase

To change your passphrase, use the following command:


```
% ssh-keygen -p
Enter file in which the key is ($HOME/.ssh/identity): [RETURN]
Enter old passphrase: little 1amp jumb3d
Key has comment 'JohnDoe@theagency.nasa.gov'
Enter new passphrase (empty for no passphrase): br0wn cow 3ats grass
Enter same passphrase again: br0wn cow 3ats grass
Your identification has been saved with the new passphrase.
```

5.3.3 Administration of Secure Shell

There is no administration of secure shell required except for general monitoring to make sure that the daemon processes (`/usr/local/sbin/sshd1` and `/usr/local/sbin/sshd2`) are running. Note, however, that the standard installation will establish a `/var/log/ssh` log file. It is recommended to review the `/var/log/ssh` and the system log file at least once a week.

5.4 Controlling Requests for Network Services (TCP Wrappers)

With TCP Wrappers, you can monitor and filter incoming requests for network services, such as FTP.

TCP Wrapper provides a small wrapper program for inet daemons that can be installed without any changes to existing software or to existing configuration files. The wrappers report the name of the client host and the name of the requested service; the wrappers do not exchange information with the client or server applications, and impose no overhead on the actual conversation between the client and server applications. The usual approach is to run one single daemon process that waits for all kinds of incoming network connections. Whenever a connection is established, this daemon runs the appropriate server program and goes back to sleep, waiting for other connections.

M&O personnel will monitor requests for these network services:

Client	Server	Application
ftp	ftpd	file transfer
finger	fingerd	show users

The `/var/log/wrappers log` file should be reviewed at least once a week. The log file provides information concerning who tried to access the network service. TCP Wrapper blocks any request made by unauthorized users. TCP Wrapper can be configured to send a message to any administrator whose request is rejected.

5.5 INSTALLATION, CONFIGURATION, and TESTING for Wrappers

The installation of TCP Wrappers is part of the ECS Secure Shell 2.0 package. The location of most of the wrappers files have been changed to `/usr/local/sbin`. `Libwrap.a` is in `/usr/local/lib` and `tcpd.h` is in `/usr/local/include`.

1. There are two files that provide access control for the system: `/etc/hosts.allow` and `/etc/hosts.deny`

The general format is:

daemonlist : clientlist : script : ALLOW/DENY

What follows is an example of a /etc/hosts.allow file as used at the Landover facility:

=====

Added for HIPPI network. Do Not Delete!

ALL: 192.168.1. : BANNERS /usr/local/sbin/banners : ALLOW

ALL: 198.118. : BANNERS /usr/local/sbin/banners : ALLOW

ALL: 198.118.192. : BANNERS /usr/local/sbin/banners : DENY

ALL: 192.150.28. : BANNERS /usr/local/sbin/banners : ALLOW

ALL: 38.177.222. : BANNERS /usr/local/sbin/banners : ALLOW

ALL: 128.183. : BANNERS /usr/local/sbin/banners : ALLOW

ALL: ALL: BANNERS /usr/local/sbin/banners : DENY

2. The following lines should be included in a Solaris /etc/inetd.conf :

```
ftp stream tcp nowait root /usr/local/sbin/tcpd in.ftpd
```

```
telnet stream tcp nowait root /usr/local/sbin/tcpd in.telnetd
```

The default daemons should be commented out:

```
#ftp stream tcp nowait root /usr/sbin/in.ftpd in.ftpd
```

```
#telnet stream tcp nowait root /usr/sbin/in.telnetd in.telnetd
```

3. Determines the process number of the inet daemon and restart it using the command:

```
# ps -ef | grep inetd
```

```
# kill -HUP "inetd process number"
```

4. Test to make sure that you can login from the existing host and also from another host on a different subnet.

5. Finish up using the following commands:

```
# chmod 750 /etc/hosts.allow
```

```
# touch /var/log/wrappers
```

```
# chmod 751 /var/log/wrappers
```

6. . You are done.

5.6 Monitoring File and Directory Integrity (Tripwire)

Tripwire is a tool that aids in the detection of unauthorized modification of files resident on Unix systems. One important application of Tripwire is as the first and most fundamental layer of intrusion detection for an organization. Tripwire is automatically invoked at system startup. This utility checks file and directory integrity by comparing a designated set of files and directories against information stored in a previously generated database. Tripwire flags and logs any differences, including added or deleted entries. When run against system files regularly, Tripwire spots any changes in critical system files, records these changes into its database, and notifies system administrators of corrupted or tampered files so that they can take damage control measures quickly and effectively. With Tripwire, system administrators can conclude with a high degree of certainty that a given set of files remain free of unauthorized modifications if Tripwire reports no changes. Tripwire works in conjunction with these other solutions to provide a "Defense in Depth"(TM) security solution.

Note: Since system files should not change and users' files change constantly, Tripwire should be used to **monitor only system files**. The list of system files you want to monitor is stored in **./configs/tw.conf**.

The system administrator should install Tripwire on a clean system. This baseline database will then be used to compare possible changes to files and directories to make sure the system has not been compromised. If the system has been compromised, information provided by Tripwire can be used to carry out a forensics investigation of the compromise. Forensics is the compiling of the chain of evidence necessary to prosecute offenders after an attack has occurred.

The system administrator should check any changes made to the system on a weekly basis or after an alert from a security organization like NASIRC or CERT has put out an alert on security vulnerabilities for any of the baseline operating systems or COTS software.

All reported changes need to be investigated right away. If no problems are detected, then the Tripwire database needs to be updated to reflect these changes. Tripwire should be configured to mail the system administrator any output that it generates

5.6.1 Installation of Tripwire

1. Login or su to root
2. Change directory to the admin automount:

```
# cd /tools/admin
```
3. Make a tripwire directory using the command:

```
# mkdir tripwire
```
4. Make sun5, irix62, irix65 and hpux10 directories:

```
# mkdir sun5
# mkdir irix62
# mkdir irix65
# mkdir hpux10
```

5. Download the distributions from the SMC to their respective directory and uncompress
6. Copy inetd file using the command:

```
# cp /etc/inet/inetd.conf /etc/inet/inetd.conf.orig
```

7. To setup:

```
# /etc/tripwire-1.2/src/tripwire -init
```

This will create a database file resided in

```
/etc/tripwire-1.2/src/databases/tw.db_HOSTNAME
```

8. To test, from a normal user account, execute the command:

```
: % touch /etc/intruder
```

9. From root, then get the report using the command:

```
# /etc/tripwire-1.2/src/tripwire -v > /tmp/tw.report
```

This should report /etc/intruder was created.

10. Delete the test file and the sample reports using the commands:

```
# rm /etc/intruder
# rm /tmp/tw.report
```

5.6.2 Updating the Tripwire Database

You can update your Tripwire database in two ways. The first method is interactive, where Tripwire prompts the user whether each changed entry should be updated to reflect the current state of the file, while the second method is a command-line driven mode where specific files/entries are specified at run-time.

5.6.2.1 Updating Tripwire Database in Interactive mode

Running Tripwire in Interactive mode is similar to the Integrity Checking mode. However, when a file or directory is encountered that has been added, deleted, or changed from what was recorded in the database, Tripwire asks the user whether the database entry should be updated.

For example, if Tripwire is run in Interactive mode and a file's timestamp changed, Tripwire will print out what it expected the file to look like, what it actually found, and then prompt the user whether the file should be updated. For example:

```
/etc/hosts.equiv
    st_mtime: Wed May 5 15:30:37 1993    Wed May 5 15:24:09 1993
    st_ctime: Wed May 5 15:30:37 1993    Wed May 5 15:24:09 1993
---> File: /etc/hosts.equiv
---> Update entry? [YN(y)n?] y
```

You could answer yes or no, where a capital 'Y' or 'N' tells Tripwire use your answer for the rest of the files. (The 'h' and '?' choices give you help and descriptions of the various inode fields.)

While this mode may be the most convenient way of keeping your database up-to-date, it requires that the user be "at the keyboard." A more conventional command-line driven interface exists, and is described next.

5.6.2.2 Updating Tripwire Database in Database Update Mode

Tripwire supports incremental updates of its database on a per-file/directory or `tw.config` entry basis. Tripwire stores information in the database so it can associate any file in the database with the `tw.config` entry that generated it when the database was created.

Therefore, if a single file has changed, you can:

```
# tripwire -update /etc/newly.installed.file
```

Or, if an entire set of files that made up an entry in the `tw.config` file changed, you can:

```
# tripwire -update /usr/local/bin/Local_Package_Dir
```

In either case, Tripwire regenerates the database entries for every specified file. A backup of the old database is created in the `./databases` directory.

Tripwire can handle arbitrary numbers of arguments in Database Update mode.

The script `twdb_check.pl` script is an interim mechanism to ensure database consistency. Namely, when new entries are added to the `tw.config` file, database entries may no longer be associated with the proper entry number. The `twdb_check.pl` script analyzes the database, and remaps each database entry with its proper `tw.config` entry.

5.6.3 Configuring the `tw.config` file

Edit your `tw.config` file in the `./configs` directory, or whatever filename you defined for the Tripwire configuration file, and add all the directories that contain files that you want monitored. The format of the configuration file is described in its header and in the "man" page. Pay especially close attention to the `select-flags` and `omit-lists`, which can significantly reduce the amount of uninteresting output generated by Tripwire. For example, you will probably want to omit files like mount tables that are constantly changed by the operating system.

Run Tripwire with **tripwire -initialize**. This will create a file called **tw.db_[hostname]** in the directory you specified to hold your databases (where [hostname] will be replaced with your machine hostname).

Tripwire will detect changes made to files from this point on. You ***must*** be certain that the system on which you generate the initial database is clean; however, Tripwire cannot detect unauthorized modifications that have already been made. One way to do this would be to take the machine to single-user mode, reinstall all system binaries, and run Tripwire in initialization mode before returning to multi-user operation.

This database must be moved someplace where it cannot be modified. Because data from Tripwire is only as trustworthy as its database, choose this with care. It is recommended to place all the system databases on a read-only disk (you need to be able to change the disk to writeable during initialization and updates, however), or exporting it via read-only NFS from a "secure-server." (This pathname is hardcoded into Tripwire. Any time you change the pathname to the database repository, you must recompile Tripwire. This prevents a malicious intruder from spoofing Tripwire into giving a false "okay" message.)

We also recommend that you make a hardcopy printout of the database contents right away. In the event that you become suspicious of the integrity of the database, you will be able to manually compare information against this hardcopy.

Once you have your database set up, you can run Tripwire in Integrity Checking mode by typing **tripwire** on the command line from the directory in which Tripwire has been installed.

5.7 Reporting Security Breaches

Reporting of Security breaches shall be in accordance with EOSDIS Security Policy and Guides (EOSDIS-IVV-0821.2-9/30/97). Appendix B and C.

5.8 Initiating Recovery from Security Breaches

Recovery from Security breaches shall be in accordance with EOSDIS Security Policy and Guides (EOSDIS-IVV-0821.2-9/30/97). Appendix B and C.

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6. Network Administration

This section covers the procedures necessary for the management operations that monitor and control the system network capabilities.

Detailed procedures for tasks performed by the Network Administrator are provided in the sections that follow. The procedures assume that the administrator is authorized and has proper access privileges to perform the tasks (i.e., root).

6.1 Network documentation

ECS Network Administration requires access to restricted documents not available via the `cmdm.east.hitc.com` (PETE Server) URL. These documents include:

- Network Overview Diagram 921-TDx-001
(x = DAAC designation: G/Goddard; L/Langley; N/NSIDC; E/EDC)
- Hardware Network Diagram 921-TDx-002
- Host IP Assignments 921-TDx-003
- Network IP Assignments 921-TDx-004
- Dual-Homed Host Static Routes 921-TDx-005
- Ingest Host Static Routes 921-TDx-006

These documents describe and depict the network layout and inter/intra-connections necessary to understand the ECS. Contact Landover Configuration Management for copies for individual sites.

6.2 Network Monitoring

Previous methods of ECS Network Monitoring included using HP OpenView (HPOV) as the Graphical User Interface (GUI) program to view, interrogate and modify the ECS network topography. Monitoring also included command-line interaction to test network operability.

HPOV agents have been removed from ECS essentially removing OpenView access. Monitoring is now conducted primarily via command-line interaction and site-developed scripts. An overview of network information is provided as a basis for evaluating network status.

6.3 DAAC LAN Topology Overview

The Distributed Active Archive Center (DAAC) Local Area Network (LAN) consists of a User Fiber Distributed Data Interface (FDDI) Network, a Production FDDI Network, an Ingest FDDI network, and a High Performance Parallel Interface) HiPPI Network. The NSIDC DAAC does not have Ingest or HiPPI networks.

The creation of separate User and Processing networks allows processing flows to be unaffected by user pull demands, and the introduction of the high-speed HiPPI Network provides adequate bandwidth to the Processing and Data Server subsystems to transfer high volumes of data. Each of the networks is discussed in detail below.

6.3.1 The Production Network

The Production Network consists of multiple FDDI rings supporting the DAAC subsystems and connections to external production systems (such as EDOS and other ECS DAACs) via the EOSDIS Backbone Network (Ebnet). The separation and aggregation of hosts and subsystems onto FDDI rings is driven mostly by reliability, maintainability and availability (RMA) and data flow requirements. For instance, Ingest is contained on an individual FDDI ring because of the strict RMA requirement for receipt of Level 0 data. Some Data Server hosts may be contained on dedicated FDDI rings in order to provide adequate bandwidth for processing flow requirements. The Data Management (DM), Local System Management (LSM), and some Data Server hosts are contained on a single ring because their flows are expected to be fairly small given that user traffic will be processed on the separate User Network (see discussion below). Another ring provides access to the EBnet router to handle DAAC-DAAC flows. The FDDI Switch is the central device connecting the FDDI rings together, and it provides the necessary routing and filtering control.

6.3.2 The User Network

The User Network is an FDDI-based LAN connecting users (via NSI, local campuses, general Internet, etc.) to DAAC hosts responsible for providing user access. It has the main advantage of separating user and production flows. This allows DAAC processing data flows to be unaffected by user demand, so that even unanticipated user pull will not hinder the production network. Basically, the User Network provides access to Data Manager hosts and to a subset of DataServer hosts that interact directly with users. Users will not have access to any other hosts, such as Ingest or Processing devices. CSS and MSS servers are also connected to the User Network. These servers are required for communications with outside networks for such things as name lookups and receipt of Internet mail, as well as communication with and monitoring of the DAAC's interfaces to the user community (such as NSI and the local campus).

The following subsystems have servers attached to the User Network:

1. Planning Server
2. Science Processor (1)
3. MSS Servers
4. CSS Servers
5. Interface Servers
6. APC Servers

At EDC, there is also an Access Server attached to the User Network. This access server has two 28.8 Kbps modems attached so that remote users can access the EDC DAAC User Network via a dial-up circuit as well as via the Internet.

The User Network connects to the Campus Isolation LAN through an ECS router which will provide the necessary routing and filtering controls. NSI, the local Campus, and other Internet providers will also be connected to the Campus Isolation LAN. At some DAACs, there is an additional direct FDDI connection to the NSI router because of the expected large user data flows.

6.3.3 FDDI Topology

Individual FDDI rings for the Production Network will be implemented with FDDI concentrators to provide ease of wiring and central points of management. Workstations will have single-attached FDDI cards, whereas the high-performance servers and processors on the Production Network will have dual-attached FDDI cards to provide redundancy. Dual-attached hosts will be dual-connected to two separate FDDI concentrators to provide an additional level of redundancy in the event of a hub failure. Interfaces of User Network hosts will also have FDDI interface cards which will be connected to a FDDI concentrator. This FDDI concentrator will be connected to the ECS Router. Printers and X-terminals will be connected to the DS/DM/LSM FDDI ring via an FDDI-to-Ethernet hub.

6.3.4 The HiPPI Network

The HiPPI Network interconnects Data Server hosts and Science Processors in order to provide a high-speed network to handle the large data transfers between the two subsystems. The HiPPI network will be implemented via a central HiPPI switch with switched 800 Mbps interface ports connected directly to the high-powered processing and storage hosts. The HiPPI Network shifts the numerous transfers of large volumes of data onto a dedicated high-speed topology, freeing the FDDI-based Production Network to handle control flows and DAAC-DAAC processing flows.

6.4 Network Hardware Components

6.4.1 LAN Components

The DAAC LANs consist of the following hardware components:

FDDI Concentrator. The FDDI Concentrator is a SynOptics 2914. It is a high-speed interface (100 Mbps). It consist of an FDDI interface for connecting to a FDDI ring and 12 FDDI ports for connecting to FDDI based hosts.

Ethernet-to FDDI Hub. The Ethernet-to-FDDI hub is a Cabletron MicroMAAC-22E. It consist of an FDDI interface for connecting to a FDDI ring and either 12 or 24 shared ethernet ports for connecting the printers and X-terminals. At EDC, the access server also attaches to an Ethernet-to-FDDI hub.

Access Server. The Access Server is a Cisco 2509. It consist of eight modem ports and an ethernet port.

Maintenance and configuration of the access server is considered a non-trivial function. Such tasks are addressed in special technical training provided by the vendor and supplemental training provided by ECS.

ECS Router. The ECS Router is a Cisco 7507 or 7513. It is a high-speed interface (100 Mbps). It consists of several FDDI interfaces. It interfaces to the local campus network, NSI, M&O network, User network, and Production network. It provides IP address and port level filtering in support of the ECS security policy.

Maintenance and configuration of the ECS router is considered a non-trivial function. Such tasks are addressed in special technical training provided by the vendor and supplemental training provided by ECS.

FDDI Switch. The FDDI Switch is a Fore Systems PowerHub. It is a high-speed interface (100 Mbps). It consists of several FDDI interfaces. The FDDI interfaces which are used within the Production network are a switched (bridged) group. It also interfaces to EBnet and the Ingest network. It provides IP address and port level filtering in support of the ECS security policy.

Maintenance and configuration of the FDDI Switch is considered a non-trivial function. Such tasks are addressed in special technical training provided by the vendor and supplemental training provided by ECS.

HiPPI Switch. The HiPPI Switch is an Essential Communication EPS-16. It is a very high-speed interface (800 Mbps). It is used to connect some of the SGI hosts to a high speed switching fabric.

Note: The NSIDC DAAC does not have a HiPPI Switch.

Maintenance and configuration of the HiPPI Switch is considered a non-trivial function. Such tasks are addressed in special technical training provided by the vendor and supplemental training provided by ECS.

6.5 ECS Domain Name Services (DNS) Structure

The parent DNS domain for ECS is **ecs.nasa.gov**. These DNS servers reside at the SMC, NSIDC, and EDC. In this domain are the SMC hosts, User hosts for all DAACs, and pointers to the DAACs' DNS servers.

The ecs.nasa.gov DNS servers are:

- m0mss02.ecs.NASA.GOV (internet address = 198.118.212.37).
- m0mss04.ecs.NASA.GOV (internet address = 198.118.212.41).
- n0css02u.ecs.NASA.GOV (internet address = 198.118.206.84).
- e0css02u.ecs.NASA.GOV (internet address = 198.118.203.104).

The DAACs' Production and HiPPI networks are a child domain of ecs.nasa.gov. They are:

- LaRC Production and HiPPI networks:
 - l0ins02.larcb.ecs.nasa.gov (internet address = 198.118.219.74).
 - l0css02.larcb.ecs.nasa.gov (internet address = 198.118.219.67).
- EDC Production and HiPPI networks:
 - e0ins02.edcb.ecs.nasa.gov (internet address = 198.118.202.159).
 - e0css02.edcb.ecs.nasa.gov (internet address = 198.118.202.132).
- NSIDC Production network:
 - n0ins02.nsidcb.ecs.nasa.gov (internet address = 198.118.205.145).
 - n0css02.nsidcb.ecs.nasa.gov (internet address = 198.118.205.123).

- GSFC Production and HiPPI networks:
 - g0ins02.gsfc.ecs.nasa.gov (internet address = 198.118.210.69).
 - g0css02.gsfc.ecs.nasa.gov (internet address = 198.118.210.63).

The DAACs' M&O networks are also a child domain of ecs.nasa.gov. They are:

- LaRC M&O network.
 - larcmo.ecs.nasa.gov.
- EDC M&O network.
 - edcmo.ecs.nasa.gov.
- NSIDC M&O network.
 - nsidcmo.ecs.nasa.gov.
- GSFC M&O network.
 - gsfcmo.ecs.nasa.gov.

6.6 Host Names

Because some hosts are attached to multiple networks (i.e., Production, User, and HiPPI), a letter is appended to the production host name to distinguish which interface (and IP address) a user is accessing.

As an example, a GSFC DAAC host named g0acg01.gsfc.ecs.nasa.gov is a host attached to the Production network. If that host was also attached to the HiPPI network, it would also be known as g0acg01h.gsfc.ecs.nasa.gov. If this host were also attached to the User network, it would also be known as g0acg01u.ecs.nasa.gov.

6.7 Network Security

6.7.1 ECS Network Connectivity

The ECS network was designed to minimize unauthorized user access.

Ingest network access at a DAAC is limited to its Level 0 data provider(s), the SMC, and hosts attached to the DAAC's Production and M&O networks. No local campus, Internet or other DAAC access is provided.

Access to a DAAC's Production network is limited to the SMC, the DAAC's M&O network, and other DAACs. No local campus, Internet, or Level 0 data provider(s) access is provided.

The ECS Network Connectivity Matrix, shown in Figure 6-1, summarizes which networks can access hosts on another network.

Network	GSFC Ingest	GSFC Prod	GSFC User	LaRC Ingest	LaRC Prod	LaRC User	EDC Ingest	EDC Prod	EDC User	NSIDC Prod	NSIDC User	SMC/BB	VATC Prod.	VATC User	NSI/ Internet
GSFC Ingest		X										X			
GSFC Production	X				X			X		X		X	X		
GSFC User												X			X
LaRC Ingest					X							X			
LaRC Production				X				X		X		X	X		
LaRC User												X			X
EDC Ingest								X				X			
EDC Production		X			X		X			X		X	X		
EDC User												X			X
NSIDC Production		X			X			X		X		X	X		
NSIDC User												X			X
SMC/BB	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
VATC Prod.		X			X			X		X		X		X	
VATC User												X	X		X
NSI/Internet			X			X			X		X	X		X	

Figure 6-1. ECS Network Connectivity Matrix

6.7.2 Troubleshooting - Verifying connectivity

One of the key reasons for failure of data access and transfer is an error or problem in system connectivity. This can be caused by a myriad of glitches such as incorrect/outdated lookup tables, incorrectly assigned IP addresses, missing default route and more. Besides checking individual host/server operation with various tools such as Tivoli and Whazzup??, you can use several command line entries to verify point-to-point communication between components.

There are three initial steps to help verify system connectivity. They include ensuring connectivity is authorized, determining if the Domain Name Service (DNS) is resolving host name and IP addresses correctly, and actively testing the connectivity by using the ping function.

Authorized connectivity can be determined by checking the ECS Network Connectivity Matrix, Figure 6-1.

Checking local host access to another local host over the network

- 1 On workstation **x0xxx##**, at the UNIX prompt in a terminal window, check the Domain Name Service entries (DNS) for the source host by typing **nslookup <local_host>**.
 - The screen display will be similar to the following:

```
g0spg01{mblument}[204]->nslookup g0spg01
Server: g0css02.gsfc.ecs.nasa.gov
Address: 198.118.210.63
Name: g0spg01.gsfc.ecs.nasa.gov
Address: 198.118.210.16
```
- 2 Check the DNS entries for the remote host by typing **nslookup <other_host>**.
 - The screen display will be similar to the following:

```
g0spg01{mblument}[201]->nslookup g0css02
Server: g0css02.gsfc.nasa.gov
```

- Address: 198.118.210.63
Name: g0css02.gsfc.nasa.gov
Address: 198.118.210.63

3 Determine the host's network interface using **ifconfig <interface>** where **<interface>** parameter can be found by executing **netstat -i**

- The **netstat -i** command will provide the following information:

```
g0spg01{mblument}[201]->netstat -i
Name Mtu Network Address Ipkts Ierrs Opkts Oerrs Coll
ipg0 4352 198.118.210 g0spg01.gsfc. 9182666 1 8103032 0 0
hip0 65280 192.168.1 g0spg01h.gsfc. 5554524 0 6776651 0 0
xpi0 4352 198.118.212.64 g0spg01u.ecs. 37850320 0 14109683 3 0
xpi1 0 none none 0 0 0 0 0
et0* 1500 none none 0 0 0 0 0
lo0 8304 loopback localhost 314800 0 314800 0 0
```

- Using **ipg0** from the **ifconfig <interface>** data as the interface parameter, **ifconfig ipg0**, will result in the following display:

```
g0spg01{mblument}[203]->ifconfig ipg0
ipg0: flags=863<UP,BROADCAST,NOTRAILERS,RUNNING,MULTICAST>
inet 198.118.210.16 netmask 0xfffff00 broadcast 198.118.210.255
```

4 Ping the two hosts to verify their inter-connectivity.

- Ping the local host (g0spg01).

```
g0spg01{mblument}[232]->ping g0spg01
PING g0spg01.gsfc.nasa.gov (198.118.210.16): 56 data bytes
64 bytes from 198.118.210.16: icmp_seq=0 ttl=255 time=0 ms
64 bytes from 198.118.210.16: icmp_seq=1 ttl=255 time=0 ms
64 bytes from 198.118.210.16: icmp_seq=2 ttl=255 time=0 ms
64 bytes from 198.118.210.16: icmp_seq=3 ttl=255 time=0 ms
64 bytes from 198.118.210.16: icmp_seq=4 ttl=255 time=0 ms
----g0spg01.gsfc.nasa.gov PING Statistics----
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 0/0/0 ms
g0spg01{mblument}[233]->
```

- Ping the remote host (g0css02).

```
g0spg01{mblument}[202]->ping g0css02
PING g0css02.gsfc.nasa.gov (198.118.210.63): 56 data bytes
64 bytes from 198.118.210.63: icmp_seq=0 ttl=255 time=2 ms
64 bytes from 198.118.210.63: icmp_seq=1 ttl=255 time=1 ms
64 bytes from 198.118.210.63: icmp_seq=2 ttl=255 time=1 ms
```

64 bytes from 198.118.210.63: icmp_seq=3 ttl=255 time=1 ms

64 bytes from 198.118.210.63: icmp_seq=4 ttl=255 time=1 ms

----g0css02.gsfc.nasa.gov PING Statistics----

5 packets transmitted, 5 packets received, 0% packet loss

round-trip min/avg/max = 1/1/2 ms

- 5 Check the health of the interface by executing **netstat -i**, looking for Ierrs and/or Oerrs that if present (1 or 2 errors are ok, 100 are not ok) indicate an interface problem; check the syslog for any startup or logged problems from the OS.

```
g0spg01{mblument}[218]->netstat -i
```

Name	Mtu	Network	Address	Ipkts	Ierrs	Opkts	Oerrs	Coll
ipg0	4352	198.118.210	g0spg01.gsfc.b.	9197317	1	8113487	0	0
hip0	65280	192.168.1	g0spg01h.gsfc.b.	5554541	0	6776668	0	0
xpi0	4352	198.118.212.64	g0spg01u.ec.s.	37851779	0	14109837	3	0
xpi1	0	none	none	0	0	0	0	0
et0*	1500	none	none	0	0	0	0	0
lo0	8304	loopback	localhost	325510	0	325510	0	0

- 6 Check the routing table for accuracy and completeness by executing **netstat -rn**.

- The resultant display will be similar to the following:

```
g0spg01{mblument}[226]->netstat -rn
```

Routing tables

Internet:

Destination	Gateway	Netmask	Flags	Refs	Use	Interface
default	198.118.212.65		UGS	1	14060556	xpi0
127.0.0.1	127.0.0.1		UH	7	270097	lo0
192.168.1	192.168.1.1	0xffffffff	U	0	0	hip0
192.168.1.1	192.168.1.1		UGHS	0	22	hip0
192.168.1.2	192.168.1.2		UGHS	1	3993577	hip0
192.168.1.3	192.168.1.3		UGHS	0	17	hip0
192.168.1.4	192.168.1.4		UGHS	0	2397593	hip0
192.168.1.5	192.168.1.5		UGHS	2	178	hip0
192.168.1.6	192.168.1.6		UGHS	0	24	hip0
192.168.1.7	192.168.1.7		UGHS	0	1403	hip0
192.168.1.8	192.168.1.8		UGHS	0	6	hip0
192.168.1.9	192.168.1.9		UGHS	0	0	hip0
192.168.1.10	192.168.1.10		UGHS	0	0	hip0
198.118.198	198.118.210.1	0xffffffff	UGS	0	16	ipg0
198.118.198.12	198.118.210.2		UGHD	0	31646	ipg0
198.118.198.14	198.118.210.2		UGHD	0	1032	ipg0
198.118.198.17	198.118.210.2		UGHD	0	0	ipg0
198.118.198.25	198.118.210.2		UGHD	0	194	ipg0
198.118.198.26	198.118.210.2		UGHD	0	36153	ipg0
198.118.198.27	198.118.210.2		UGHD	0	23425	ipg0

```

198.118.198.28 198.118.210.2      UGHD    4  11686 ipg0
198.118.198.29 198.118.210.2      UGHD    0   1682 ipg0
198.118.198.30 198.118.210.2      UGHD    3  14760 ipg0
198.118.198.32 198.118.210.2      UGHD    2  917384 ipg0
198.118.198.42 198.118.210.2      UGHD    0   87381 ipg0
198.118.198.76 198.118.210.2      UGHD    3  568062 ipg0
198.118.198.100 198.118.210.2      UGHD    0   1223 ipg0
198.118.198.107 198.118.210.2      UGHD    0    299 ipg0
198.118.198.113 198.118.210.2      UGHD    0    893 ipg0
198.118.198.116 198.118.210.2      UGHD    0   9438 ipg0
198.118.202    198.118.210.1  0xffffffff00 UGS    0    0 ipg0
198.118.205    198.118.210.1  0xffffffff00 UGS    0    0 ipg0
198.118.208    198.118.210.1  0xffffffff00 UGS    0    0 ipg0
198.118.210    198.118.210.16  0xffffffff00 U    177 5624292 ipg0
198.118.210.16 127.0.0.1        UGHS    15  55462 lo0
198.118.211.32 198.118.210.1  0xffffffe0 UGS    0   6842 ipg0
198.118.212.32 198.118.210.1  0xffffffe0 UGS    0   1004 ipg0
198.118.212.40 198.118.210.2      UGHD    0   6205 ipg0
198.118.212.64 198.118.212.69  0xffffffe0 U    0   4485 xpi0
198.118.212.160 198.118.210.1  0xffffffe0 UGS    0    0 ipg0
198.118.219    198.118.210.1  0xffffffff00 UGS    0    0 ipg0
198.118.220    198.118.210.1  0xffffffff00 UGS    0    0 ipg0
198.118.232    198.118.210.1  0xffffffff00 UGS    0   143 ipg0
210.138.100    198.118.210.1  0xffffffff00 UGS    0    0 ipg0
224            198.118.210.16  0xf0000000 US     0    2 ipg0
g0spg01{mblument}[227]->

```

- Ping the default IP address to ensure connectivity to the default route (default: 198.118.212.65)

```

g0spg01{mblument}[228]->ping 198.118.212.65
PING 198.118.212.65 (198.118.212.65): 56 data bytes
64 bytes from 198.118.212.65: icmp_seq=0 ttl=255 time=1 ms
64 bytes from 198.118.212.65: icmp_seq=1 ttl=255 time=1 ms
64 bytes from 198.118.212.65: icmp_seq=2 ttl=255 time=1 ms
64 bytes from 198.118.212.65: icmp_seq=3 ttl=255 time=1 ms
64 bytes from 198.118.212.65: icmp_seq=4 ttl=255 time=1 ms
64 bytes from 198.118.212.65: icmp_seq=5 ttl=255 time=1 ms
64 bytes from 198.118.212.65: icmp_seq=6 ttl=255 time=1 ms
----198.118.212.65 PING Statistics----

```


7 packets transmitted, 7 packets received, 0% packet loss
round-trip min/avg/max = 1/1/1 ms

- 7 Check the other host using the same steps.
- 8 Check other hosts using the same infrastructure components as the two hosts with the problem.
- 9 If the host you are trying to communicate with is attached to the Ethernet Hub, make sure that the “Don’t Fragment” bit in the IP header is NOT set on the host which is FDDI attached. The Ethernet Hub does not support MTU discovery so it will not inform the host that the packet is too big. It silently discards the packet. By default, the Sun hosts are improperly configured. Check the file /etc/init.d/inetinit to ensure that the command to reset the “Don’t Fragment” bit is included: **ndd -set /dev/ip ip_path_mtu_discovery 0**

Checking local host access to another local host over the HiPPI Switch

- 1 On workstation **x0xxx##**, at the UNIX prompt in a terminal window, check the Domain Name Service entries (DNS) for the source host by typing **nslookup <local_host>**.
 - The screen display will be similar to the following:

```
g0drg07{mblument}[205]->nslookup g0drg07h
Server: g0css02.gsfc.nasa.gov
Address: 198.118.210.63
Name: g0drg07h.gsfc.nasa.gov
Address: 192.168.1.6
```
- 2 Check the DNS entries for the remote host by typing **nslookup <other_host>**.
 - The screen display will be similar to the following:

```
g0drg07{mblument}[203]->nslookup g0spg01h
Server: g0css02.gsfc.nasa.gov
Address: 198.118.210.63
Name: g0spg01h.gsfc.nasa.gov
Address: 192.168.1.1
```
- 3 Determine the host’s network interface using **ifconfig <interface>** where **<interface>** parameter can be found by executing **netstat -i**
 - The **netstat -i** command will provide the following information:

```
g0drg07{mblument}[216]->netstat -i
Name Mtu Network Address Ipkts Ierrs Opkts Oerrs Coll
ipg0 4352 198.118.210 g0drg07.gsfc. 114659 0 63268 0 0
hip0 65280 192.168.1 g0drg07h.gsfc. 85 0 115 24 0
et0* 1500 none none 0 0 0 0 0
lo0 8304 loopback localhost 10062 0 10062 0 0
g0drg07{mblument}[217]->
```
 - Using **hip0** from the **ifconfig <interface>** data as the interface parameter, **ifconfig hip0**, will result in the following display:

```
g0dr07{mblument}[217]->ifconfig hip0
hip0: flags=1061<UP,NOTRAILERS,RUNNING,CKSUM>
    inet 192.168.1.6 netmask 0xfffff00
g0dr07{mblument}[218]->
```

4 Ping the two hosts and the hip0 interface IP address to verify their inter-connectivity.

- Ping the local host (g0dr07h).
g0dr07{mblument}[205]->ping 192.168.1.1
PING 192.168.1.1 (192.168.1.1): 56 data bytes
64 bytes from 192.168.1.1: icmp_seq=0 ttl=255 time=1 ms
64 bytes from 192.168.1.1: icmp_seq=1 ttl=255 time=1 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=255 time=1 ms
64 bytes from 192.168.1.1: icmp_seq=3 ttl=255 time=1 ms
----192.168.1.1 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 1/1/1 ms
- Ping the remote host (g0spg01h).
g0dr07{mblument}[205]->ping 192.168.1.1
PING 192.168.1.1 (192.168.1.1): 56 data bytes
64 bytes from 192.168.1.1: icmp_seq=0 ttl=255 time=1 ms
64 bytes from 192.168.1.1: icmp_seq=1 ttl=255 time=1 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=255 time=1 ms
64 bytes from 192.168.1.1: icmp_seq=3 ttl=255 time=1 ms
----192.168.1.1 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 1/1/1 ms
- Ping the HiPPI switch interface (g0dr07h.gsfc.nasa.gov).
g0dr07{mblument}[204]->ping 192.168.1.6
PING 192.168.1.6 (192.168.1.6): 56 data bytes
64 bytes from 192.168.1.6: icmp_seq=0 ttl=255 time=1 ms
64 bytes from 192.168.1.6: icmp_seq=1 ttl=255 time=1 ms
64 bytes from 192.168.1.6: icmp_seq=2 ttl=255 time=1 ms
64 bytes from 192.168.1.6: icmp_seq=3 ttl=255 time=1 ms
64 bytes from 192.168.1.6: icmp_seq=4 ttl=255 time=1 ms
64 bytes from 192.168.1.6: icmp_seq=5 ttl=255 time=1 ms
----192.168.1.6 PING Statistics----
6 packets transmitted, 6 packets received, 0% packet loss
round-trip min/avg/max = 1/1/1 ms
g0dr07{mblument}[205]->

5 Check the health of the interface by executing **netstat -i**, looking for Ierrs and/or Oerrs that, if present, (1 or 2 errors are ok, 100 are not ok) indicate an interface problem; check the syslog for any startup or logged problems from the OS.

```

g0drg07{mblument}[211]->netstat -i
Name Mtu Network Address Ipkts Ierrs Opkts Oerrs Coll
ipg0 4352 198.118.210 g0drg07.gsfc. 128799 0 70050 0 0
hip0 65280 192.168.1 g0drg07h.gsfc. 103 0 133 24 0
et0* 1500 none none 0 0 0 0 0
lo0 8304 loopback localhost 11822 0 11822 0 0
g0drg07{mblument}[212]->

```

6 Check the routing table for accuracy and completeness by executing **netstat -rn**.

- The resultant display will be similar to the following:

```

g0drg07{mblument}[212]->netstat -rn
Routing tables
Internet:
Destination Gateway Netmask Flags Refs Use Interface
default 198.118.210.1 UGS 2 241 ipg0
127.0.0.1 127.0.0.1 UH 4 4659 lo0
192.168.1 192.168.1.6 0xffffffff U 0 0 hip0
192.168.1.1 192.168.1.1 UGHS 0 24 hip0
192.168.1.2 192.168.1.2 UGHS 0 24 hip0
192.168.1.3 192.168.1.3 UGHS 0 33 hip0
192.168.1.4 192.168.1.4 UGHS 0 0 hip0
192.168.1.5 192.168.1.5 UGHS 0 0 hip0
192.168.1.6 192.168.1.6 UGHS 0 17 hip0
192.168.1.7 192.168.1.7 UGHS 0 52 hip0
192.168.1.8 192.168.1.8 UGHS 0 0 hip0
192.168.1.9 192.168.1.9 UGHS 0 0 hip0
192.168.1.10 192.168.1.10 UGHS 0 0 hip0
198.118.198.25 198.118.210.2 UGHD 0 612 ipg0
198.118.198.109 198.118.210.2 UGHD 0 7395 ipg0
198.118.210 198.118.210.45 0xffffffff U 36 64343 ipg0
198.118.210.45 127.0.0.1 UGHS 21 7892 lo0
198.118.212.40 198.118.210.2 UGHD 0 865 ipg0
224 198.118.210.45 0xf0000000 US 0 2 ipg0
g0drg07{mblument}[213]->

```

7 Check the other HiPPI attached hosts using the same steps.

8 Check other hosts using the same infrastructure components as the two hosts with the problem.

Checking host communication across EBnet

- 1 Check the DNS by executing `nslookup < local_host>` and `nslookup <other host>`.
- 2 Check the host route table using `netstat -rn`.
- 3 Check the health of the FDDI switch by logging into it, goto FDDI subsystem, and execute `smtmib`. Look at the health of the interfaces.
- 4 Run `tracert <target host ip address>` or similar tool to discover which router or local route table is in error or not having sufficient route information.
- 5 Check the Route Advertisement diagram, ECS Connectivity Matrix, and the Network Security Design to see that the filters are not blocking communications or provide no path between hosts. Details are in the configurations of the FDDI switch or ECS router. Also check host TCP Wrappers.

Checking host attached to User Network communicating with Hosts on the Campus Network(s) or to the Internet

- 1 Check the DNS by executing `nslookup < local_host>` and `nslookup <other host>`.
- 2 Check the host route table using **`netstat -rn`**. Make sure that the `route_add` script has executed correctly. (Note: The `route_add` script will NOT execute correctly if the User Network interface or Cisco ECS router are not working correctly).
- 3 Check that the default route is pointing to the Cisco ECS router User Network interface and not pointing to the PowerHub 8000 Production Network interface.
- 4 Check the Route Advertisement diagram, ECS Connectivity Matrix, and the Network Security Design to see that the filters are not blocking communications or provide no path between hosts. Details are in the configurations of the FDDI switch or ECS router. Also check host TCP Wrappers.

Checking host communicating with any other host over the HiPPI Switch

- 1 Check the DNS by executing `nslookup < local_host>` and `nslookup <other host>`.
- 2 Check on the extent of the problem by pinging itself over the HiPPI interface, **`ping 192.168.x.x`** where `x.x` can be discovered by **`netstat -i`**. Do the same for other hosts connected to the HiPPI Switch; if all fail, it's a HiPPI switch problem (check the other supplied troubleshooting tip handout); if all other hosts are ok, continue.
- 3 If the HiPPI cabling has been removed (for example, for SGI maintenance) check for bent pins at the SGI and re-seat cable; if problem not cleared, go to the other troubleshooting tip handout to begin testing with the **`hiptest`** testing.
- 4 Make sure the HiPPI interface is up by executing **`hipcntl startup`**.
- 5 Check on the HiPPI interface status by executing **`hipcntl hippio status`** and scan results for error conditions (see SGI ref #1 below, table 3-2).
- 6 Check that the HiPPI interface is "pingable" by executing **`ping <host_ip_address>`**; if no response, check the interface for being UP by executing **`ifconfig hippo`**; if interface is UP, there is probably a cable or switch interface problem.

- 7 Check the SGI HiPPI interface error counts by executing **netstat -i**
- 8 Check for the static routes in the host route table by executing **netstat -rn**; it should look similar to following:
- | | | | | | |
|-------------|-------------|--------------|----|-----|------|
| 192.168.2 | 192.168.2.5 | 0xffffffff U | 0 | 0 | hip0 |
| 192.168.2.1 | 192.168.2.1 | UGHS | 0 | 9 | hip0 |
| 192.168.2.2 | 192.168.2.2 | UGHS | 0 | 0 | hip0 |
| 192.168.2.3 | 192.168.2.3 | UGHS | 0 | 212 | hip0 |
| 192.168.2.4 | 192.168.2.4 | UGHS | 0 | 0 | hip0 |
| 192.168.2.5 | 192.168.2.5 | UGHS | 0 | 12 | hip0 |
| 192.168.2.6 | 192.168.2.6 | UGHS | 19 | 60 | hip0 |
| 192.168.2.7 | 192.168.2.7 | UGHS | 0 | 7 | hip0 |
| 192.168.2.8 | 192.168.2.8 | UGHS | 0 | 0 | hip0 |
- 9 Check the HiPPI interface to switch loop by executing **hiptest -I 0x0100000x** where x is the HiPPI switch's port number of the host's connection to it.
- 10 Check other host interfaces to see if any other are working properly.
- 11 Check the switch counters by logging (telnet) into the HiPPI switch from a Production network host, and look at counters by executing **show counters all all**. Also check the state of the interfaces by executing **show state all all** and look for interface(s) with a "true" power-up initialization error, a "false" source interconnect, or a "false" destination interconnect.

6.7.3 Specific Security Limitations

In addition to limiting network access as described above, access is further limited by port level filters installed in the ECS router and FDDI Switch. In addition to the port filters, a host's tcp wrappers will further limit network access.

Note: Any service that is not listed below is an allowable service.

The following services are NOT permitted into a DAAC's Production and User networks:

1. remote login (tcp port 513).
2. remote shell (tcp port 514).
3. telnet to hosts (tcp port 23).
4. NFS (udp and tcp ports 2049).
5. Port Mapper [RPC] (udp and tcp ports 111).
6. Access to udp and tcp ports 255-1023 on NIS servers.
7. X-11* (udp and tcp ports 6000-6003).

* X-11 is a special case. While by default X-11 is not allowed to X servers (X-terminals), a DAAC can decide to allow X-11 access between a selected set of hosts within the DAAC and an external entity such as a remote SSI&T host or a host at another DAAC. This access would be granted by modifying the appropriate router filter tables.

Also, ftp is NOT allowed to the MSS and CSS servers from the User network (tcp port 21).

Each DAAC has its own M&O Sustaining Engineering network. Hosts attached to this network are NOT permitted to use the following services when communicating with their Production and Ingest networks:

1. remote login (tcp port 513).
2. remote shell TCP port 514).
3. telnet (tcp port 23).
4. NFS (udp and tcp ports 2049).
5. Port Mapper [RPC] (udp and tcp ports 111).
6. Access to udp and tcp ports 255-1023 on NIS servers.

Note: All other services, including X-11 (udp and tcp ports 6000-6003) are permitted.

The Network Security diagram, illustrated in Figure 6-2, shows graphically the information discussed above.

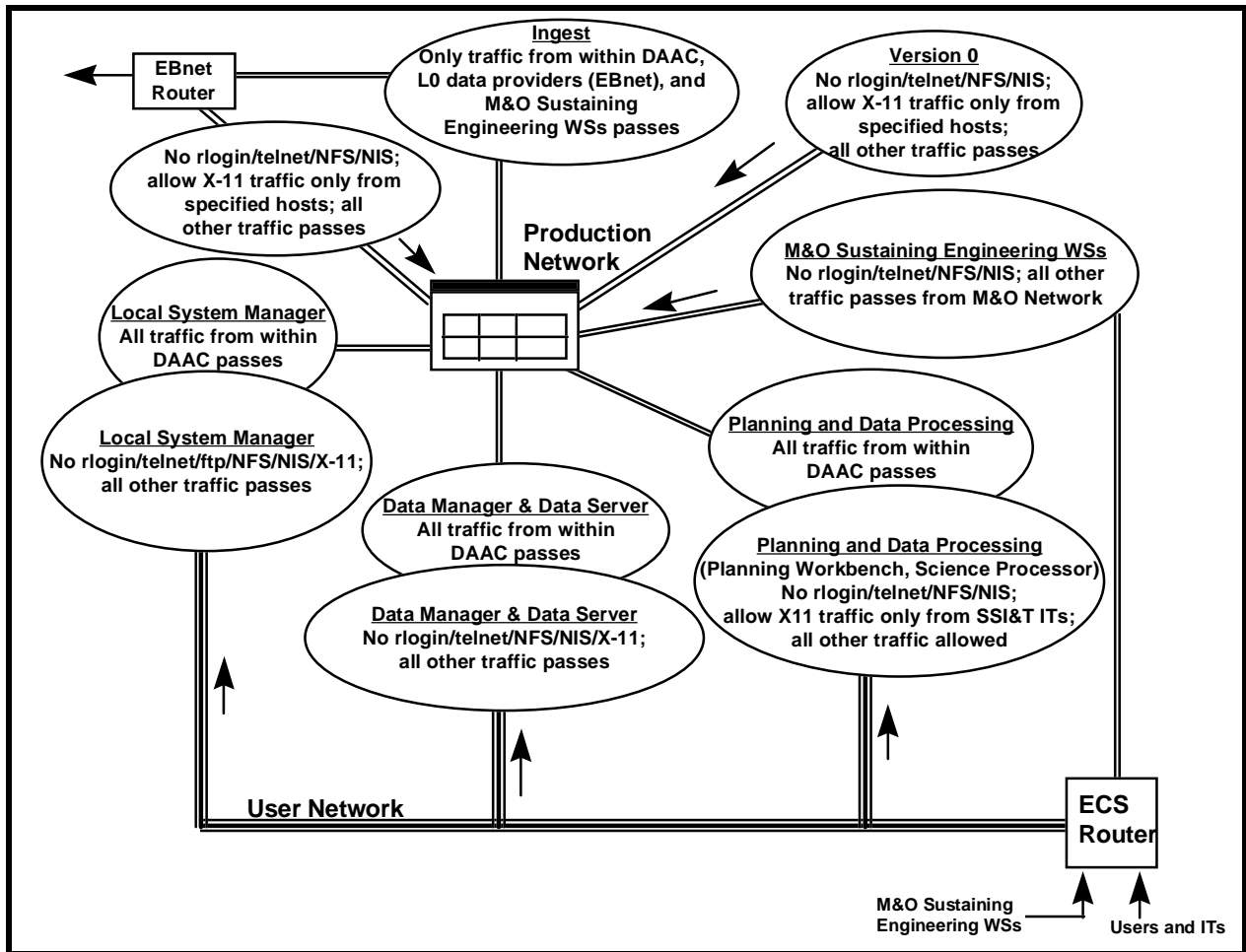


Figure 6-2. Network Security Diagram

6.8 Route Add Scripts

On each host which is attached to both the Production and User networks, special route add scripts are run at system startup to add several static routes to the host's routing table.

6.8.1 Script Locations

There is a separate route add script for each host type (Sun, SGI, and HP). The scripts are located in the following directories:

- Sun:
 - script `S87route_add` is in directory `/etc/rc2.d`.
- SGI:
 - script `S87route_add` is in directory `/etc/init.d` with a soft link to `/etc/rc2.d/S87route_add`.
- HP:
 - script `route_add` is in directory `/sbin/init.d` with a soft link to `/sbin/rc2.d/S350route_add`.

7. System Monitoring

This section covers the procedures necessary for the management operations that monitor the system.

7.1 Checking the Health and Status of the system.

There are several graphical tools available to monitor ECS status. One COTS program, Tivoli, and two ECS programs, ECS Assistant and EcMs-Whazzup?? These programs provide system monitors with real-time status of the system and indications of potential problem areas.

7.2 System Monitoring Tools

7.2.1 EcMs-Whazzup??

A powerful COTS program that has been modified for ECS and used to monitor the ECS system is EcMsWz – Whazzup??. It is a web-accessed program that provides a graphical display of Host Status, Mode Status, Mode Verification and Performance Management.

These functions of Whazzup provide graphical displays of host and software-server status in real-time mode. When used in conjunction with Tivoli and ECS Assistant, System Administrators can acquire a comprehensive knowledge of the system's status.

To start EcMsWz-Whazzup, execute the procedure steps that follow:

- 1 Logon onto a host machine
 - 2- At the UNIX prompt on the host from which Whazzup is to be run, type **setenv DISPLAY <hostname>:0.0**, press **Return/Enter**. Note: If the host has been remotely accessed via ssh then do not use the setenv DISPLAY command again. Doing so will compromise system security.
 - The hostname is the name of the machine on which Whazzup is to be displayed, i.e., the machine you are using.
 - To verify the setting, type **echo \$DISPLAY**, press **Return/Enter**.
- 3- At the UNIX prompt, using secure shell, log on to the Whazzup host, xxins0x. Type **ssh xxins0x**, press **Return/Enter**. Enter your **passphrase**, press **Return/Enter**.
 - You are logged into the Whazzup host machine.
- 4 Start the Netscape web browser by typing **netscape &**, press **Return/Enter**.
 - You are in the web browser on the Whazzaup host xxins0x.
- 5 Type in the URL to activate Whazzup. Enter **http://xxins0x:5150**.
 - The Whazzup intro screen appears

6 Select a monitoring function

- **Host Status** to determine individual host parameters.
- **Mode Status** to determine “up” servers for the selected Mode.
- **Verify Mode** to determine status of all servers for a selected Mode.
- **Performance Management** to determine the performance status all hardware/software servers for all modes.

7.2.1.1 Host Status

Selecting Host Status provides a pop-up box from which to choose a specific host to determine its status. Host Status data include percent of CPU used, Swap Free space, Memory Free space, and Server information

7.2.1.2 Mode Status

Selecting Mode Status enables a pop-up window showing Modes available. Subsequent to selecting the desired Mode, a display of “up” ECS Servers is provided.

7.2.1.3 Verify Mode

Selecting **Verify Mode** and choosing a desired mode will provide a thorough display of ECS server status, by host, for the mode. Alternatively, selecting **What’s Down** will provide a display indicating all down ECS servers, by mode, by host.

7.2.1.4 Performance Management

Following recommended monitoring procedures, the optimum method of system monitoring is to select **What’s Down** from **Verify Mode** and then **Right Click** on **Performance Management** and open the link in a new window.

Having these two displays active simultaneously will provide the Systems Administrator the status of “down” ECS servers and the performance status of individual hosts.

7.2.2 ECS Assistant and ECS Monitor

The Whazzup tool provides a quick look capability to note whether any servers are down. The ECS Assistant and ECS Monitor tools provide additional easy-to-use tools that offer a server monitoring and ping capability (ECS Monitor) as well as a capability to start and stop servers (ECS Assistant).

To run the ECS Assistant, use the following procedure.

Starting ECS Assistant

- 1 Log in to one of the host machines.
- 2- At the UNIX prompt on the host from which the ECS Assistant is to be run, type **setenv ECS_HOME /usr/ecs**, and then press the **Return/Enter** key.

- To verify the setting, type **echo \$ECS_HOME**, and then press the **Return/Enter** key.
- 3- At the UNIX prompt, type **cd /tools/common/ea**, and then press the **Return/Enter** key. Then type **EcCoAssist /tools/common/ea &**, and then press the **Return/Enter** key.
 - **/tools/common/ea** is the path where ECS Assistant is installed, and also where EcCoScriptlib may be found.
 - The ECS Assistant GUI is displayed.
- 4 At the ECS Assistant GUI, click the **Subsystem Manager** pushbutton.
 - The Subsystem Manager GUI is displayed.
- 5- Select a mode by clicking on the down arrow at the right end of the **Mode** field and then on the desired mode name in the resulting list.
 - The selected mode is displayed in the **Mode** field and colored indicators show the installation status for components in that mode on the host; the legend for the color indications is at the lower right on the Subsystem Manager window.
- 6 In the list of subsystems, double click on the name of the subsystem of interest.
 - One or more component groups appear below the selected subsystem name.
- 7 Double click on the name of a component group.
 - One or more application groups appear below the selected component group name.
- 8 Double click on the name of the application group of interest.
 - The applications or servers in the selected group are listed below the name of the group.
- 9 Single click on the name of an application or server of interest.
 - The selected application or server is highlighted.
 - Detailed installation information is displayed in the **Installation Statistics** window.

ECS Monitor provides a convenient way to monitor the status of the servers by listing their up/down condition. The **ECS Monitor** GUI has a status flag for a server indicating whether or not that server is running, and for a server that is running, the window shows the process ID (PID), the user ID, and the start time. The ECS Monitor also includes near the top of the window a button labeled **cdsping all servers . . .** that permits an operator to ping all servers.

To start up the ECS Monitor GUI, use the following procedure.

Using the ECS Assistant Server Monitor

- 1 Log in to one of the host machines.
- 2- At the UNIX prompt on the host from which the ECS Assistant is to be run, type **setenv ECS_HOME /usr/ecs**, and then press the **Return/Enter** key.
 - To verify the setting, type **echo \$ECS_HOME**, and then press the **Return/Enter** key.
- 3 At the UNIX prompt, type **cd /tools/common/ea**, and then press the **Return/Enter** key. **/tools/common/ea** is the path where ECS Monitor is installed.
- 4 Then type **EcCoMonitorGui /tools/common/ea <mode> &**, and then press the **Return/Enter** key.
 - **/tools/common/ea** is the path where EcCoScriptlib may be found.
 - The **ECS Monitor GUI** is displayed, showing the status (**UP** or **DOWN**) of the servers on the current host in the mode specified in the command, as indicated near the top left corner of the window.
 - The status “**UP/DOWN**” indicates whether a listed server is running.
- 5 To see which host each server is running on, click the **cdsping all servers...** button.
 - The **ECS Monitor (cdsping)** GUI is displayed.
 - The host name for each running server is listed, and whether or not it is listening.

- 6 Both the **Server Monitor** and **cdsping** GUI can be updated by clicking the **update** button in the GUI.
 - This causes the list to update to the current status.
- 7 To monitor other servers, log in to other hosts and launch the ECS Monitor GUI in the desired mode, as in steps 2-4.
- 8- To exit, click the **EXIT** button.
This terminates display of the monitor GUI.

7.2.3 Tivoli Management Environment

Another powerful COTS program used to monitor the system is Tivoli Management Environment. Version 3.6 is the current version installed at the DAACs. Tivoli is based on a core program, Tivoli Framework, to which specific user applications are added to meet management and monitoring requirements. These applications, when configured for specific ECS functions, provide detailed information and notification of events on a programmable polling basis.

Specific Tivoli Environment applications used in ECS are:

- **Tivoli Enterprise Console.** A rules-based management application that collects, processes, and automatically responds to common management events.
- **Tivoli Software Distribution** (previously Tivoli Courier). A management application that provides for the distribution and installation of software on machines in a heterogeneous networking computing environment.
- **Tivoli Distributed Monitoring** (previously Tivoli Sentry). A management application for monitoring system and application resources and generating events and alarms on a network-wide basis. It provides availability data and performs automated actions based on the monitored data.

Tivoli Management Environment, when used in conjunction with Whazzup?? and ECS Monitor, can provide detailed, current data on system status.

7.2.3.1 Tivoli Management Region

The core of a Tivoli Management Environment is the Tivoli Management Region, or TMR. It consists physically of a primary Server and its clients. In ECS, the TMR is normally installed on the MSS Server. As an example, for GSFC, it is located on g0msh08, and for the VATC it is installed on t1msh01.

Complete installation instructions and release notes for Tivoli Management Environment, Version 3.6 Upgrade for the ECS Project, are contained in the ECS Project document 914-TDA-043-REV01.

The program is accessed by various levels of administrators. During installation, the installer assumes the highest level of administrator, the Super Administrator. After installation, other administrators are created and provided specific authorization roles as required, such as Senior, Admin, and User. Administrators can only create other administrator accounts that have capabilities equal to, or less than, their own level.

The Tivoli Startup screen appears briefly upon starting the program. The Administrator Desktop, is displayed immediately after the appearance of the Startup screen. The Desktop screen features icons which permit access to various administrative functions.

To run Tivoli, execute the procedure steps that follow:

Tivoli startup procedure

- 1** Log in to a host machine.
- 2** At the UNIX prompt on the host from which Tivoli is to be run, type **setenv DISPLAY hostname:0.0** and then press the **Return/Enter** key. *Note:* If the host has been remotely accessed via ssh then do not use the setenv DISPLAY command again. Doing so will compromise system security.
The hostname is the name of the machine on which Tivoli is to be displayed, i.e., the machine you are using.
To verify the setting, type **echo \$DISPLAY** and then press the **Return/Enter** key.
- 3** At the UNIX prompt, using secure shell, log on to the Tivoli host, *x0mshxx*. Type **ssh x0mshxx** and then press the **Return/enter** key. Enter *<your passphrase>* and then press the **Return/Enter** key.
You are logged into the Tivoli host machine.
- 4** Type **cd /etc/Tivoli** and then press the **Return/Enter** key.
You are in the Tivoli directory on host *x0mshxx*.
- 5** Type **source setup_env.csh** and then press the **Return/Enter** key.
The environment variables for Tivoli are set.
- 6** Type **tivoli -f** and then press the **Return/Enter** key.
The Tivoli Startup screen appears briefly, followed by the TME Administrator Desktop.

7.2.3.2 Tivoli Policy Region

Monitoring of system resources uses displays that are organized analogous to a hierarchical file structure. Accessed through the top-level policy region icon, displayed on the Administrator Desktop subsequent screens display specific hosts and agents. A policy region is a special collection of resources that share one or more common policies. An administrator can create special sub-policy regions to monitor specific areas of interest. Policy sub-regions can be arbitrarily nested and can contain any desired set of managed resources.

Policy Region content for the VATC system is under TMR t1msh01. It has been populated with the individual hosts and other managed resources under Tivoli management purview.

7.2.3.3 Distributed Monitoring

The component of Tivoli Management Environment that establishes system monitoring criteria is the Tivoli Distributed Monitoring application. Tivoli Distributed Monitoring checks the status of a variety of networked resources, such as systems, applications, and processes. Through the use of profiles, Distributed Monitoring enables system administrators to set monitoring policy and to change monitoring parameters for any number of related, remote systems from a single location. Distributed Monitoring profiles also define automated responses. These responses can be as simple as changing the status of an icon or sending E-mail to an administrator, or as complex as sending an SNMP trap or running a user-specified program or script.

Key items that can be set for any given monitor are:

Set the response level.

- Determine monitor trigger.
- Send a Tivoli Notice.
- Activate a Pop-up Window.
- Change an icon's status.
- Send E-mail.
- Log to a file.
- Run a program.

It is the profile edit screen establishing a Daemon Monitor on the VATC host t1msh01.

Multiple monitoring profiles can be created and distributed across several hosts.

Administrators can also determine monitor profiles assigned to specific hosts monitor profiles active on host t1msh01 in the VATC.

To determine Monitor Profiles active on a specific host, execute the procedure steps that follow:

Display Active Tivoli Monitor Profiles procedure

- 1** Start Tivoli using the Tivoli Startup Procedure.
The Tivoli Startup screen appears temporarily, followed by the TME Administrator Desktop screen
- 2** Double-click on the region icon to display Policy Region components.
A scrollable window of components is displayed
- 3** Double-click on any component icon.
A scrollable window of Monitor Profiles is displayed
- 4** Double-click on any specific Profile Monitor icon to determine profile characteristics

7.2.3.4 Tivoli Enterprise Console

The component of Tivoli Management Environment that provides the interface for system monitoring is the Tivoli Enterprise Console. It monitors events defined by the administrator across individual or groups of items. An event is any significant change in the state of an application or system resource, such as a network or host. The Event Console is the interface that an administrator uses to receive notification of events and to respond to events. An Event Group is depicted in the Event Groups event console dialog. There is one icon for each event group that is monitored shows the Tivoli Enterprise Console Event Groups for the VATC.

As in previous hierarchical displays, the Enterprise Console icons can be stepped through to determine specific errors in addition to any programmed notifications as determined by the administrator.

For detailed information and specific configuration and utilization of the Tivoli Management Environment, all documentation is available directly from the vendor in PDF format at the following URL: <http://www.tivoli.com/support/documents>.

8. Problem Management Procedures

ECS Problem Management is administered through system-level and site-level control board reviews. These control boards oversee the analysis, recommendations, and actions taken to resolve ECS system/site problems concerning hardware, software, documentation, and procedures. The M&O and the site-level maintenance organization resolve routine maintenance issues at the system-level and site-level, respectively, using the Trouble Ticket System for tracking maintenance changes. Trouble Tickets (TT) may evolve into Non Conformance Reports (NCR), as required, which may then be utilized to generate Configuration Change Requests (CCR) to effect changes to the approved baseline. To ensure controlled change, NCRs are tracked using the DDTS in the EDF and CCRs manually by Systems Engineering.

The Trouble Ticket System is the first vehicle used to record and report problems with the operational system. Trouble Tickets can be generated by operations, maintenance, development, and customer personnel as well as users. The Trouble Ticket System is an automated database that tracks the resolution activities associated with each trouble ticket. Documentation that is related to the problem, and is not in electronic form, or is in electronic form at the DAAC, is distributed by the local CM Administrator (CMA), and is listed as an attachment to the trouble ticket.

The CM Administrator at each site serves as Trouble Ticket System administrator. Trouble Tickets initially generated at a site, the resolution of which require changes to the system level baseline, are forwarded to the SMC, where they are reviewed and *translated* into NCRs. Additionally, Trouble Tickets and CCRs that are generated at the sites, which are repaired locally, and result in site-unique extensions to the system level baseline, are forwarded to the SMC for tracking across the ECS baseline. The SMC CMA is responsible for tracking ECS level TTs after they have been received from the sites, and for propagating system problem resolutions for site visibility.

CMAs also support the activities of the local Problem Review Board. This includes generating status reports, and implementing resolutions, instructions, and changes as directed by the Board. User Services Representatives monitor trouble tickets to notify users concerning problem resolution and status. Maintenance engineers at respective levels will record all activities in the trouble ticket. This information can be used to determine critical maintenance concerns related to frequency of occurrence, criticality level, and the volume of problems experienced. The maintainability analysis will guide critical changes, volume and type of support components to be utilized, and will focus further ECS release development.

This section provides an overview of the Trouble Ticketing process and defines the M&O procedures for processing and resolving trouble ticket submissions. In addition, this section provides instructions for diagnosing network problems.

8.1 The Problem Resolution Process — An Overview

8.1.1 ECS Internal Process

Any ECS user may submit Trouble Tickets using the local Trouble Ticketing System (TTS) at any site. TT submission triggers an internal review by the site's review board. Primary objectives of the internal review are to quickly identify and correct problems that fall within the site's capability to maintain, review and validate the priority of the problem, and to elevate to the system level those problems that either exceed their capability to repair, or that require a change to the system level baseline.

Problems passed from the sites to the ECS system level, are passed by transferring the trouble ticket from the local TTS to the SMC TTS. Here they are reviewed by the M & O Problem Review Board (PRB), which hosts daily teleconferences, known as the PRB Telecon.

The permanent membership of the Problem Review Board is as follows:

- a. Chair: Problem Management Lead or designee
- b. Each DAAC: one member representative
- c. Quality Assurance: one member representative
- d. ECS Integrated Logistics Support: one member representative
- e. Secretary: SMC CM Administrator
- f. Systems Engineering Department: one member representative
- g. ESDIS M&O: one member representative

The roles and responsibilities of the participants in the PRB Telecon are to:

- a) Follow a nominal agenda that includes the following discussions:
 - i) new NCRs
 - ii) deferred trouble tickets
 - iii) Review NCRs in the Verified State of DDTS.
- b) Review severity of each NCR according to the guidelines specified in the Operations Class NCR Management Process (MO-1-003-5)
- c) Convert any TTs that identify a system non-conformance and have the appropriate information will be forwarded into a NCR by requesting that the CM Administrator forward the TT to the DDTS (Distributed Defect Tracking System). NCRs document the system non-conformance and are worked by the Sustaining Engineering staff.
- d) NCRs that are deemed to not have enough information for proper adjudication will either be rejected as incomplete or they will be deferred until a future meeting as determined by the

PRB chairperson. The PRB administrator will maintain a list of deferred items and place those items on a future PRB agenda after more information is gathered.

The PRB performs a preliminary review of each trouble ticket to confirm the priority assigned by the site, the completeness of information and data relevant to the problem, and whether it requires a change to the system level operational baseline.

The PRB may forward TTs to the appropriate organizations or individuals for further analysis and technical investigation, resolution proposal, and NCR preparation, when required. The CM Administrator or Daac Support Help Desk members provide administrative support to the PRB by publishing minutes of teleconference meetings, tracking TTs and action items, and by translating TTs to NCRs.

The PRB has the authority to direct resolutions to trouble ticket problems that do not change, or in any way affect, the ECS operational baseline and baseline documentation. An NCR is required when the Technical Investigation (TI) determines that the operational baseline must be changed in order to correct the problem identified in the trouble ticket.

The PRB is not a voting board; the membership is appointed for the purpose of providing timely, direct technical support to the Chair, who has the decision making responsibility and authority.

The M&O CCB has the authority and responsibility to approve Class II changes to the operational baseline. Specific responsibilities include:

- a. Review, approve and schedule; review and backlog; or reject each NCR's proposed resolution, or cost and schedule input from the Responsible Engineer (RE).
- b. Approve the schedule for the deployment of configuration changes in the form of a 'drop' to the SMC.
- c. Approve the content of each block.
- d. Manage and adjust the schedule and contents of each block in accordance with ECS SDPS Program priorities and the progress of NCR work-off.
- e. Review the status of all backlogged NCRs on a periodic basis. Schedule NCRs for a future block as appropriate
- f. Collect and report on NCR statistics.

The permanent membership of the M&O CCB is as follows:

- a. Chair: ECS M&O Manager of designee.
- b. Each DAAC: one representative.
- c. SMC: one representative.
- d. System Engineering Department: one representative
- e. Development Department: one representative.

- f. The Patch IPT (or Test Department): one representative.
- g. ECS Integrated Logistics Support Department: one representative.
- h. Secretary: TBD

The M&O CCB reviews each NCR as received from the PRB for technical merit, completeness, priority and complexity. It may direct additional technical investigation and analysis, or assign immediately for resolution. The Responsible Engineer prepares a proposal which will include:

- a. A short, narrative description of the change that identifies the object or objects, configuration files, COTS SW, documentation, or scripts that require change. The nature of the change must also be included in the narrative.
- b. A cost estimate where:
 - 1. LOW requires fewer than 5 staff-days of effort
 - 2. MEDIUM requires 6 to 20 Staff-days of effort
 - 3. HIGH requires more than 20 staff-days of effort
- c. The date by which the change could be ready for integration and deployment, given the RE's knowledge of tasking, priorities, development activities, etc.

The M&O CCB is not a voting board. The CCB Chair has the singular authority for decision making. Other board members are appointed to provide direct and timely technical support to the CCB's decision making process.

In accordance with ECS Configuration Management procedures, the RE, as directed by the CCB, makes the necessary changes to the system baseline, including the ECS baseline documentation changes to support the resolution. These changes are then integrated into an M&O block by the Patch IPT.

The Patch IPT integrates and tests each block to verify that the system still meets functional and performance requirements, that the integrated block corrects the NCR(s), and that new features execute properly. The status of each block passing through integration and test is reported to the CCB regularly by the Patch IPT.

Upon satisfactory completion of the test program, the M&O CCB may authorize deployment of the block to the DAACs. The SMC pulls the block from the EDF and saves it to a locked-down directory. The SMC then notifies the DAACs that the block is available for transfer. Each DAAC desiring the block notifies the SMC of the transfer path, and the SMC pushes the block as requested. DAACs may then install the block and keep the SMC apprised of the state of each mode.

8.1.2 Interface with ESDIS

The EOSDIS Sciences Systems Configuration Management Board CCB must approve all ECS Class I CCRs before work is authorized to commence. (See the *Sciences Systems Configuration*

Management Board (PCMB) Configuration Management Plan (level 3) for discussion of change classification.)

Should the RE recommend, and the M&O CCB concur, that a CCR is an enhancement rather than a maintenance change, the M&O CCB will place the CCR in backlog after reviewing and approving the technical solution, cost and schedule impact. The CCR is then sent to the PCMB for approval. When approved by the PCMB and returned to the M&O CCB, the CCR is assigned to an RE for implementation.

When the PCMB or the ESDIS CCB forwards a new CCR as an enhancement to the M&O CCB, the CCR is assigned to an RE by the CCB. The CCB approved technical, cost and schedule assessments of the RE are sent by the M&O CCB back to the PCMB.

8.2 Problem Management Procedures

The Trouble Ticket System is comprised of the Remedy Action Request System, a Commercial Off-The-Shelf (COTS) product that provides a distributed trouble ticketing service which provides a common environment and means of classifying, tracking, and reporting problem occurrence and resolution to both ECS users and operations personnel. The trouble ticketing service:

- Provides a GUI for operations personnel to access all Trouble Ticket services.
- Provides a common Trouble Ticket entry format.
- Stores Trouble Tickets.
- Retrieves Trouble Tickets via ad hoc queries.
- Allows operations personnel to forward problems from one DAAC to another.
- Produces stock and common reports.
- Provides an interface to user's and operator's e-mail to provide automatic notification.
- Offers an application programming interface through which applications can submit trouble tickets.
- Provides summary information to the SMC from each DAAC to allow trend reports regarding trouble tickets.
- Defines a consistent "life cycle" for trouble tickets.
- Allows each DAAC a degree of customization through definition of further re-prioritization and action rules.

In addition to the functionality provided by Remedy's Action Request System, the Trouble Ticketing Service utilizes a set of custom HTML pages ("screens") to provide registered users with the ability to submit new trouble tickets and query the current status of any of their previous

entries. Access to the Trouble Ticketing System through this technique provides users an easy method for reporting problems in an environment with which most are already familiar. Additionally, as another means of trouble ticket entry, the Trouble Ticket System provides a text e-mail template through which automated entry of trouble tickets is possible. Support staff members are able to enter Trouble Tickets through the TTS interface for problems received via other methods (for example, phone calls).

The Remedy Action Request System also functions as the User Contact Log. Remedy's Action Request System is configured to have a separate schema that contains the entries that User Services personnel enter for each contact that they receive from a user. The User Contact Log allows a trouble ticket to be initiated from a log entry: with the push of a button — the Trouble Ticket will be populated with information from the contact log.

Users submit trouble tickets to the User Services Desk. External users submit trouble tickets through the Internet [using a series of hypertext mark-up language (HTML) screens]. Site personnel submit trouble tickets via the Trouble Ticket System (Remedy).

User Services personnel process trouble tickets through the Trouble Ticket System for problem resolution in accordance with local policy. Trouble tickets are first evaluated to determine the severity of the problem and assignment of on-site responsibility. Every trouble ticket is logged into the database for record keeping purposes. Trouble tickets that can be resolved locally are assigned and tracked at the local center. The Operations Supervisor reviews each trouble ticket for priority verification and problem description; and assigns it to an appropriate Maintenance Engineer for resolution.

Matters that require external or higher level assistance; and problems, the repair of which require changes to the system baseline; are escalated to M&O via the Problem Review Board (PRB) Telecon for discussion and disposition. The telecon is held to coordinate trouble ticket activities within the M&O organization as well as with development, customer, and user organizations.

The CM Administrator or Daac Support Help Desk staff is responsible for preparing and disseminating the agenda and the minutes for the PRB . Electronic dissemination via the web or e-mail is preferred. Agenda items may be supplemented or replaced by hardcopy or softcopy reports. Material from this meeting is distributed within each ECS organization and to customer and user organizations as required. A typical agenda might include:

- Review and prioritize each trouble ticket opened at each center.
- Review and re-prioritize older trouble tickets (as required).
- Assign trouble ticket work-off responsibility to one organization.
- Review distribution of trouble tickets by organization, priority and age.
- Discuss trouble ticket issues with development organizations.

8.3 Using the Trouble Ticket System

1. User or Operator discovers a problem with ECS (hardware, software, documentation, procedure) and documents this problem for later resolution. The submitter forwards a trouble ticket to User Services by: calling up the Trouble Ticket System via the Internet; going on-line with the Trouble Ticket System; phoning User Services; or sending an e-mail message to the Trouble Ticket System.
2. The trouble ticket is logged into the system. TTS automatically assigns "New" status to the trouble ticket and notifies the Operations Supervisor for assignment and prioritization. TTS notifies the Operations Supervisor via email, or through Remedy's notification tool, or both. The status of each trouble ticket, as it progresses through the resolution process, is recorded by the CMA.
3. Categorizing Problem Severity

The Help Desk Primary or Secondary will review the information provided by the DAAC to determine if the problem has been described in enough detail to warrant the recommended severity. If there is insufficient information, the Help Desk Primary or Secondary will contact the DAAC submitter or the DAAC representative to collect the necessary details to categorize the problem. In the case where a problem was submitted as a Medium or Low Impact Trouble Ticket and the Help Desk has determined that there is insufficient detail to provide a proper assessment, the Trouble Ticket will be deferred to the Problem Review Board for further review.

In determining severity of the problem, the Help Desk must consider the following factors:

- Impact on the ability to ingest, process or distribute satellite data
- Frequency of occurrence
- Availability of and adequate work-around

Refer to the following figure (Figure 8.3-1) to determine problem severity:

As Documented in NASA 420-05-03	As Used/Interpreted by M&O
Category 1: System/Service cannot major safety hazard. (Priority 1) systems, or space mission resources; or mission objectives.	HIGH (Severity 1) An NCR which causes: ... a mission critical function (i.e., Ingest/Pre Processing/Archiving of Science Data, Planned Processing, Browse/Order/Distribute); cannot be achieved; - A mission-critical function to be performed improperly, resulting in permanent loss of data; - operator, or both.
substantially impaired. (Priority 2) requirements.	MEDIUM (Severity 2) An NCR with the consequence that: minimum goals; temporary loss of data or incorrect data results; integrity; performance/workload/schedules.
impaired. (Priority 3) data processing functions. Support may accomplished.	Severity 3: An NCR with the consequence that: - A non-critical mission function (e.g., Advertising) cannot be performed, or yields incorrect results; minimal impacts to performance/workloads/schedules operations to continue indefinitely without severely impaired performance/workload/schedules.
	Severity 4: Improvement (Nuisance: e.g., a typo).
	Severity 5: Enhancement (Identified for next release).

Figure 8.3-1. Trouble Ticket Priority / NCR Severity

***Mission-Critical functions:**

Ingest/Pre-Process/Archive Science Data
Planned Processing
Browse/Order/Distribute

**** Non-Mission-Critical functions**

The Trouble Ticket System (TTS) has coded these three priorities as HIGH, MEDIUM, and LOW. All trouble ticket submittals are required to designate a priority level for the problem. However, the formal priority is assigned by the Operations Supervisor and maintained by the CM Administrator. M&O applies these additional priorities:

Priority 4: Nuisance Problem:

Problems that do not impair the capability of the ECS, but rather could simplify the it's use, such as the arrangement of video screens, color, and so on.

Priority 5: Enhancement:

Problems, the resolution of which result in enhanced system capability, or are out-of scope (Class I problem).

4. All affected Operations Supervisors at the sites (SMC, DAACs, EOC, EDF) are notified by e-mail of the problem and solicited for inputs to problem assessment (impact) and resolution.
5. The Trouble Ticket database is updated by the CM Administrator or the DAAC Support Help Desk Staff. The trouble ticket may be modified to reflect any new information/coordination activity.
6. The Operations Supervisor assigns the problem to a Problem Investigator for further follow-up.

7. The Problem Investigator coordinates input from SEO, developers, vendors, and external organizations to effect the local resolution. The Problem Investigator presents significant issues at the PRB Telecon.
8. The Problem Investigator updates the trouble ticket database.
9. The Problem Investigator forwards any information regarding proposed/implemented fixes to the established notification list.
10. In those cases where the problem resolution will result in a change to the operational baseline, or where the local site wishes to elevate the TT to M&O for advice or for resolution, the site CMA forwards the TT to the SMC.
11. The proposed resolution is then presented to the Problem Review Board for review, ratification, or revision.
12. Changes that do not affect controlled configuration items may be approved and implemented by the Failure Review Board/Problem Review Board and closed.
13. All system level changes are proposed in Non Conformance Reports (NCRs). The SMC is the custodian of a translation utility which, when invoked, opens an NCR in the Change Request Manager, and closes the trouble ticket in TTS. Emergency fixes (Priority 1) can be made locally with the approval of the local CCB, and then reported to M&O after the crisis is resolved. The M&O CCB may approve, reject, defer or revise the NCR.
14. The off-site problem resolution process is monitored by the M&O Problem Review Board, which may also revise the proposed solution because of any system-level effect(s).
15. The NCR may be escalated to higher level CCBs for system and/or external elements that may be involved in the resolution process.

Table 8.3-1. Trouble Ticket System - Activity Checklist

Order	Role	Task	Section
1	ECS users	Access the Trouble Ticket System	8.3.1, 8.4.1
2	ECS users	Submit Trouble Ticket	8.3.2
3	Maintenance Engineer	Modify Open Trouble Ticket	8.3.3
4	Operations Supervisor, Maintenance Engineer	Forward Trouble Ticket	8.3.4
5	Database Administrator	Add Users to TTS	8.3.5
6	CMA	Modify TTS User Privileges	8.3.6
7	CMA	Modify TTS' Configuration	8.3.7
8	Maintenance Engineer, CMA	Generate Reports	8.3.8
9	Maintenance Engineer	Maintain Escalation Time Table	8.3.9

8.3.1 Accessing the Trouble Ticket System

The Trouble Ticket System may be accessed through either HTML or Remedy. The Trouble Ticket HTML is used by both User Services and the end user to submit trouble tickets without going through Remedy. It is accessed through the web. Through HTML, the user can submit, obtain a list, and view details of trouble tickets. Complete and detailed instructions for Remedy may be found in the current DID 609-CD and *Remedy's Action Request System Users's guide*.

Through Remedy, the User clicks on the User Tool icon, which opens the ReIB-Trouble Tickets schema to submit, query, or work a Trouble Ticket. The Main Remedy Trouble Ticket screen is used to select the appropriate schema for submitting, modifying, or displaying a trouble ticket. The Main Page data fields are identified in Table 8.3.1-1.

The Remedy Action Request System provides a distributed Trouble Ticketing Service that furnishes DAACs a common environment and the means of classifying, tracking, and reporting problem occurrences and resolutions to both ECS users and operations personnel. The Trouble Ticketing Service:

- provides a GUI for operations personnel to access all Trouble Ticket services
- provide a common Trouble Ticket entry format
- stores Trouble Tickets
- retrieves Trouble Tickets via ad-hoc queries
- allows operations personnel to forward problems from one DAAC to another
- generates reports and statistics
- interfaces with user's and operator's e-mail to provide automatic notification
- offers an application programming interface through which applications can submit Trouble Tickets
- provides summary information to the SMC from each DAAC to allow trend reports regarding Trouble Tickets
- enables operations personnel to forward a copy of a "closed" trouble ticket to the SMC for insertion into the ECS Closed Trouble Ticket Database
- defines a consistent "life-cycle" for Trouble Tickets
- allows each DAAC a degree of customization through definition of further escalation and action rules.

Several timesaving features are available through Remedy: the Admin Tool, GUI Import tool, the Hardware Information schema, and the GUI Notification tool. Brief descriptions are provided in Sections 8.3.1.1 through 8.3.1.4.

Table 8.3.1-1. RelB-Trouble Ticket Field Description (1 of 2)

Field Name	Data Type	Size	Entry	Description
Ticket-Id	Character	15	System generated	Ticket number which is set and maintained by the system
Ticket Status	Selection	4	Required	Status of the Trouble Ticket
Assigned-Priority	Selection	4	Required	Priority of Trouble Ticket assigned at the site (HIGH, MEDIUM, LOW)
Short Description	Character	128	Required	Short Description of the problem
Submitter Impact	Selection	4	Optional	Impact of the problem to the submitter (HIGH, MEDIUM, LOW)
Long-Description	Character	4060	Optional	Long Description of the problem
Resolution Log (End User Sees)	Diary	Unlim	Optional	General steps in the resolution of the problem
Detailed Resolution Log	Diary	Unlim	Optional	Detailed steps in the resolution of the problem
Submitter ID	Character	30	Required	User Id of the Submitter.
Submitter Name	Character	30	Optional	Full Name of the Submitter
Submitter Phone	Character	30	Optional	Phone number of the Submitter
Submitter e-mail	Character	64	Optional	E-mail address of the Submitter
Submitter Home DAAC	Character	60	Optional	Home DAAC of the Submitter
History	Diary	Unlim	Optional	Upon submission or modification, the person assigned to the ticket and the ticket status will be indicated in the History field. Due to a limitation in Remedy, this information will only be written when the Assigned-to and Status fields are modified
CI	Character	30	Required	Name of the Configuration Item to which the problem is associated
Assigned-To	Character	30	Optional	Person that Trouble Ticket has been assigned to
Last-modified-by	Character	30	System generated	Person that last modified the Trouble Ticket
Create-date	Date/Time	4	System generated	Date Trouble Ticket was created at the present site
Last-Modified-date	Date/Time	4	System generated	Date the Trouble Ticket was last modified
Related CCR	Character	60	Optional	ID of a related CCR

Table 8.3.1-1. RelB-Trouble Ticket Field Description (2 of 2)

Field Name	Data Type	Size	Entry	Description
Key Words	Character	255	Optional	Key words to help identify this Trouble Ticket
Problem Type	Character	30	Required	Type of problem addressed by this Trouble Ticket
Closing Code	Character	60	Required	Disposition of the closed trouble ticket
Closed-by	Character	60	System generated	Person that closed this Trouble Ticket
Close-date	Date/Time	4	System generated	Date this Trouble Ticket was closed
Software Resource	Character	60	Optional	Software Resource that the problem came from
Hardware Resource	Character	60	Optional	Hardware Resource that this problem came from
Duplicate Master Id	Character	25	Optional	The Master Ticket-ID of this Trouble Ticket
Forward-to	Character	60	Optional	Site that this Trouble Ticket was last forwarded to
Forwarded-from	Character	60	Optional	Site that forwarded this Trouble Ticket
Forwarded-by	Character	60	Optional	Contact person at the forwarding site
Forward-date	Date/Time	4	Optional	Date Trouble Ticket was forwarded
Unique-Identifier	Character	20	Optional	Unique identifier which is established at the origination site This identifier should NEVER be changed once set
Forwarded-to-1	Character	60	Optional	First site to have been forwarded this Trouble Ticket
Forwarded-to-2	Character	60	Optional	Second site to have been forwarded this Trouble Ticket
Forwarded-to-3	Character	60	Optional	Third site to have been forwarded this Trouble Ticket
Forwarded-to-4	Character	60	Optional	Fourth site to have been forwarded this Trouble Ticket
Associated Contact Log Id	Character	30	Optional	ID number of the Associated Contact Log

8.3.1.1 Remedy's GUI Admin Tool

The Admin Tool is used to set user permissions for accessing Remedy schemas. This tool is accessed by clicking on the Admin Tool to open the correct schema, filter, escalation or active link. (Problem escalation is discussed in Section 8.3.9)

For more information on the Admin Tool, refer to the Remedy Administration Manual.

8.3.1.2 Remedy's GUI Import Tool

The GUI Import tool is used to import existing entries rather than retyping information manually. It also enables the user to import entries into a schema from a file generated by the Admin tool. This tool is accessed by clicking on the Remedy Import Tool icon. For more information on the Import tool, refer to the Remedy User Guide.

8.3.1.3 Remedy's Hardware Information Schema

Detailed hardware information can be provided beyond what can be entered on the Trouble Tickets schema by using the Hardware Information schema. The User Tools Hardware Information schema provides the vehicle to add a description of a hardware problem that corresponds to a trouble ticket. Through this schema, the user can enter detailed information about failed hardware components (e.g., part and serial numbers) and the actions taken to correct the problem. This schema is accessed by clicking on the User Tool icon and opening RelB-Hardware Information schema, or via Hardware Information link from Trouble Tickets schema.

8.3.1.4 Remedy's GUI Notification Tool

The GUI Notification Tool is used as an alternative to email notification to notify the user of a Remedy event. This tool is accessed by clicking on the Remedy Notification Tool icon. It allows properties and options to be modified via pull-down menus. Examples of GUI notification include a beep, a pop-up window, and a flashing message. In addition, both an email and a GUI notification can be sent if the site so desires.

8.3.2 Submit a Trouble Ticket

When a problem is either found by or reported to User Services, follow the procedure applicable to your system, to create and log trouble tickets. Trouble tickets can be submitted via HTML or via Remedy's user tool – RelB-Trouble Tickets schema. Remedy's Contact Log schema is used to classify, track, and report contacts of ECS users and operators and also to submit a trouble ticket from a log entry. E-mail is another method of submitting a trouble ticket. The template is available from your System Administrator.

1. For HTML submission:
 - a) Access HTML Trouble Ticketing Main page.
 - b) Select Submit link, which opens the Submit page.
 - c) Fill out the impact, short description, and detailed description fields.
 - d) Select Submit.
2. For submission through Remedy (See the Remedy User Guide, Chapter 3, “Submitting an Action Request” for the general steps):
 - a) Access Remedy User Tool (See the Remedy User Guide, Chapter 2, “Getting Started with the User Tool”, page 2-3, section on “Starting the User Tool”).

- b) Access RelB-Trouble Ticket schema (See the Remedy User Guide, Chapter 2, “Getting Started with the User Tool”, page 2-18, section on “Using Schemas”).
 - c) Select Open Submit from the File menu.
 - d) Fill in those fields as specified in Table 8.3.1-1 "RelB-Trouble Ticket Field Description".
 - f) Select Apply.
3. For submission from a Remedy Contact Log entry:
- a) Click on User Tool icon and open RelB-Contact Log schema.
 - b) Fill out Contact Log ID and Contact Information. If the contact is a registered Remedy user, the contact information is filled out automatically.
 - c) Fill in Short Description (limit is 128 characters).
 - d) Click on **Create TT** button.
4. For submission via E-mail:
- a) Obtain Template from your System Administrator.
 - b) Address the message to arsystem@_____.
 - c) Copy template into message area. **DO NOT INCLUDE AS AN ATTACHMENT. DO NOT ALTER TEMPLATE.** The template is presented in Figure 8.3.2-1. The # sign indicates comments, which are not read by Remedy. **Enter data as indicated in Figure 8.3.2-1.** Send message.

```

#
# File exported Wed Feb 28 19:01:27 1996
#
Schema: RelB-Trouble Tickets
Server: remedy server name
Login:
Password:
      Short Description !  8!:
      Submitter Impact !536870922! : Low
# Values: Low, Medium, High _____ Select one
      Long-Description !          9!:
      Submitter ID !          2!:
      Submitter Name !536870917! :
      Submitter Phone !536870918! :
      Submitter e-mail !536870921! :
      Submitter Home DAAC !536870919! :

```

Figure 8.3.2-1. Trouble Ticket E-mail Template

8.3.3 Reviewing and Modifying Open Trouble Tickets

Trouble tickets may need to be modified based on better understanding of the nature of problems defined and revised resolutions from the Maintenance Engineer investigations, Sustaining Engineering inputs, Developer inputs, Problem Review Board decisions, Change Control Board decisions, and/or Failure Review Board decisions. The results will be factored into revisions and/ or additions to the Trouble Ticket log.

1. For HTML Review and Modification of Trouble Tickets:
 - a) Access HTML Trouble Ticketing Main (see Section 8.4). Trouble Tickets can be *submitted, queried or modified*.
 - b) Select List link which opens the List page and shows each Trouble Ticket's Identification, Short Description, and Status.
 - c) Select the Trouble Ticket Id to get a more detailed description of that particular Trouble Ticket.
2. For Reviewing and Modifying Trouble Tickets through Remedy (See the Remedy User Guide, Chapter 4, "Reviewing and Modifying Action Request" for the general steps):
 - a) Access Remedy User Tool (See the Remedy User Guide, Chapter 2, "Getting Started with the User Tool", page 2-3, section on "Starting the User Tool").
 - b) Access Release B-Trouble Ticket schema (See the Remedy User Guide, Chapter 2, "Getting Started with the User Tool", page 2-18, section on "Using Schemas").
 - c) Select List from the Query menu.
 - d) From the List pick the Trouble Ticket(s) that you would like to Review/Modify.
 - e) Select Modify Individual from the Query menu of the List window to review and modify the Trouble Ticket.

8.3.4 Forwarding Trouble Tickets

Trouble ticket administrative reports are forwarded for local and system-wide usage. The trouble ticket contains all forwarding information; once forwarded, it goes to the RelB-TT-ForwardToSite holding area (transparent to the user). The RelB-TT-Sites schema is used to indicate the site name and email address to be used in forwarding. To forward a trouble ticket:

1. Click on User Tool icon and open RelB-Trouble Ticket schema.
2. Set the status to "Forwarded".
3. Select a value for the Forward-to field from its picklist.
4. Select the Forward button.
5. Select Apply.

If necessary, a site name and email address can be modified, added, or deleted to update the picklist of Release B sites by authorized Remedy users: DAACs, SMC, NSI, EBnet. To modify picklist:

1. Click on User Tool icon and open RelB-TT-Sites schema.
2. Modify data.

8.3.5 Adding Users to Remedy

The database administrator uses the RelB-User schema to grant access to the Remedy tool. See Remedy Administrator's Guide for OSF/ Motif, Chapter 3, "Setting Up Users and Groups", page 3-11, section on "Adding Users". Users who change jobs can be deleted.

8.3.6 Changing Privileges in Remedy

This procedure is used by the CM Administrator to control privileges of those who have been granted access. For more information, refer to the Remedy Administrator's Guide.

NOTE: No group should be modified without proper configuration change approval.

To change Privileges in Remedy:

1. See Remedy Administrator's Guide, Chapter 3, "Setting Up Users and Groups", page 3-2, section on "Understanding Access Control".
2. See Remedy Administrator's Guide, Chapter 3, "Setting Up Users and Groups", page 3-4, section on "Access Control Groups".
3. Groups have already been created to accommodate all privileges needed by Remedy Users for Release B. These groups are identified in see Table 8.3.6-1.

Table 8.3.6-1. Table of Access Control Groupings

Groups	Description	Access Type
Operator	Submits trouble ticket internally.	Change
User Services	Submits trouble ticket internally for user.	Change
Operations Supervisor	Assigns problem priority and resolution responsibility. Can forward trouble ticket to another site.	Change
Resource Manager	Assigns problem priority and resolution responsibility. Can forward trouble ticket to another site.	Change
Resolution Technician	Attempts to resolve problem.	Change
Problem Review Board Chair Person	Reviews proposed solutions	Change
Administrator	Adds groups and users. Changes permissions. Sets escalation times. Sets menu items. Etc.	Change
Sub-Administrator	Same functions as Administrator but only with certain Schemas.	Change
Browser	Read only permission.	Read
Customize	Can use all features of the customize facility.	Change
Submitter	Place holder for anyone that submits a trouble ticket.	NA
Assignee	Place holder for anyone that is assigned a trouble ticket.	NA
Public	Read only permission. Guest users are automatically put in this group.	Read
NotifyNewEscal	Everyone that will be notified on an escalation due to trouble ticket being in "New" status.	Read
NotifyAssignedEscal	Everyone that will be notified on an escalation due to trouble ticket being in "Assigned" status.	Read
NotifySolPropEscal	Everyone that will be notified on an escalation due to TT being in "Solution Proposed" status.	Read
NotifyImpSolEscal	Everyone that will be notified on an escalation due to trouble ticket being in "Implement Solution" status.	Read
NotifySollmpEscal	Everyone that will be notified on an escalation due to TT being in "Solution Implemented" status.	Read

8.3.7 Modifying Remedy's Configuration

RelB-Trouble Ticket schemas' pulldown menus can be customized. Customization is achieved through the User Tool by modifying the RelB-Menu-Closing Codes, RelB-Menu-Hardware Resources, RelB-Menu-Software Resources, RelB-Menu-Key Words, RelB-Menu-Problem Type, Sites schemas.

To modify the Remedy environmental variables, refer to the Remedy User's Guide and Remedy Administrator's Guide as indicated.

1. See Remedy User's Guide, Chapter 7, "Customizing the Environment."
2. See Remedy Administrator's Guide, Chapter 1, "Using the Administrator Tool."

NOTE: No administrative configuration should be made without proper configuration change approval.

8.3.8 Generating Trouble Ticket Reports

A set of predefined reports will be placed in a public directory that should be downloaded to your personal configuration directory (see the Remedy User Guide, Chapter 2, "Getting Started with the User Tool," page 2-31, section "Sharing Macros, User Commands and Custom Reports," sub-section "Copying Files"). These reports are trouble ticket administrative reports generated for local and system-wide usage. See Remedy User's Guide, Chapter 5, "Reports."

8.3.9 Re-prioritization of Dated Trouble Ticket Logs

Remedy provides automated prioritization of trouble tickets based on delinquency status of outdated trouble ticket logs. The File Tickler System automatically assigns higher priority to promote timely resolution.

1. Access Remedy User Tool (See the Remedy User Guide, Chapter 2, "Getting Started with the User Tool," page 2-3, section on "Starting the User Tool").
2. Access RelB-Times schema (See the Remedy User Guide, Chapter 2, "Getting Started with the User Tool", page 2-18, section on "Using Schemas").
3. Select List from the Query menu.
4. From the List pick the Time(s) that you would like to Review/Modify.
5. Select Modify Individual from the Query menu of the List window to review and/or modify the Time (in seconds).

8.4 Using Hypertext Mark-up Language (HTML) Screens

The hypertext mark-up language (HTML) Trouble Ticket Main Screen ("ECS Trouble Ticketing: Menu") provides an introduction on how to use the Trouble Ticketing HTML, and is used by registered ECS users to go to either the Submit page or List page.

Selecting **Submit a Trouble Ticket** will bring up the Trouble Ticketing Submit screen.

Selecting **List the [username] Trouble Tickets** will bring up the Trouble Ticketing List screen.

Help on the Trouble Ticket HTML screens is available by clicking on the Trouble Ticket Help icon at the bottom of the screen .

8.4.1 ECS Trouble Ticketing HTML Submit Screen

The HTML Trouble Ticket Submit screen is used by registered ECS users to submit a Trouble Ticket.

Table 8.4.1-1 below provides a description of the Trouble Ticket HTML Submit Screen fields.

Table 8.4.1-1. Trouble Ticket HTML Submit Screen Field Description

Field Name	Data Type	Size	Entry	Description
ID	character	30	System generated	Submitter Id
Name	character	30	System generated	Submitter Name
E-mail address	character	64	System generated	Submitter E-mail Address
Phone	character	30	System generated	Submitter Phone Number
Home DAAC	character	60	System generated	Submitter Home DAAC
Impact	selection	4	Required	Impact to Submitter
Short description	character	125	Required	Short description of problem
Detailed problem description	character	245	Optional	Long description of problem

When the information is completed, the user can submit the Trouble Ticket by clicking on the **Submit** button on the lower half of the screen. The Problem Information Fields can be cleared by clicking on the **Reset** button. The user also has the choice of returning to the Trouble Ticketing Homepage or going to the Trouble Ticket Help screen by clicking on the respective icons at the bottom of the page.

8.4.2 ECS Trouble Ticketing HTML Success Screen

The HTML Trouble Ticket Success screen is used by registered ECS users to ensure successful submission and report Trouble Ticket Id.

From this screen, the user is provided with the following information/options:

- Confirmation that the trouble ticket was successfully submitted, the trouble ticket identification number, and who submitted the trouble ticket.
- Notification that an E-mail message has been sent to the user indicating that a Trouble Ticket has been submitted and when it was closed. Selecting this Trouble Ticket will open the Trouble Ticket Detailed Screen.
- Instructions telling the user how to check the progress of Trouble Ticket resolution.

The user also has the choice of returning to the Trouble Ticketing Homepage or going to the Trouble Ticket Help screen by clicking on the respective icons at the bottom of the page.

8.4.3 ECS Trouble Ticketing HTML List Screen

The HTML Trouble Ticket List screen is used by registered ECS users to List Trouble Tickets for a user and links the listed Trouble Ticket Number to the Trouble Ticket Detailed Screen.

Table 8.4.3-1 below provides a description of the Trouble Ticket HTML List Screen fields.

Table 8.4.3-1. Trouble Ticket HTML List Screen Field Description

Field Name	Data Type	Size	Entry	Description
Trouble Ticket Number	character	15	System generated	Trouble Ticket Id
Problem Short Description	character	125	System generated	Short Description of Problem
Status	character	20	System generated	Status of Trouble Ticket

The user also has the choice of returning to the Trouble Ticketing Homepage or going to the Trouble Ticket Help screen by clicking on the respective icons at the bottom of the page.

8.4.4 ECS Trouble Ticketing HTML Detailed Screen

The HTML Trouble Ticket Detailed screen is used by registered ECS users to see a more detailed output of a Trouble Ticket.

Table 8.4.4-1 below provides a description of the Trouble Ticket HTML Detailed Screen fields.

Table 8.4.4-1. Trouble Ticket HTML Detailed Screen Field Description

Field Name	Data Type	Size	Entry	Description
ID	character	30	System generated	Submitter Id
Name	character	30	System generated	Submitter Name
E-mail address	character	64	System generated	Submitter E-mail Address
Phone	character	30	System generated	Submitter Phone Number
Home DAAC	character	60	System generated	Submitter Home DAAC
Status	selection	4	System generated	Status of Trouble Ticket
Impact	selection	4	System generated	Impact to Submitter (low, medium, high)
Short description	character	125	System generated	Short description of problem
Detailed problem description	character	245	System generated	Long description of problem
Log	character	unlim.	System generated	Diary of problem resolution

The user also has the choice of returning to the Trouble Ticketing Homepage or going to the Trouble Ticket Help screen by clicking on the respective icons at the bottom of the page.

8.4.5 ECS Trouble Ticketing HTML Help Screen

The HTML Trouble Ticket Help screen is used by registered ECS users to get help with the HTML screens.

This screen provides general information on the following:

- Index -- links that scroll the screen to the Introduction, Submit Page, and List Page sections listed below.
- Introduction – provides information about the Trouble Ticket Help page
- Menu Page – describes the Trouble Ticketing Menu page.
- Submit Page – describes the Trouble Ticket Submit page.
- Success Page – describes the Trouble Ticket Success page.
- List Page – describes the Trouble Ticket List page.
- Detailed Page - describes the Trouble Ticket Detailed page.

8.5 Emergency Fixes

Emergencies may be in real time with the understanding that the Trouble Ticket System must be brought up-to-date as soon as possible after implementing the repair. The example presented below, involves a hardware failure. The problem needs to be resolved quickly to bring a system back into operation. The resolution requires emergency replacement of a component that is of a later version than is contained in the original equipment. The scenario is summarized in Table 8.5-1.

Scenario — An Example of an Emergency Change Procedure

It is 7:00 on a Saturday evening. The DAAC operator detects a problem with the automated tape library (ATL) and reports the problem to the Trouble Ticket System. The trouble ticket is routed to the System Administrator, who confirms that the system will not operate and notifies the site Maintenance Engineer. After running further diagnostics, the Maintenance Engineer reports the problem and symptoms to the OEM's maintenance desk. The original equipment manufacturer (OEM) maintenance representative arrives and concludes that a controller card has failed. The only card the OEM has immediately available is of a later version and no spares are available on site. It will be Monday at the earliest before a replacement board of the same revision level can be located. The site maintenance engineer reports this to the operations Crew Chief (i.e., shift leader) for a decision.

The DAAC cannot afford to have the ATL down until Monday. The Crew Chief calls the DAAC manager at home, appries him of the situation, and obtains approval to replace the board with the later version if tests conclude that it works properly. The OEM's maintenance representative installs the board. The site's sustaining engineer tests the new controller board, finds that it works properly, and brings the ATL back on-line. The sustaining engineer updates the trouble ticket to document the configuration change and the authority for the change, and forwards it to the site CMA. The site Maintenance Engineer updates the property record with the model, version, and serial number of the new board.

The site CM Administrator reviews the trouble ticket, and presents it to the local CCB for approval. The CMA then updates the Baseline Manager with the new configuration and TT number authorizing the change. At this point, the site is operational at variance from the system baseline, i.e., site unique, and is at risk of loosing maintenance support from M&O.

The site CMA forwards the trouble ticket to the SMC, presented to the PRB for priority review and is solved or translated into an NCR. The M&O PRB reviews all emergency TTs to assess whether there may be impacts to the ECS and/or applicability to other sites. The M&O CCB monitors all open NCR promotion and approves them for closure.

In the event that it is later discovered that the new version controller board has adverse impacts when operating in the ECS configuration, a board of the original version will have to be obtained to replace the newer version. In such cases, the action will be recorded on a new trouble ticket, citing the previous CCR.

Table 8.5-1 summarizes emergency procedures that might be taken during an after-hours, over-the-weekend emergency hardware failure.

Table 8.5-1. Example of Emergency Change Procedure

Operator/User	System
Operator prepares trouble ticket to report ATL controller failure.	Trouble ticket recorded.
System Administrator and Maintenance Engineer confirm ATL controller failure, call ATL maintenance vendor, report call and time in Trouble ticket.	Diagnosis and vendor call recorded in trouble ticket.
Maintenance vendor isolates failure to the controller card. The later version card is the only card available.	
Crew Chief notified of situation and decision needed to bring ATL up to full operating capability. Approves use of the newer version card, records decision in the trouble ticket, forwards trouble ticket to Sustaining Engineer.	
Maintenance vendor installs card, tests using hardware diagnostics. Crew Chief authorizes controller to be brought back on-line.	
Maintenance Engineer records card installation by model/version into the trouble ticket.	Trouble ticket action recorded.
Sustaining Engineer reads trouble ticket and prepares for discussion at 8:30 am meeting. Updates the TT.	Install action recorded in TT. TT routed to the CMA.
CMA updates site baseline, forwards TT to the CCB. When CCB approves the action, CMA forwards to SMC.	Site ATL baseline updated in Baseline Manager.
M&O reviews emergency NCR, checks for applicability to other sites, opens new NCR if other sites require change.	

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9. Configuration Management Procedures

The procedures that have been prepared are applicable to all of ECS including all hardware, software, and firmware components of systems or subsystems developed or acquired by the ECS contract and/or delegated to configuration management control by the operational site-level organizations. The procedures are applicable to all items maintained by the ECS Sustaining Engineering Organization in support of ECS mission-specific projects and multiple mission-specific institutional facilities. The procedures are not applicable to those entities controlled by higher level ESDIS Project Office CM Plans. The procedures also apply to ESDIS authorized replacements of or augmentations to fungible assets at extant facilities. CM procedures already in place may be used by the contractor subject to direction from the Change Control Board (CCB) chair person.

Some major features of the approach being offered here include:

- Customers participate in establishing the procedures;
- The M&O CCB performs a support role for ESDIS and its designated on-site CCBs by processing system-level CCRs & Trouble Tickets;
- Prioritization, automated tools, and procedures are used for handling change requests;
- Diverse/Strategic representation at hierarchical CCBs facilitate a path for speedy escalation/resolution of problems/issues;
- Local organizations have the needed autonomy to accomplish their mission with the minimum necessary outside intervention to promote timely resolution of local problems and enable timely production of data products;
- Proper use and deployment of CM database assets to support all CCBs allows management monitoring, control, and analysis of activities;
- Coordination with the Failure Review Board allows coordinated response to problems and filtering of prioritized issues; and
- Common CM tools will be used in all elements of the ECS Project during operations.

The procedures are organized into nine major sections that address the flow-down of procedures from the ECS system-level to the site-level with references to site-tailoring of procedures where applicable. The topics include (Section 9.1) configuration identification, (Section 9.2) change control processes, (Section 9.3) configuration status accounting, (Section 9.4) configuration audits, (Section 9.5) data management, and the use of standardized CM tools known as (Sections 9.6 and 9.7) Software CM Manager (ClearCase), (Section 9.8) Change Request Manager (Distributed Defect Tracking System), and (Section 9.9) Baseline Manager (XRP-II).

9.1 Configuration Identification Procedure

9.1.1 Purpose

The purpose of configuration identification during maintenance and operations is to incrementally establish and maintain the definitive basis of control and status accounting for the ECS control items. To accomplish configuration identification for both hardware and software, the configuration management (CM) administrator (CMA) shall ensure the maintenance of each ECS configuration controlled item in an operational baseline by executing the following tasks:

- a. Assign identifiers to configuration items (CIs) and their component parts and associated configuration documentation, including revision and version number where appropriate. Assign serial and lot numbers, as necessary, to establish the CI effectivity of each configuration of each item of hardware and software.
- b. Follow ECS developer guidelines as referenced below in section 9.1.3.
- c. Follow vendor nomenclature for COTS items.
- d. Apply operation and maintenance (O&M) version name extensions to ECS modified item nomenclature following the rules in Section 9.1.4.
- e. Follow author-designated version control and nomenclature for documents and follow guidelines from the ECS Librarian (cf. Section 20, *Library Administration*)
- f. Support the ECS Librarian's efforts to maintain linkage of the ECS documentation to ECS configuration items in the Baseline Manager tool. Ensure that the marking and labeling of items and documentation with their applicable identifiers enables correlation between the item, configuration documentation, and other associated data.
- g. Maintain a release system for configuration changes (cf. Section 9.2, *Configuration Change Control Procedures*).
- h. Maintain views of operational baselines using the Baseline Manager tool (cf. Section 9.9).
- i. Ensure that applicable identifiers are embedded in the source and object code.

9.1.2 Applicable to

All ECS CM Administrators and support personnel.

9.1.3 References

ESDIS CM Plan

CM Plan for the Science Data Processing Segment of the ECS Project

Software Build Process, CM-1-023

Software Naming Conventions, SD-1-015

Developed Application Versioning, CM-1-031-1

Directory and File Name Guidelines and Standards for Release A

Document Numbering, DM-1-002

DoD Mil-Std-973

9.1.4 Procedures

9.1.4.1 Extended Configuration Identification

The extended configuration identification for ECS is of the standard form:

Control Item.Release.Organization.#_Dev.#_M&O.#_center

where:

- *Control Item* is the ECS Project designation of the CI at RRR turnover. The CI naming convention has been explained in CM-1-023 *SW Build Process* and further elaborated in SD-1-015 *SW Naming Conventions*.
- *Release* is the major release, A, B, C, or D.
- *Organization* is the organization that established the configuration. Legal values are DEV for development, M&O for Maintenance and Operations system-wide, or center (e.g., SMC, EOC, EDC, GSFC, etc.) for center unique.
- *#_Dev* is a numeric identifier applied by the development organization to the major release and/or a minor release.
- *#_M&O* is a numeric identifier applied by the M&O/SEO organization. This field is used by the SEO organization to establish the system M&O baseline.
- *#_Center* is a numeric identifier applied by each center. This field is used by the operational centers to establish the site specific baseline.

For example, at the TRMM Development Release RRR, the ECS CCB establishes the initial operational baseline. Assume this baseline is identified as CI.A.DEV.3. CI.A.DEV.3 is delivered to the ESDIS CCB. After ESDIS CCB acceptance, the M&O organization will configure and build its first, system-wide baseline, CI.A.M&O.3.0. If it is assumed that some M&O tailoring is applied, the baseline released to the operational centers is CI.A.M&O.3.1. Each center then configures a center specific baseline. The RRR baseline for EDC, GSFC, LaRC, and NSIDC as well as the SMC and EOC is built from CI.A.M&O.3.1 and are identified as CI.A.EDC.3.1.1, CI.A.GSFC.3.1.1, CI.A.LaRC.3.1.1, CI.A.NSIDC.3.1.1, CI.A.SMC.3.1.1 and CI.A.EOC.3.1.1.

9.1.4.2 Other Procedures as Applicable

The CM Administrator will author other configuration identification procedures applicable to the local site environment to carry out the objectives listed in the Section 9.1.1 Purpose.

9.2 Configuration Change Control Procedures

9.2.1 Purpose

The ESDIS CCB chartered Change Control Boards (CCBs) shall apply configuration control measures to all the ECS configuration items and the associated documentation prior to the time it is baselined for operations. The CCBs shall apply configuration control measures to

- a. Ensure effective control of all CIs and their approved documentation;
- b. Provide effective means, as applicable, for (1) proposing engineering changes to CIs, (2) requesting deviations and waivers pertaining to such items, (3) preparing notices of revision, and (4) preparing Specification Change Notices; and
- c. Ensure the implementation of approved changes.

9.2.2 Applicable to

All ESDIS chartered ECS CCBs.

9.2.3 References

ESDIS CM Plan

MO&DSD CM Plan

CM Plan for the Science Data Processing Segment of the ECS Project

ECS Development Facility Change Control Process CM-1-007

9.2.4 Procedures

9.2.4.1 Configuration Change Request Preparation

The Configuration Change Request (CCR) form in Figure 9.2.4-1 has been developed as a medium for the drafting of CCRs throughout the ECS Maintenance and Operations environment for changes processed locally at ECS site-level chartered CCBs at the SMC, EOC, and DAACs (GSFC, LaRC, EDC, NSIDC, and ORNL).. For changes processed by the ESDIS Change Control Board (CCB), use ESDIS own forms. For ECS CCBs, use the form available at the URL <http://dmsserver.gsfc.nasa.gov/forms/formindex.html>. There are numbered items on the form that correspond exactly to the data entry required to be performed by the respective Configuration Management Administrator who maintains CCR records for the CCB on the distributed implementation of the Change Request Manager tool. Each CCB will have unique CCR identification sequence numbers. Each CCB can forward CCRs and reports from the Change Request Manager to SMC where SEO processes system-level CCRs for ESDIS CCB. The ESDIS CM Plan will determine the charter of the respective CCBs and thus the scope of CCR issues to be addressed by the site CCBs.

- (2) **CCR Number** -- The unique serialized CCR number is applied at each site.
- (3) **Submitted Date** -- The date that the CCR was prepared is documented.
- (4) **Revision** -- The current revision is designated for tracking changed versions of original CCR.
- (5) **Priority** -- The priority level of the CCR is assigned. Emergency CCRs may have already been implemented on a temporary basis by the Trouble Ticket Review Board (TTRB) with concurrence from the CCB Chair who later receives the CCR to document /implement the permanent change. Urgent items will be reviewed by the next CCB meeting. Routine items will be reviewed as soon as the schedule permits.
- (6) **Change Class** -- Change Classes are either I or II. Class I will be handled by ESDIS-only because of cost, schedule, and/or mission impacts that may require requirements changes. Class II items do not affect mission requirements, but may have cost and/or schedule implications which affect maintenance, operations, procedures, documentation, site-tailored items, COTS implementation, site installations of core system changes, science SW changes, etc.
- (7) **Status** -- The following table is a summary of the CCR states maintained by the Distributed Defect Tracking System (DDTS) application SW database tool that implements the Change Request Manager. Note that the hard copy form will not be updated chronically, but will be kept in the master suspense file of the CM Administrator until closed-out with a stamp (item #7 & 15) and appropriate signatures (viz., items 16, & 17).

State Table Composition in DDTS format

State Code	Available States	State Assigned
S	Submit	Submitted
N	New	New
A	Assign-Eval	Assign-Eval
O	Assign-Implement	Assigned-Implement
R	Implement	Implemented
T	Assign-Verify	Assigned-Verify
V	Verify	Verified
C	Close	Closed
D	Duplicate	Duplicate
F	Forward	Forwarded
P	Defer	Deferred

Explanations of DDTS' State Table Content:

Uppercase character in the 1st column is the character stored in the change request record to indicate what state a change request is in. DDTS uses this character to go into the table and extract the descriptive name for display in reports.

Names in the second column is the state in the present tense. They are shown on the DDTS list of states that are available for selection during input. It's also used by some of DDTS' query and report code. It facilitates querying based on descriptive names opposed to a single letter.

Names in the third column is the state in the past tense. They are shown on the DDTS change request record. It's also used by some of DDTS query and report code. It facilitates querying based on descriptive names opposed to a single letter.

Definitions (a state is the stage that a proposed change has reached in its life cycle.):

New - the initial state for all newly entered change requests.

Assign-Eval- state entered when the change request is being assigned to an engineer for evaluation/analysis.

Assign-Implement- state entered when the change request is being assigned to an engineer for development.

Implement-state entered when the proposed change has been developed.

Assign-Verify-state entered when the developed change is being assigned to an engineer for verification testing.

Verify- state entered when a developed change has been tested and verified that it functions properly.

Close- state entered when all activity specified in the change request has been completed or that the approval authority has decided to close it prior to completion of all activity.

Duplicate-state entered when a change request is determine to be duplicate of an existing change request. Duplicate change request identifies change request being duplicated.

Forward-state entered when a change request needs to be forwarded to another DDTS defined project (In DDTS terminology, a project is a grouping of change requests. For example, a change request from a site project can be forwarded to an ECS project.).

Defer- state entered when activity on a change proposal has to be postponed.

(8) **CCR Title** -- The CCR title is supplied by the originator.

(9) **Originator** -- The originator name, organization, e-mail address, and phone number is given.

(10) **Approval** -- The CCR is approved by the designated management authority which is assigned by the CCB. This sponsorship requirement acts as a primary filter to eliminate from consideration those CCRs that cannot be implemented or which have no ECS site management support.

(11) **Reason for Change** -- The reason for the change is narrated on the form and/or the designated attachment.

(12) **Description of Change** -- The proposed implementation of the change is narrated along with any known impacts, resources, and expenses to be incurred.

(13) **Impact Analysis** -- Impact analysis is documented in the form of figure 9.2.4-3. The impact analysis is collected by the CCB Chair appointed Evaluation Engineer in coordination with the CM Administrator who maintains the CM records and assembles the review package for the CCB. The Evaluation Engineer documents the list of Impact Evaluators and derives and/ or verifies cost, technical, and schedule impact of the proposed change based on all inputs received. The results of the coordinated CCR Impact Analysis inputs are presented in the CCR Impact Summary form shown in figure 9.2.4-3 part of the CCR review package.

CCR Impact Analysis

Responder Request Number: _____

Responder: _____

Responder Point of Contact:
address: _____

phone: _____

e-mail: _____

CCB Schedule Date: _____

CCR Number: _____

CCR Log Date: _____

CCR Originator: _____

CCR Originator Point of Contact:
address: _____

phone: _____

e-mail: _____

Evaluation Engineer: _____

Evaluation Engineer Point of Contact:
address: _____

phone: _____

e-mail: _____

Requested Return Date: _____

Rough Order of Magnitude (ROM) Impact Analysis

Basis of Estimate:

Technical Assumptions and Comments:

Cost Impact:

None []

Small [] < \$ 100, 000

Medium [] \$100,000 < x < \$500,000

Large [] > \$500,000

Schedule Impact:

Technical Assessment: (Your impact analysis should consider the implementation approach; interfaces affected; HW or SW changes required; documentation changes required-- change from/to pages; suggested alternatives, if any; and impact to security features. If your system is not impacted, please provide that information to the CM Administrator.)

Comments:

Signed: _____
(Responder)

Date: _____

Figure 9.2.4-2. ECS CCR Impact Analysis

CCR Impact Summary

Evaluation Engineer: _____
Evaluation Engineer Point of Contact:
address: _____

phone: _____
e-mail: _____
CCR Board Date: _____

Resources Summarized:

Technical Summary:

ROM Summary (BOE, Cost, and Schedule):

Recommendation:

Signed: _____
(Evaluator)
Date: _____

Figure 9.2.4-3. ECS M&O CCR Impact Summary

(14) **Comments** -- Comments are added to the CCR to summarize sites and/ or organizations affected by the CCR. Additional comments may address proposed CCB dispositions and recommendations to be indicated by resolutions in item #15.

(15) **Board Action** -- CCB actions and follow-up actions that will be facilitated and tracked by the CM Administrator are indicated. Possible CCB dispositions are given as approved, withdrawn, disapproved, and deferred (pending follow-up activities by the indicated schedule date). Further actions are indicated as

Engineering Change Proposal (ECP)-- changed scope of contract requirements

Waiver-- declaration that certain contract requirements no longer apply

Deviation-- change of contract terms or substitution of terms or deliverable requirements

Technical Direction-- order by Contracting Officer's Technical Representative (COTR) to perform certain tasks within the scope of the contract

Contract Modification-- changes to the terms of a contract

Document Change Notice (DCN)-- notification of changes to published documents

Others-- Engineering Change Notice, Change Order, Escalate to higher CCB authority, etc.

(16) **CCB Approval** -- CCB approval signature authority by CCB Chair or designate.

(17) **CCR Implemented** -- This signature and close-out stamp (item #7) are executed by the CM Administrator witnessing the completion of the CCR implementation process which is tracked in the Change Request Manager automated tool DDTS and updated in Baseline Manager (XRP-II) for affected version control status changes.

9.2.4.2 Change Control Board Process (System and Site-level CCBs)

The ECS M&O organization will provide administrative and technical support services for the CCB at each site. Each site's CCB is controlled by the host site organization and provides the authority and direction for the ECS contractor to modify the operational baseline. The ESDIS CCB has chartered an ECS Review Board to coordinate ECS system-level changes and problem management via the Sustaining Engineering Organization (SEO) contractor and on-site Review Boards that also act as site CCBs. This is illustrated using the CM Administrator's workflow for the SEO support of the ECS Review Board in Figure 9.2.4-4 and the On-Site CM Administrator's workflow for SEO support of the on-site CCB in Figure 9.2.4-5. The problem management process was discussed in detail in Section 8 of this document. Both diagrams illustrate the flow of CCRs through the respective CCBs with inputs from the review boards and evaluators that determine the disposition of proposed changes. Details of this process are given below:

System-level Change Control Procedures

(The enumeration corresponds to the diagram of figure 9.2.4-4)

- (1) Configuration Change Requests are received by the SEO CM Administrator from all sources with regard to the operational ECS Core System as described in Section 9.2.4.1. These changes designated as from other sources could involve system enhancements, procedures, interfaces (both external and internal), documentation changes, etc. that are not the subject of contemporaneous problem reports which would be first deliberated by the Trouble Ticket Review Board (TTRB) and/ or Failure Review Board as explained below.
- (2) Proposed common baseline changes will be proposed based on Trouble Ticket (TT) resolutions obtained from the respective review boards (see Section 8 for details). The respective TT would be closed via a corresponding CCR to either ratify, i.e., to make permanent the prior temporary/emergency action taken by the TTRB or to consider normal priority (scheduled) changes for incorporation into future change releases.
- (3) The SEO CM Administrator is responsible for logging the CCR into the Change Request Manager (DDTS tool) as described in Section 9.8.
- (4) The CCB chair assigns an evaluator and the SEO CM Administrator coordinates impact assessment.
- (5) Class I change requests (proposed changes that affect controlled milestones, schedules, budget, cost and requirements) are forwarded to the ESDIS CCB for consideration with recommendations from the ECS Review Board.
- (6) Class II change requests (proposed changes affecting documentation, hardware [alternative use of], software [correction of errors], and COTS substitution without a Class I impact) are considered by ECS Review Board deliberations.
- (7) Notice of proposed changes is distributed to affected parties and review board members to obtain and coordinate impact assessment and optimize the approach to implement proposed changes.
- (8) The results of ECS Review Board deliberations are factored into review board resolutions which determine whether, when, or where the system changes will be implemented.
- (9) Approved changes are processed by the SEO CM Administrator to the support activities, i.e., site CCBs, support personnel (SEO), vendors, etc. who are provided with change orders, schedule, and implementation instructions.
- (10) Disapproved changes are processed by the SEO CM Administrator via official notifications, memo to the file, and update of the Change Request Manager (CRM).
- (11) The SEO CM Administrator tracks implementation and closure of CCRs via directions to implementing organizations and their acknowledgements using the CRM tracking and statusing features (see section 9.8).
- (12) New versions and/or maintenance updates are annotated in Baseline Manager at the SMC and at the affected sites by following the procedures for configuration identification, activation dates, deactivations dates, and issuing version description documents.

(13) Simultaneously, the SW Change Manager (ClearCase) is updated with directory trees, installation files, and software as required by SW maintenance.

(14) Status of this activity to implement changes and assigned responsibilities is tracked through closure in the CRM at SMC and at the sites.

(15) The databases are synchronized by manual checking between applications (Baseline Manager vs. CRM vs. SW Change Manager) and automated verification by the SW CM Manager for purposes of SW distribution and maintenance.

(16) The TT Review Board is empowered to make emergency fixes without common baseline changes and update these changes directly to Baseline Manager with documentation to follow via the CCR submitted to the appropriate CCB. Proposed common baseline changes must be submitted by CCR to the ECS Review Board.

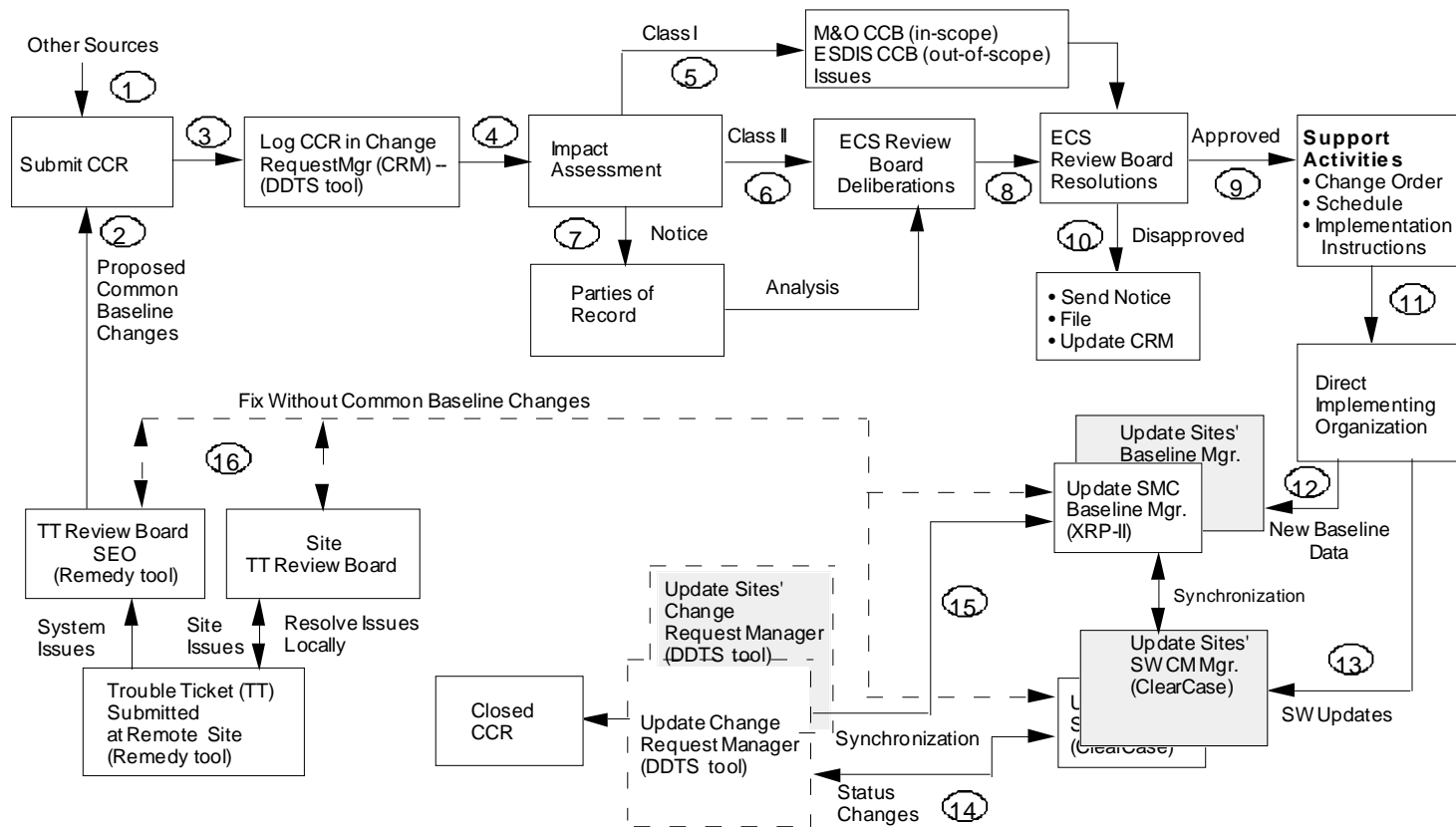


Figure 9.2.4-4. Work-Flow Diagram for SEO CM Administrator

Site-level Change Control Procedures

(The enumeration corresponds to the diagram of Figure 9.2.4-5)

- (1) Configuration Change Requests are received by the Site CM Administrator from all sources with regard to the **site unique extensions** to the operational ECS Core System as described in section 9.2.4.1. These changes designated as from other sources could involve system enhancements, procedures, interfaces (both external and internal), documentation changes, etc. that are not the subject of contemporaneous problem reports which would be first deliberated by the Site/ SEO Trouble Ticket Review Board (TTRB) and/or Failure Review Board as explained below.
- (2) Proposed site baseline changes will be proposed based on Trouble Ticket (TT) resolutions obtained from the respective review boards (see section 8 for details). The respective TT would be closed via a corresponding CCR to either ratify, i.e., to make permanent the prior temporary/
emergency action taken by the TTRB or to consider normal priority (scheduled) changes for incorporation into future change releases.
- (3) The Site CM Administrator is responsible for logging the CCR into the Change Request Manager (DDTS tool) as described in Section 9.8.
- (4) The CCB chair assigns an evaluator and the Site CM Administrator coordinates impact assessment.
- (5) Class I/System Issues change requests (proposed changes that affect controlled milestones, schedules, budget, cost and requirements) are forwarded to the ECS Review Board for consideration with recommendations from the Site CCB. Class I issues are further forwarded with recommendations by the ECS Review Board to the M&O CCB for in-scope issues and to the ESDIS CCB for consideration of out-of scope issues with respect to the SOW of the ECS Contract.
- (6) Class II change requests (proposed changes affecting documentation, hardware [alternative use of], software [correction of errors], and COTS substitution without a Class I impact) are considered by Site CCB deliberations.
- (7) Notice of proposed changes is distributed to affected parties and review board members to obtain and coordinate impact assessment and optimize the approach to implement proposed changes.
- (8) The results of Site CCB deliberations are factored into CCB resolutions which determine whether, when, or where the system changes will be implemented.
- (9) Approved changes are processed by the Site CM Administrator to the support activities, i.e., other CCBs, support personnel (SEO), vendors, etc. who are provided with change orders, schedule, and implementation instructions.
- (10) Disapproved changes are processed by the Site CM Administrator via official notifications, memo to the file, and update of the Change Request Manager (CRM).

- (11) The Site CM Administrator tracks implementation and closure of CCRs via directions to implementing organizations and their acknowledgements using the CRM tracking and statusing features (see Section 9.8).
- (12) New versions and/ or maintenance updates are annotated in Baseline Manager at the affected sites and the SMC by following the procedures for configuration identification, activation dates, deactivations dates, and issuing version description documents.
- (13) Simultaneously, the SW Change Manager (ClearCase) is updated with directory trees, installation files, and software as required by SW maintenance.
- (14) Status of this activity to implement changes and assigned responsibilities is tracked through closure in the CRM at the sites.
- (15) The databases are synchronized by manual checking between applications (Baseline Manager vs. CRM vs. SW Change Manager) and automated verification by the SW CM Manager for purposes of SW distribution and maintenance.
- (16) The on-site TT Review Board is empowered to make emergency fixes without common baseline changes and update these changes directly to Baseline Manager with documentation to follow via the CCR submitted to the appropriate CCB. Proposed common baseline changes must be submitted by CCR to the ECS Review Board.

Each site's CCB accepts initial release or updates from the ESDIS CCB. Similarly, the Distributed Active Archive Center (DAAC) CCBs will accept product generation software from an ESDIS authority. Local tailoring and installation decisions are determined by the site CCB.

In the case of Evaluation Package (EP) and Prototype deliveries, the ECS CCB as directed by ESDIS will provide a configured, documented, executable with supporting files. Again, installation decisions are determined by the site CCB.

Each Science Computing Facility (SCF) is assumed to have a configuration control function. For commonality with other sites, it is assumed that this function will be performed by a CCB. A major difference, though, is the ECS contractor does not have an active role in the support of this CCB.

The SCF CCB will provide two types of configuration control:

- (1) Configuration control of software and databases that are to be executed in another site's environment. In this mode, it operates very much as the ECS CCB does to establish a product baseline.
- (2) Configuration control of SCF resources that are made available to the EOSDIS community. In this mode, its functions are the same as a DAAC CCB.

The ECS M&O CM function at each DAAC will accept science SW and data items from the SCF CCB. These items will be incorporated into the DAAC's operational baseline as directed by the DAAC CCB.

The EOC CCB will control the operational configuration of the required EOC operational baseline. ECS M&O CM will provide services as directed by the CCB.

The ECS Review Board will be charged with the responsibility for centralized coordination and control of ECS CM activities to ensure:

- ECS integrity and quality of service
- Successful coordination with both internal and external networks, systems, and on-site facilities
- Timely ESDIS CCB visibility into and oversight of ECS operations
- Convenient user administrative services

9.2.4.3 Configuration Control - Deviation and Waivers

1. Prior to completion of software development or to purchase of equipment or software, a Deviation from the specification may be granted by the ESDIS CCB.
2. Subsequent to the completion of development or delivery of equipment or software, a Waiver of specific requirements may be granted in order to accept defined nonconforming items. The waiver is traceable to a nonconformance report. A waiver is limited: additional deliveries of like items must conform to approved requirements .
3. Departures from expected configurations that are not at variance with customer-approved requirements are handled as Nonconformance Reports.
4. A request for a Deviation or Waiver consists of a Deviation/Waiver Form shown in figure 9.2.4-6 attached to a CCR form .
5. Instructions for completing the form are listed below. Additional pages should be attached as necessary.

Dev or Wai: Check the applicable box in accordance with the definitions given on page 1 of this Instruction.

Waiver Number: Assigned by ECS CM Administrator

Title: Enter a brief descriptive title. The title should be a statement, e.g., "Accept x in lieu of y".

Reason: Describe the reason for the deviation or waiver. This may also include the history of the problem and consequences of not implementing the deviation/waiver.

Existing Requirement: Specify and describe the baseline from which the deviation or waiver departs.

Departure: Give instructions for the deviation or waiver with reference to the requirement.

Implementation Scope: Include as appropriate, configuration item number, model no., supplier, subcontractor, series, serial numbers, order no., location, release number, quantity, time period or other criteria delimiting the deviation or waiver.

Documents Affected: List current release number(s) of affected document(s).

6. The Deviation or Waiver CCR is prepared in accordance with the instructions in section 9.2.4.1 with the following exceptions:

Change Class: All deviations and waivers are change class I because they depart from approved requirements and must be approved by the ESDIS CCB.

Description (Title): The title of the CCR will be the deviation or waiver title.

Proposed Solution: Enter "See Attached Deviation/Waiver form ."

7. Waiver and Deviation CCRs are submitted to the ECS CCB. Upon ECS CCB approval, the CM Administrator forwards the CCR to ESDIS CCB for authorization to implement the deviation or waiver.
8. When the deviation or waiver is authorized, the ECS CM Administrator immediately distributes the authorization information to the appropriate implementors and issues a document change order (DCO) to the Document Management Organization.
9. The SEO Librarian copies the implementation instructions into the List of Deviations and Waivers at the front of the document and inserts the Deviation/Waiver number and effectivity at the point of applicability within the document.
10. Approved deviations/waivers are published via Document Change Notices (DCNs). Adding the deviation/waiver information to the document makes its status general knowledge. However, the deviation or waiver is in effect as soon as it is authorized by the customer .

11. A change in scope, effectivity or closeout, or any other change in a deviation or waiver requires a new CCR. The closeout or change is applied to the document via a Document Change Order in the same procedure as given in paragraphs 7 through 10.

ECS Deviation / Waiver

Deviation/Waiver No.		Deviation <input type="checkbox"/>	Waiver <input type="checkbox"/>	Date:
NCR No.				
Title:				
Reason for Deviation / Waiver:				
Existing Requirement: (attach pages as needed)				
Departure: (attach pages as needed)				
Implementation Scope: (Identify CI, model, supplier, subcontractor, series, order no., location, release, time period, etc. as applicable)				
Document No.	Page/Paragraph Reference	Document Title		

CM05MR95

ECS

Figure 9.2.4-6. Deviation/Waiver Form

9.3 Configuration Status Accounting Procedures

9.3.1 Purpose

Operational phase configuration status accounting (CSA) consists of recording and reporting information about the configuration status of the ECS Project's documentation, hardware and software throughout the Project life cycle. Periodic and ad hoc reports keep ESDIS informed of configuration status as the operational mission evolves. Reports to support reviews and audits will be extracted as needed starting from the RRR.

The Baseline Manager tool described in section 9.9 records and tracks as-built products designated as ECS control items (i.e., custom, COTS, science, toolkits, etc. SW and HW items along with their associated documentation and records) and historical versions of ECS operational configurations. Baseline Manager, which is updated with the acceptance tested version of the ECS baseline at RRR, records and reports M&O document change status and histories, mission milestone baselines, and change status.

CSA entails maintaining version histories of delivered and maintained products as well as histories of operational baselines and changes made to each baseline. Additionally, CSA tracks the status of proposed changes from initial CCR submission to ultimate disposition and/or implementation. CSA also maintains historical records of CCRs.

9.3.2 Applicable to

All ESDIS chartered CCBs.

9.3.3 References

ESDIS CM Plan

CM Plan for the Science Data Processing Segment of the ECS Project

9.3.4 Procedures

The following are topical items subject to periodic or ad hoc reporting on behalf of the respective CCB or a system-level summary of information that will be reported by the SEO CM Administrator representing the operational baseline for all the ECS sites.

- (a) **New CCRs and Revisions.** This is a standard Change Request Manager report (cf. Section 9.8). This report will be issued monthly and summarized annually.
- (b) **CCB Review.** Distribute CCR copies for review (and Impact Analysis forms if applicable). Print the agenda and distribute prior to the meeting.
- (c) **Open Action Items.** Open action items should be statused regularly between meetings.
- (d) **CCB Meeting.** Record the CCB's disposition of each CCR.
- (e) **Record Action Items.** Record actions, assignments, and due dates.

- (f) **SEO Librarian Maintained Document Changes.** When all authorized document changes have been accomplished prepare DCN, post the final version on the ECS Document Data Server and distribute hardcopy as required.
- (g) **Minutes Distribution.** Distribute minutes to the standard distribution and inform actionees of assigned action items.
- (h) **CCR Implementation Status.**
- After CCB disposition, regularly status open CCRs until closure.
 - Class I events include: CCR to ECS Review Board for review/appoval; Technical Review Board; and ESDIS Disposition
 - Further events are as follows for M&O implementation status: Consent Obtained; Item Received; Installed; Document Completed; etc.
 - CCR CLOSED: A Class I CCR is not closed until the ESDIS contract officer's authorization is received or the reference CCR has been withdrawn.
 - Class II document change CCRs may be closed with the CM Administrator's issuance of the DCN.
 - Other non-document change CCRs may be closed when the originator verifies to the CM Administrator that all specified changes have been implemented.

9.4 Configuration Audits

9.4.1 Purpose

SEO will support Functional Configuration Audit /Physical Configuration Audit (FCA/PCA) by IATO at RRR. SEO will also support audits by ESDIS and our own Quality Office functions. Internal CM self-audits will be conducted by the SEO. Self-audits evaluate the Project's compliance with the EOS Configuration Management Plan and the ESDIS CMP. The CM self-audits will verify:

- That CM policies, procedures, and practices are being followed.
- That approved changes to documentation, and to software and hardware products are properly implemented.
- That the as-built documentation of each CI agrees with the as-deployed configuration or that adequate records of differences are available at all times.

A post-audit report is written outlining the specific items audited, audit findings, and corrective actions to be taken. All action items are tracked to closure.

In addition, SEO supports formal audits scheduled and conducted by ESDIS. These audits are conducted to validate that each ECS CI is in conformance with its functional and performance requirements defined in the technical documentation. The audits validate that:

- The as-built configuration compares directly with the documented configuration identification represented by the detailed CI specifications.
- Test results verify that each ECS product meets its specified performance requirements to the extent determinable by testing.
- The as-built configuration being shipped compares with the final tested configuration. Any differences between the audited configuration and the final tested configuration are documented.
- When not verified by test, the compatibility of ECS products with interfacing products or equipment is established by comparison of documentation with the interface specifications which apply.
- COTS products are included in audits as integral parts of the ECS baseline.

9.4.2 Applicable to

All ESDIS chartered CCBs.

9.4.3 References

ESDIS CM Plan

CM Plan for the Science Data Processing Segment of the ECS Project

9.4.4 Procedures

The audits will be standardized for a limited set of issues that drive the process for which the audit is taken, viz., FCA/PCA, Security Issues, General Accounting, Test Readiness Review, or Operational Certifications. The documented basis for the audit process will be maintained in the Baseline Manager CM tool (cf. Section 9.9). Alternatively, the Version Description Document (VDD) will be used to document auditable changes to configured articles that are issued at the ECS configuration item (CI) level. The use of the VDD is discussed in the *CM Plan for the Science Data Processing Segment of the ECS Project*. The VDD will contain the prioritized current status summary of any Trouble Tickets/Discrepancy Reports against the CI that is being issued per the change request.

Some general guidelines and/or items that must be tailored for the specific size and scope of configuration audit to be conducted include:

- (a) Audit Plan;
- (b) Conference Agenda;
- (c) Location to collect and analyze data; conduct meetings;
- (d) Applicable specifications, drawings, manuals, schedules, design and test data;
- (e) Test Results Analysis;
- (f) Meeting minutes including resulting audit action items;

- (g) Tools and inspection equipment necessary for evaluation and verification;
- (h) Unencumbered access to the areas and facilities of incoming inspection, fabrication, production, and testing;
- (i) Personnel from each engineering, production, and quality department to be available for discussion of their respective areas;
- (j) Copies of inspection reports, process sheets, data sheets, and other documentation deemed necessary by the Government FCA/ PCA teams; and
- (k) Isolation of the item(s) and detailed parts to be reviewed.

9.5 Data Management

9.5.1 Purpose

The term "data management" pertains to two activities. The first pertains to the activities of the Data Management Organization (DMO) within the ECS project. The second, broader in scope, includes all organizing and use of documents and data across the ECS project. This procedure describes the DMO activities fully. In addition, certain activities that are material to the data management of the project are described in this procedure although they are performed by organizations other than the DMO.

This procedure describes:

- the policies and procedures that apply to data handling and document distribution.
- requirements for data management for the ECS project.
- the role of the data base administrator .
- the use of data control and data handling systems (Document Data Handling Subsystem (Section 20).
- the activities pertaining to establishing and maintaining system libraries and records.
- management of data required during operations readiness review, missions operations, and certification and to assist the on-going development of the system for design, implementation, and test.
- how data will be collected, maintained, and made available to the development team and for distribution to the NASA.
- the data management functions of controlling document masters, preparing change pages, and keeping auditable change records.
- the plan for controlling the data base structure, controlling the interfaces to the data base, establishing the data base security, and evaluating data base performance.

This procedure does not cover the handling or use of notes, test data, software, financial information, or draft documents that would generally be characterized as working papers or other

non-controlled and non-deliverable information. This information is handled by the contractor Integrated Management Information System (IMIS).

9.5.2 Applicable to

All ECS Sites CM Administrators and the SEO Librarian

9.5.3 References

ECS Data Mangement Plan

ECS Documentation Management and Control	DM-1-001
Documentation Numbering	DM-1-002
CDRL and Required Document Generation, Review, Release, and Maintenance	DM-1-004
Electronic CDRL Preparation and Delivery	DM-1-005
CDRL Document Format	DM-1-006
Document Delivery and Dissemination	DM-1-007
ESDIS/ECS Review of Contract Required Data	DM-1-008
ECS Documentation Storage	DM-1-009
Document Archiving	DM-1-010
Technical and White Paper Generation, Review, Release, and Maintenance	DM-1-013
Electronic Storage and Distribution of ECS Documentation	DM-1-014

9.5.4 Procedures

The following text describes standard data management procedures and methods to be used by the ECS project. Occasionally special circumstances may arise which call for exceptions and flexibility to the customary procedures.

9.5.4.1 Information Preparation, Submittal, & Cataloguing

9.5.4.1.1 Creation/Preparation

The originator / author (usually engineering) will create all source material (text, graphics files, etc.) per CDRL/DID preparation instructions and be accountable for the accuracy of its content. Publishing will assist the author by providing Word Processing and Graphics support such as templates and fonts. (Publishing will do the final formatting later.) The DMO will provide the appropriate CDRL numbering and DID instructions.

9.5.4.1.2 Submission

The originator / author will submit all source material (text, graphics files, etc.) to the DMO electronically including necessary metadata descriptors. The latter include reference to source documents and dates.

The Data Management Office verifies delivery schedule with the appropriate task manager prior to a scheduled release or CDRL delivery date. The DMO notifies the responsible organization at the Program Office Weekly Status Report of upcoming CDRL items and their delivery dates, any special preparation instructions, formats, title pages, signature approvals, and any other pertinent information. Copies of the ECS Master Schedule are provided at the Weekly Status Review.

9.5.4.1.3 Identification and Numbering

Data Identification. Upon receipt of information, the SEO Librarian assigns a DMO identification number to each pertinent type of program data created for the ECS program. If appropriate both SEO and NASA numbering are assigned at this time.

9.5.4.1.4 Logging/Cataloguing

The DMO verifies proper submission of information into the system including valid numbering, manually making changes if necessary, and provide supplementary cross-references as part of the data base catalogue. DMO also updates the status log for those submissions that were pre-scheduled.

9.5.4.2 Information Review, Signoff, Release, and Change/Revision

9.5.4.2.1 Document/Test Data Review, Release, and Change Procedures

(ESDIS/ECS Review) of Contract Required Data (DM-1-008)

9.5.4.2.2 Review/Release

Prior to its release, each CDRL document will be reviewed and signed off by each of the participating functions involved (e.g., engineering, product assurance, systems engineering) as depicted in Figure 9.5.4.2-1. Only when all the proper signatures have been obtained will the document be released and distributed.

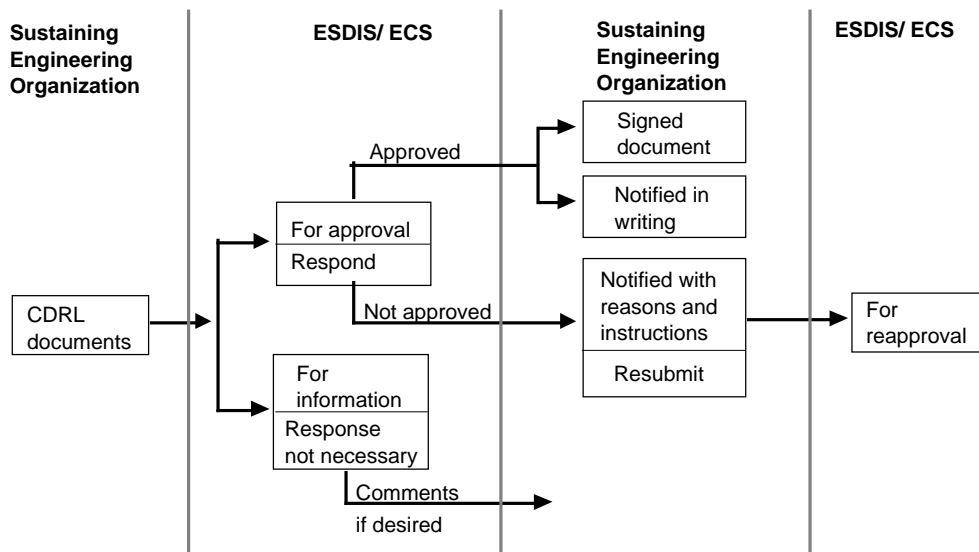


Figure 9.5.4.2-1. CDRL Item Submission Criteria Flow

The DMO will verify that review and signoff has been completed and annotate the status log for the respective information accordingly.

Data Control Procedures:

1. Data Item Scope, Content, and Format
2. Data Item Submittal (Schedule and Distribution)
3. Data Item Use of Common Information
4. Data Not Duplicated
5. Data Item Quality Control and Assurance
6. Data Item Approval
7. Internal Data
8. Data Items Rework
9. Recorded Information

9.5.4.2.3 Changes, Revision, and Document Maintenance

Changes to controlled documentation come under control of the appropriate Change Control Board (CCB) and details concerning the procedure are to be found in the Configuration Management Plan. In summary, once the author (usually engineering) and the CCB agree on a change, the DMO is mandated to reflect the change in the data and documents. Changes to other data come under control of the appropriate task manager.

Once information is released, no changes will be permitted except upon the instruction of the appropriate authority (CCB or task manager). Changes to specifications are submitted to a formal change review board, which repeats the review/approval process (described above).

The DMO receives the document with approval signatures and reviews for compliance with the SOW, DID, and other contractual requirements. If found to be deficient, the document is returned to the author for corrections.

Revision and resubmission of any CDRL item will be subject to the same submission criteria as applied to the initial release of the document. The DMO will store a file copy and include information about updates in the next status report. The DMO will maintain a detailed data catalog and provide, as requested, specific indices that include document revisions and issue dates.

9.5.4.3 Information Distribution and Submission to ESDIS/ECS

9.5.4.3.1 Data/Document Distribution/Submittal to ESDIS/ECS

ESDIS/ECS will receive preliminary versions of data for comments prior to final release. After data in final form is received and cataloged, the DMO will reproduce the data, if necessary, and make distribution in accordance with CDRL/DID instructions and 500-TIP-2601 delivery interchange standard. The DMO will maintain special distribution lists (sorts) for any requirement that may occur. For documents transferred electronically, the Document Data Server Subsystem will encode and transmit the documents to ESDIS/ECS and will prepare and deliver a backup disk or tape for each document in the appropriate format.

All contractual data submitted to ESDIS/ECS, both engineering and non-engineering, will have a standard transmittal sheet attached. This sheet will contain key information about the data being submitted, such as data number, description, submission criteria, format.

9.5.4.3.2 Categories of CDRL Data Submitted to ESDIS/ ECS

All CDRL data submitted to ESDIS/ECS will be classified as being *for information* or *for approval*.

1) For Information. – Routine documentation which will be evaluated by ESDIS/ECS to determine current program status, progress, and future planning requirements. Examples of *for information* documents include status reports and programs management directives. *For information* documents shall be sent to ESDIS/ECS as soon as approved and issued by the SEO. ESDIS/ECS may elect to provide comments, although a formal ESDIS/ECS response is not required.

2) For Approval. – Documentation that requires written approval from ESDIS/ECS before its acceptance, distribution, and intended use. Examples of *for approval* documents include all documentation that is required to come before a CCB. ESDIS/ECS will approve the document or ask for resubmission at ESDIS/ECS Program Office. Provisions will be made for ESDIS/ECS signature on the cover of documents submitted for approval. If the document is approved,

ESDIS/ECS will sign and return the document and notify SEO in writing of the approval. If the document is not approved, within a mutually agreed time, ESDIS/ECS will notify SEO of those parts of the document which cannot be approved, together with the reasons and instructions concerning resubmission of the document. If the ESDIS/ECS evaluation reveals inadequacies, ESDIS/ECS will inform SEO of the parts of the document that require alterations, recommend actions, and give resubmission instructions according to the character of the inadequacies. SEO will resubmit the document to ESDIS/ECS for approval after receipt of ESDIS/ECS's notification.

9.5.4.3.3 Documentation Distribution

The DMO will prepare approved CDRL(s) transmittal letters. The DMO will reproduce copies of the letter and data package as required by the CDRL, ship it to those on the approved distribution list, and provide internal distribution as appropriate.

9.6 Archiving Procedures for the SW CM Manager (ClearCase)

9.6.1 Purpose

These instructions establish Configuration Management procedures for the backup of ClearCase Version Object Base (VOB) data, Views, and data delivered to the customer.

9.6.2 Applicable to

All ECS CM Administrators, SW Maintenance Engineers, and Sustaining Engineers

9.6.3 References

CM Plan for the Science Data Processing Segment of the ECS Project	102-CD-003-001
CCB Processes	CM-1-004
Configuration Control of Formal Track Software	CM-1-010
Configuration Control of EP Software	CM-1-016
Configuration Control of Prototype Software	CM-1-018
Software Development Library	CM-1-019
EDF Configuration Control	SE-1-002

9.6.4 Procedures

DEFINITION ECS Development Facility (EDF) - the software development environment including data, hardware, software, networks, facilities, and procedures used to support ECS software development and testing.

Software - for the purpose of this instruction, software includes all ECS-developed application software, COTS software, build and environmental instructions, and databases used in the execution of these products.

Segment-level - for the purpose of this instruction, segment-level includes all software development undertaken in the EDF by ECS segments from the initiation of software coding through completion of segment integration and test (I&T).

System-level - for the purpose of this instruction, system-level includes all ECS integration and test activities beginning with installation of segment software in the system I&T files.

Software Development File - a repository for a collection of material pertinent to the development or support of software.

Thread - a set of components (software, hardware, and data) and operational procedures that implement a scenario, portion of a scenario, or multiple scenarios.

Build - An assemblage of threads to produce a gradual buildup of system capabilities.

VOB - Version Object Base. Secure, permanent, mountable file system. Repository for storage of version-controlled data.

View - A unique workspace management or “sandbox management” that provides developers with transparent, file-level access to any version of any element through the use of dynamically-evaluated, user-specified version selection rules.

GENERAL

1. System Administrators maintain a backup for all ECS systems. This procedure documents an additional backup procedure for only ClearCase-specific data. This process is in parallel with System Administrator procedures. ClearCase, the ECS level software tracking tool, contains within itself a number of repositories called Version Object Bases (VOBs). These VOBs maintain all versions of all software elements developed for the ECS project. Additionally, there are disk areas known as Views, which contain file(s) that may be newly created or modified but not yet given or returned to ClearCase control.
2. It is critical that these repositories, VOBs, and Views get backed up synchronously on a daily basis, and that the backup tapes be maintained in such a way as to guarantee their restoration to the system in the event of a catastrophic failure. A View may contain files that were checked out of a ClearCase VOB, modified, but not yet checked back in when the failure occurred. This CM archive procedure uses synchronization techniques to ensure that no data is lost. The System Administrator’s procedure does not include these techniques.

3. Current system and network configurations prohibit the installation of the View storage area on the developers'/ maintainers' personal workstations. As a result, Configuration Management has assumed the responsibility of backing up the View storage areas from the ClearCase server. However, once the developers/maintainers are provided with workstations that permit the installation of a private View storage area, this responsibility will be shifted to the developer/maintainer.
4. All ECS software is delivered electronically and via magnetic media. Copies of the exact magnetic media that were delivered are made and stored similarly to in-house generated backup tapes.
5. Backups of VOBs and Views are accumulative rather than incremental. Therefore, each tape has all data contained on previous archive tapes plus new files created, modified, etc.
6. A tape set consists of 31 archive tapes. The tapes are numbered from 1 to 31, a tape for each day of the month.
7. All software CM personnel will be familiar with the archive procedures.
8. All tape backup and archives are performed on Triton.

INSTRUCTION

1. A Software Configuration Management person will be assigned the responsibility for tape backup and archives. Daily backups are created every day at 03:30 a.m. via a UNIX cron job. Every workday morning the assigned Software CM person will perform tape archive procedures.
2. The daily backup tapes are obtained from and maintained in a fireproof safe which is kept locked. Key CM personnel hold the combination to the safe. The most current tape (the tape corresponding with the day of the month) is removed from the Triton tape drive and is always placed in the slot farthest to the left in the location marked "Current Backup". The tape corresponding to the day of the month for the next day is inserted into the tape drive.
3. On the first business day of each week the backup tape from the last business day of the previous week is given to System Administrator personnel for transportation to an off-site storage facility. Periodically the tapes stored off-site are returned to CM for reuse.
4. All tapes will be labeled with the type of data contained. In the case of delivered software, this will include, at a minimum, the title and version of the delivery, the tool used to generate the tape, and the date made.

Example of a routine weekly backup tape label:

Weekly Clear Case Backup Tape

VOBs and Views

For week ending: 01/06/94

Tar formatted.

Person Performing Backup:

Example of a Deployed Software Tape:

194-904-DV3-002

Label: PGS TK2 Test Drivers Date: April 29, 1994

Test_drivers.tar 2gbyte format

Command to copy file to disk: dd if=## of=file.tar

Command to untar tar file: tar xvf file.tar

where ## = your tape device and file.tar = Name you give tar file

5. During weekends and holiday periods the tape for the next workday will be placed in the tape drive on the last workday prior to the weekend/holiday. This tape will be written to on all days prior to the next workday. In this case should the system crash over the weekend/holiday period, there will be a more up-to-date backup. For example, on Friday, Monday's tape would be placed in the drive. This tape will be written to on Saturday, Sunday, and Monday due to the automated cron job. Should the system crash on Saturday after 03:30 a.m., there would be a backup from Saturday available rather than Friday. On Monday this tape would be removed and replaced with the tape for Tuesday.
6. This process does not archive personal view storage areas resident on personal development workstations (see General 3., above). Therefore, when personal development workstations are assigned, files checked out of ClearCase and under modification are not backed up. The System Administrator can back up these workstations. The user can request through the Help Desk that his development workstation be scheduled for System Administration backup. Alternately, personal backup procedures can be initiated.
7. At the time the tar file for software delivery is created, a second delivery tape will be generated in accordance with delivery procedures. This archive copy will be given to System Administrator personnel for transportation to the off-site storage facility. Incremental delivery tapes will be created, documented, and stored in accordance with this procedure. Delivery archive tapes will be stored for the life of this contract.

9.7 SW Transfer and Installation

9.7.1 Purpose

This procedure involves transferring a Sustaining Engineer Organization (SEO)-developed software maintenance change package from the SMC to a remote site (a DAAC) and later installing the ECS custom software on a selected host computer under a configuration

management controlled process. The procedure begins when the SMC Configuration Management Administrator receives the software maintenance change from the SEO and directs transfer to a designated DAAC drop-off point (SEO on-site SW library). At the DAAC, the installation actions are executed by the site sustaining engineering SW Maintainer under direction from the DAAC Configuration Change Board (CCB).

9.7.2 Applicable to

All ECS sites' Sustaining Engineers, System Administrators, CM Administrators, and Maintenance Engineers.

9.7.3 References

- Software Distribution Scenario, 604-CD-002-001, 305-CD-029-001 (modified)
- COTS Software Upgrade Scenario, 604-CD-002-001, 305-CD-029-001 (adapted)
- CM Plan for the Science Data Processing Segment of the ECS Project, 102-CD-003-001
- Developed SW Maintenance Plan, 614-CD-001-002

9.7.4 Procedures

9.7.4.1 Overview

This procedure details the transfer of SW changes under CM control from the ESDIS CCB using SMC resources to distribute maintenance changes to the sites (nominally, to a DAAC). The flowcharts of figure 9.7.4.1-1 (transfer) and figure 9.7.4.1-2 (installation) detail the sequence of events involved in the delivering, testing, and installing of SW maintenance releases.

Assumptions:

- The SMC storage software will be ClearCase.
- The baseline records will be maintained in the Baseline Manager (XRP-II tool)
- The SMC transfer of software will be via tar tape or File Transfer Protocol (FTP) for Release A; will be upgraded to Tivoli Courier (Release B)
- The transfer-storage point will be the SEO on-site SW library.
- The Software Maintenance Change package is relatively small and requires no special build/test procedures.
- Resource Planning, Mode Management, and other issues are not addressed in this scenario.

Summary of Procedures:

- CM Process defined Changes to be incorporated by SEO into ECS Operational Baseline
- SW received at SMC from SEO CM Administrator

- Baseline changed via Baseline Manager (XRP-II tool)
- Packaged via ClearCase
- Transferred via tar tape or File Transfer Protocol (FTP) for Release A; will be upgraded to Tivoli Courier (Release B)
- DAAC CCB Approves the Installation of SW Change Package into DAAC Operational Baseline
- SW Change Package Installed at DAAC on selected host computer

Software Transfer & Install

Functional Flow I (Transfer)

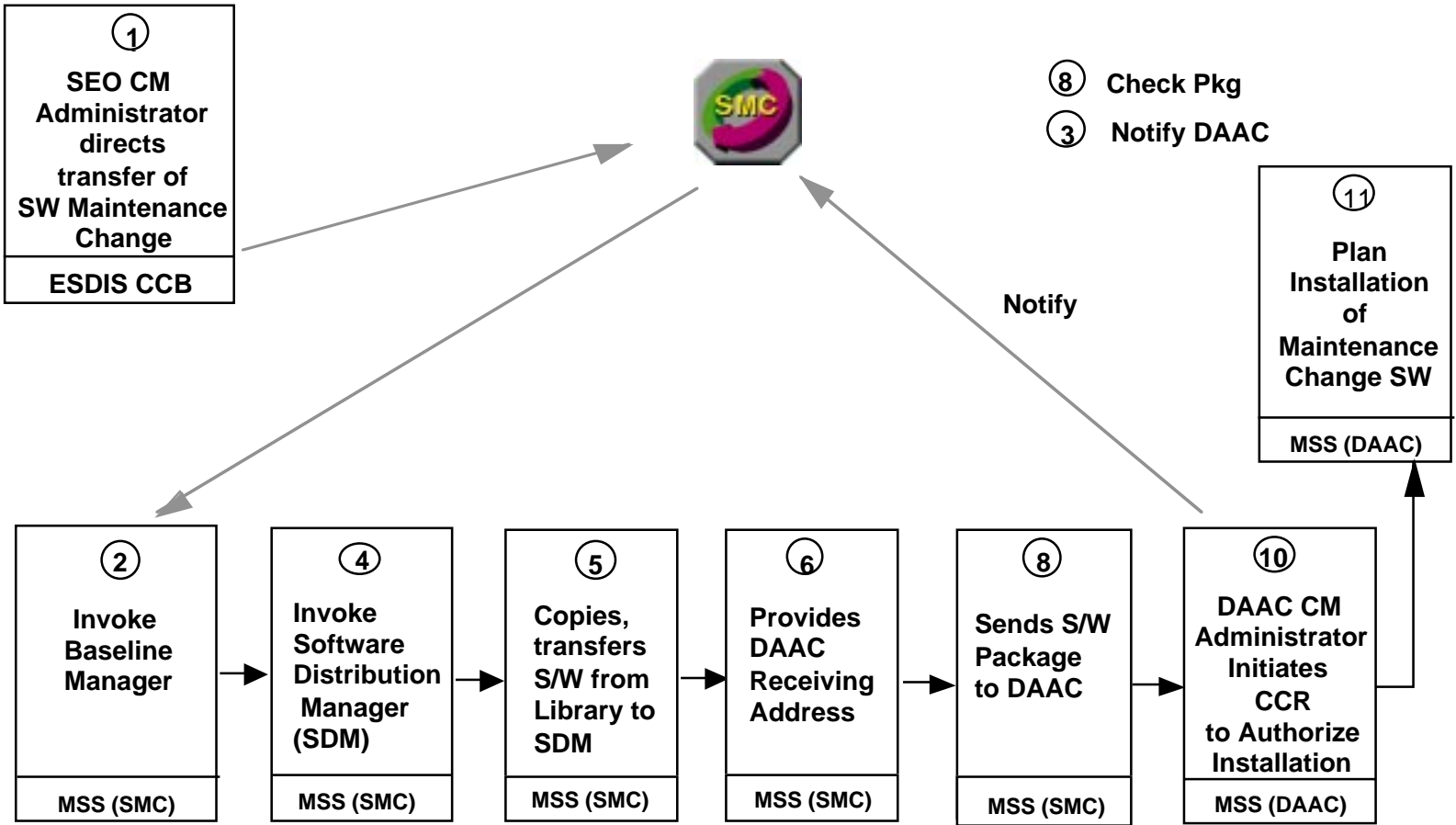


Figure 9.7.4.1-1. SW Transfer Functional Flow

Software Transfer & Install Functional Flow II (Install)

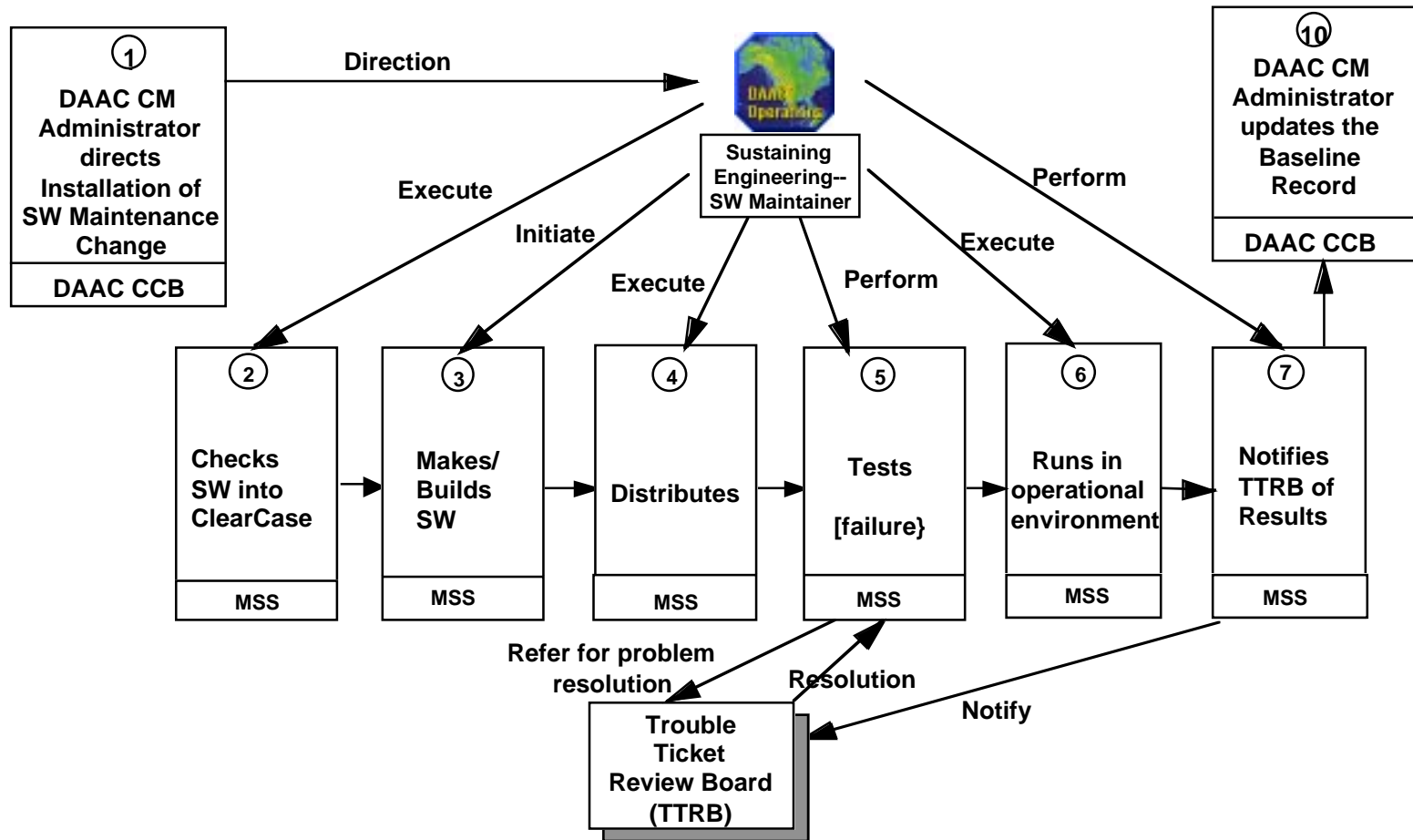


Figure 9.7.4.1-2. SW Installation Functional Flow

9.7.4.2 Operator Roles

SEO CM Administrator--Ensures that changes to the hardware, software, and procedures are properly documented and coordinated. Maintains control of all configured hardware and software.

SMC CM Administrator--Provides ECS system-wide configuration management and exercise control and/or monitoring over the configurations.

DAAC CM Administrator--Ensures that changes to the hardware, software, and procedures are properly documented and coordinated. Maintains control of all configured hardware and software. Assists in the development and administration of the library with respect to configuration management procedures.

DAAC Sustaining Engineering--SW Maintainer--Produce, deliver, and document the corrections, modifications, and enhancements made to ECS software (including COTS), and/or adapt or incorporate COTS software for ECS use.

9.7.4.3 Detailed Procedures

The following figures are a three part Point of View chart that steps through all the procedure and showing how all relevant roles interact.

Software Transfer & Install

Points of View I (Transfer)

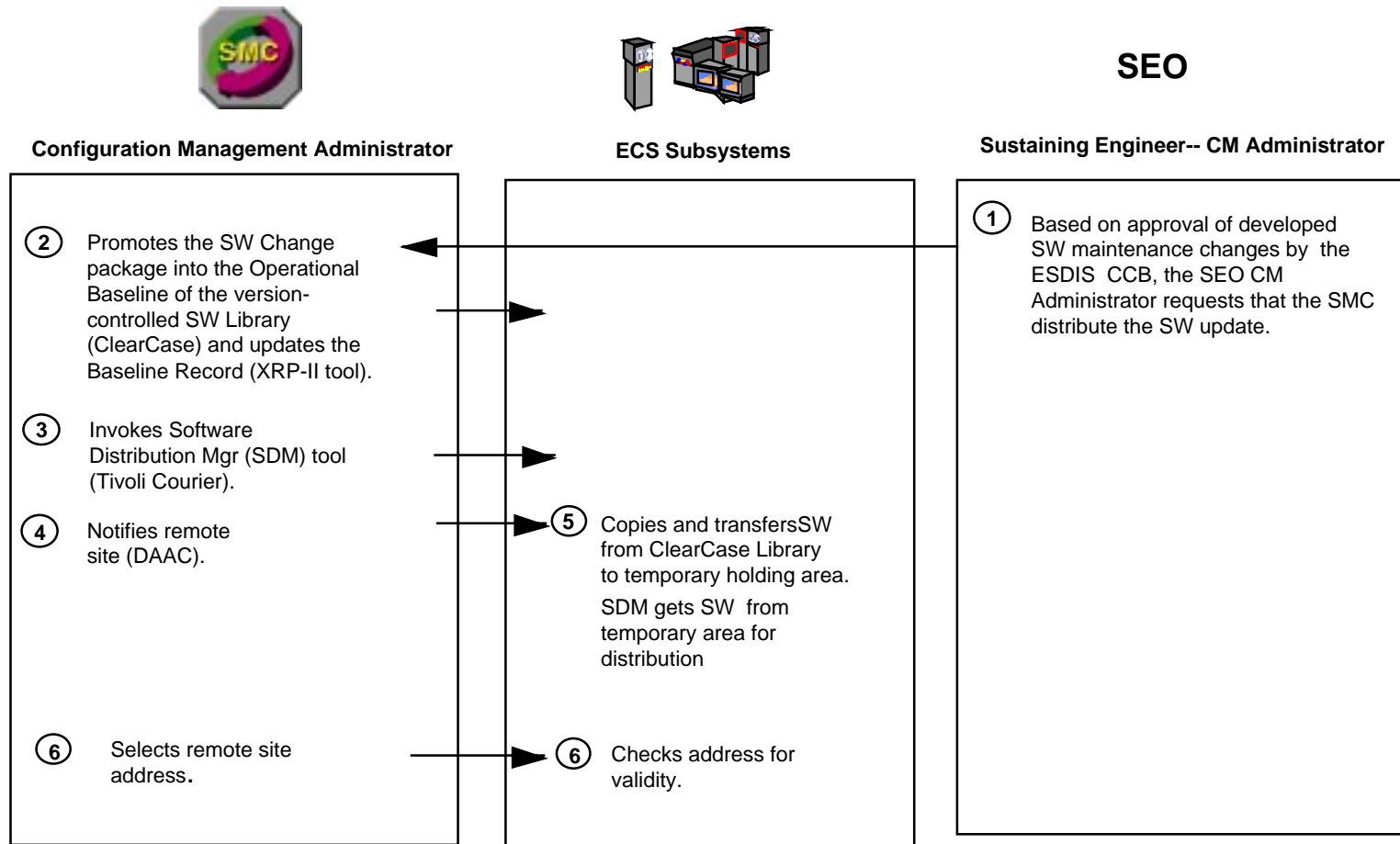


Figure 9.7.4.3-1. Detailed Points of View

Software Transfer & Install

Points of View II (Transfer)

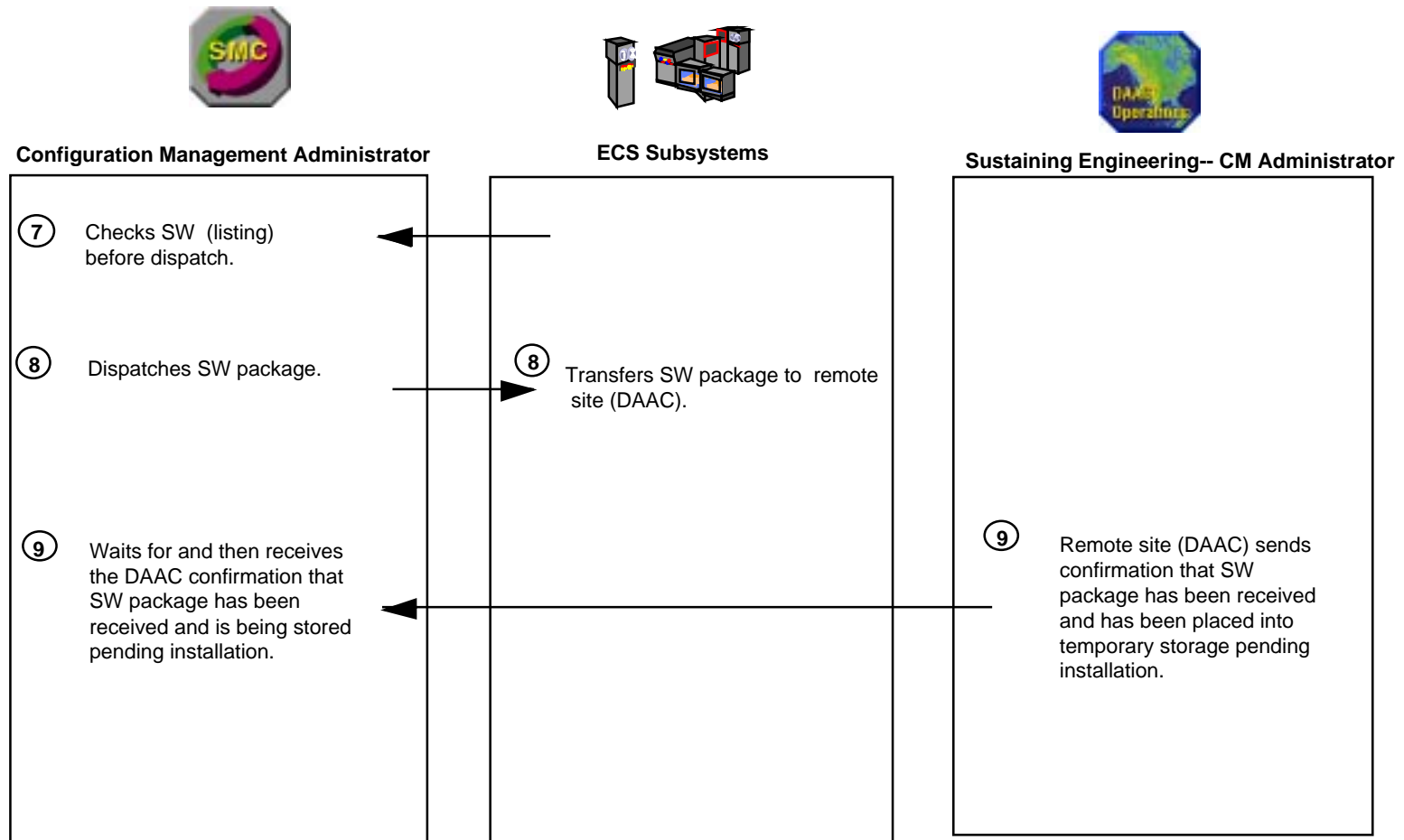


Figure 9.7.4.3-2. Detailed Points of View

Software Transfer & Install

Points of View III (Install)

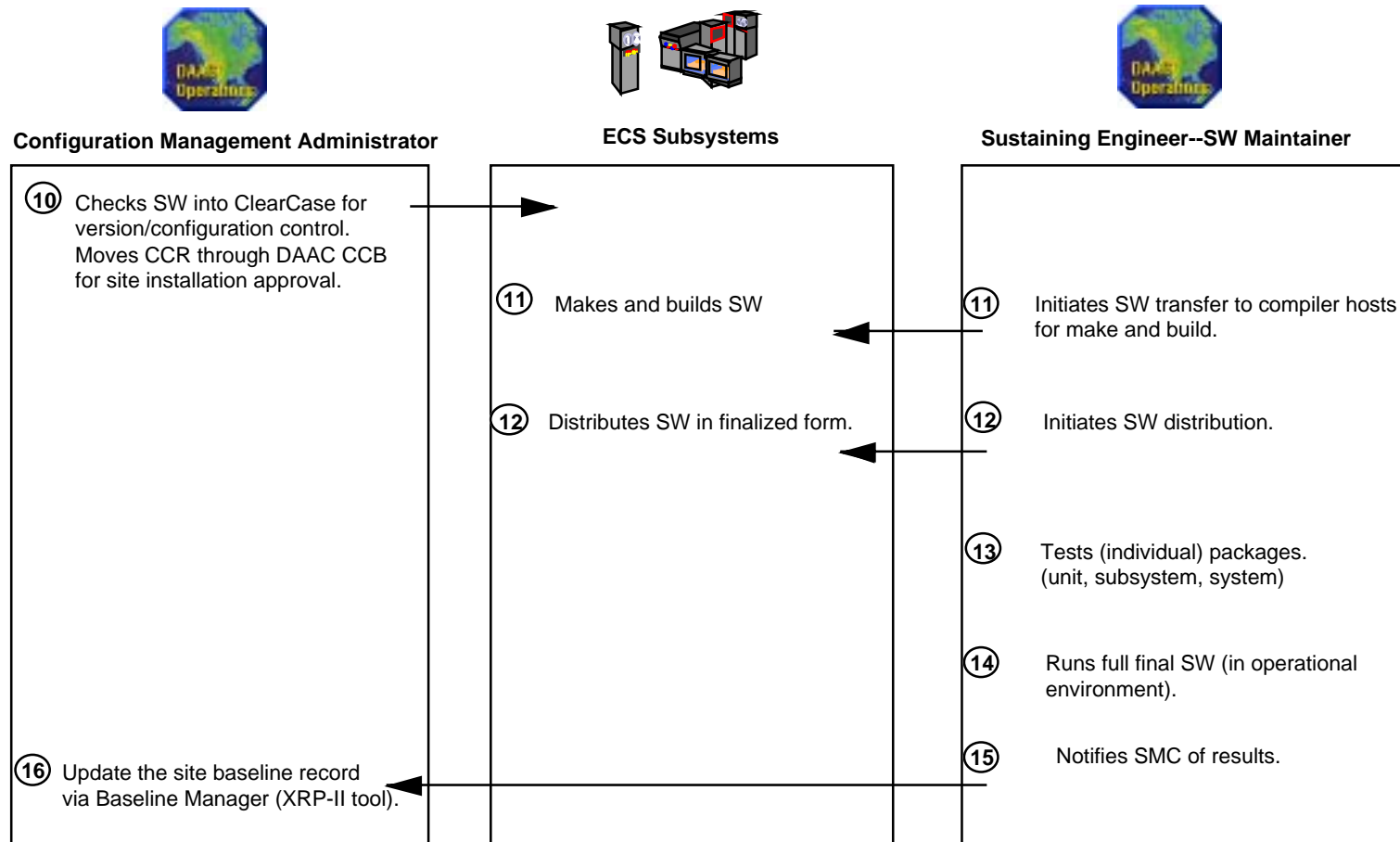


Figure 9.7.4.3-3. Detailed Points of View

Table 9.7.4.4-2. Data Activity for Workflow at the DAAC

DAAC CM Administrator	Data Element (Object Attribute)	Operator Interactions (Edit, Input, Display)
<p>1. Receives message of SW ready for site installation</p> <p>2. Processes CCR for DAAC Installation of Software Upgrade using developer's install script stored in ClearCase.</p>	<p>E-Mail (send/receive)</p> <p>DDTS: DAAC CCR # SW Package ID Package Name SW Upgrade Name Version Description File Structure Type Installation Schedule</p>	<p>Display</p> <p>Input/Edit</p>

Table 9.7.4.4-3. Data Activity for Workflow at the DAAC

DAAC Sustaining Engineer SW Maintainer	Data Element (Object Attribute)	Operator Interactions (Edit, Input, Display)
<p>3. Installs SW Upgrade using the developer's installation script stored in ClearCase</p> <p>4. Verifies that all of the paths and directory structures have been created and are correct.</p> <p>5. Runs all diagnostic tests to verify that the new upgrade is operating as expected.</p> <p>6. Informs the Resource Manager that the upgrade is completed.</p>	<p>Package ID Package Name SW Upgrade Name Version Description File Structure Type</p> <p>ClearCase: Description File Structure Type</p> <p>ClearCase: Description File Structure Type</p> <p>E-Mail (send/receive)</p>	<p>Input/Edit</p> <p>Input/Edit</p> <p>Input/Edit</p> <p>Input/Edit</p>

Table 9.7.4.4-4. Data Activity for Workflow at the DAAC

DAAC CM Administrator	Data Element (Object Attribute)	Operator Interactions (Edit, Input, Display)
7. Update the Baseline Record	XRP-II: DAAC CCR # SW Package ID Package Name SW Upgrade Name Version File Structure Type Installation Date	Input/Edit

9.8 Change Request Manager

The commercial off-the-shelf (COTS) product, Distributed Defect Tracking System (DDTS), serves as the Change Request Manager (CRM). DDTS provides the functionality necessary to compose, submit, report, and track status of changes proposed for ECS resources. It provides the M&O staff at the sites and the SMC the capability to register Configuration Change Requests (CCRs). DDTS prompts for relevant information, assigns an identifier, and mails notification of the newly submitted requests to pre-designated personnel. As the CCRs advance through approval and implementation processes, DDTS maintains status, disposition, resolution, and closure information as entered by the M&O staff. It sends notification to pre-designated personnel when the status of the CCR record changes and makes data available for viewing by authorized staff members.

The Activity Checklist table that follows provides an overview of Change Request Manager capabilities. Although Column one (**Order**) shows the order in which tasks might be accomplished, please note that they are independent of each other and can be performed in any order, as necessary. Column two (**Role**) lists the site/organization Configuration Management Administrator (CMA) responsible for performing the task. Column three (**Task**) provides a brief explanation of the task. Column four (**Section**) provides the Procedure (P) section number or Instruction (I) section number where details for performing the task can be found.

Change Request Manager - Activity List

Order	Role	Task	When and Why to Use	Section
1	CMA	View CCR	Operator uses this function whenever he/she wants to quickly view the contents of CCRs in the Index.	(P) 9.8.3
2	CMA	Submit CCR	Operator uses this function whenever there is a new CCR to be entered into the DDTS database.	(P) 9.8.4
3	CMA	Change Status of CCR	Operator uses this function whenever the activities of a particular state have been completed and its time to move to the next state.	(P) 9.8.5
4	CMA	Modify CCR	Operator uses this function to change previously entered data and/or to enter data into fields previously left blank.	(P) 9.8.6
5	CMA	Print CCR	Operator uses this function to obtain a hard or soft copy of a CCR or all of the CCRs in the CCR index.	(P) 9.8.7
6	CMA	Generate Reports	Preformatted reports will be generated for each CCB.	(I) 9.8.9

NOTE: All changes made to the CCR record are monitored by the system and logged in the History enclosure. To view this log, click on the History icon on the DDTS main screen (PureDDTS).

9.8.1 The Configuration Change Request (CCR)

The CCR form has been developed as a medium for processing CCRs throughout the ECS Maintenance and Operations environment for changes processed by the ESDIS CCB and its ECS site-level chartered CCBs at the SMC, EOC, and DAACs (GSFC, LaRC, ASF, EDC, JPL, NSIDC, and ORNL). The information included on the CCR is described below. Copies of the CCR, CCR Impact Analysis Form, and CCR Impact Summary form are provided in Section 9.2. Each CCB will have unique CCR identification sequence numbers. Each CCB can forward CCRs and reports from the Change Request Manager to SMC, where SEO processes system-level CCRs for ESDIS CCB. The ESDIS CM Plan will determine the charter of the respective CCBs and thus the scope of CCR issues to be addressed by the site CCBs.

Section 9.8.4 defines the procedures to enter data from the hardcopy CCR into the Change Request Manager.

Many of the numbered items on the form correspond to the data entry required for CCRs maintained in the Change Request Manager. [Where the hardcopy CCR information is entered in the Change Request Manager tool is defined by referencing appropriate tables found in the subsections that follow.] The Configuration Management Administrator oversees maintenance of the CCR records in the Change Request Manager for his or her respective CCB.

1. **Configuration Control Board (CCB)** — The designated CCB is checked-off for changes processed by the ESDIS CCB and its ECS site-level chartered CCBs at the SMC, DAACs (GSFC, LaRC, ASF, EDC, JPL, NSIDC, and ORNL), and EOC. [This information is not entered into the Change Request Manager.]
2. **CCR Number** — The unique serialized CCR number is applied at each site. This number is system-generated. [Submit record field; see Table 9.8.4-1.]
3. **Submitted Date** — The date that the CCR was prepared is documented. [Submit record field; see Table 9.8.4-1.]
4. **Revision** — The current revision is designated for tracking changed versions of the original CCR. The Revision number is assigned by the Configuration Management Administrator or by the originator of the CCR with approval of the Configuration Management Administrator. [Submit record field; see Table 9.8.4-1.]
5. **Priority** — The priority level of the CCR is assigned by the CCB. Emergency CCRs may have already been implemented on a temporary basis by the Trouble Ticket Review Board (TTRB) with concurrence from the CCB Chair who later receives the CCR to document/implement the permanent change. Urgent items will be reviewed by the next CCB meeting. Routine items will be reviewed as soon as the schedule permits. [Submit record field; see Table 9.8.4-1.]
6. **Change Class** — Change Classes are either I or II. Class I will be handled by ESDIS-only because of cost, schedule, and/or mission impacts that may require requirements changes. Class II items do not affect mission requirements but may have cost and/or schedule implications which affect maintenance, operations, procedures, documentation, site-tailored items, COTS implementation, site installations of core system changes, science SW changes, etc. [Submit record field; see Table 9.8.4-1.]
7. **Status** — Status of the CCR is updated in the Change Request Manager until closed by the CCB. Note that the hard copy form will not be updated but will be kept in the master suspense file of the CM Administrator until closed-out with a stamp (Item 15, below) and appropriate signatures (see Items 16 and 17, below). [Submit record field; see Table 9.8.4-1.]

Eleven valid status indicators (states) are listed below. The corresponding Change Request Manager State Code (upper-case single character) is provided in parentheses after the status descriptive name. This code is stored in the change request record. The Change Request Manager uses this value to search and extract the descriptive name to display in reports. The descriptive names, for example, Assign-Eval, are as they appear

in the Change Request Manager for selection during input. Some query and report codes use the descriptive name rather than the single letter code to facilitate querying. Following the definition is the status as it appears on the CRR. These status indicators appear in the Change_State Menu, described in Section 9.8.5, below.

Submitted (S) — not used on CCR hardcopy but is system-generated when CCR is input to the Change Request Manager prior to a CCB decision. (Submitted)

New (N) — the initial state for all newly entered change requests. (New)

Assign-Eval (A) — state entered when the change request is being assigned to an engineer for evaluation/analysis. (Assigned-Eval)

Assign-Implement (O) — state entered when the change request is being assigned to an engineer for development. (Assigned-Implement)

Implement (R) — state entered when the proposed change has been developed. (Implemented)

Assign-Verify (T) — state entered when the developed change is being assigned to an engineer for verification testing. (Assigned-Verify)

Verify (V) — state entered when a developed change has been tested and verified that it functions properly. (Verified)

Close (C) — state entered when all activity specified in the change request has been completed or that the approval authority has decided to close it prior to completion of all activity. Referred to as Close-out stamp. (Closed)

Duplicate (D) — state entered when a change request is determined to be a duplicate of an existing change request. Duplicate change request identifies change request being duplicated. (Duplicate)

Defer (P) — state entered when activity on a change proposal has to be postponed. (Deferred)

Forward (F) — state entered when a change request needs to be forwarded to another DDTS-defined project. In DDTS terminology, a project is a grouping of change requests. For example, a change request from a site project can be forwarded to an ECS project. (Forwarded)

8. **CCR Title** — The CCR title is supplied by the originator. [Submit record field; see Table 9.8.4-1.]
9. **Originator** — The originator name, organization, e-mail address, and phone number is given. [Submit record fields; e-mail address not included; see Table 9.8.4-1.]
10. **Approval** — The CCR is approved by the designated management authority which is assigned by the CCB. This sponsorship requirement acts as a primary filter to eliminate from consideration those CCRs that cannot be implemented or which have no ECS site management support. [Assign-Implement field; see Table 9.8.5-2.]

11. **Reason for Change** — The reason for the change is narrated on the form and/or the designated attachment. [This information may be included in the Proposed Change Enclosure; see Section 9.8.4-1, Step 2.]
12. **Description of Change** — The proposed implementation of the change is narrated along with any known impacts, resources, and expenses to be incurred. [This information may be included in the Impact Summary Enclosure; see Section 9.8.5.1, Step 2.]
13. **Impact Analysis** — Impact analysis is documented in the CCR Impact Analysis form. The impact analysis is collected by the CCB Chair appointed Evaluation Engineer in coordination with the CM Administrator who maintains the CM records and assembles the review package for the CCB. The Evaluation Engineer documents the list of Impact Evaluators and derives and/ or verifies cost, technical, and schedule impact of the proposed change based on all inputs received. The results of the coordinated CCR Impact Analysis inputs are presented in the CCR Impact Summary form as part of the CCR review package. [This information may be included in the Impact Summary Enclosure; see Section 9.8.5.1, Step 2.]
14. **Comments** — Comments are added to the CCR to summarize sites and/or organizations affected by the CCR. Additional comments may address proposed CCB dispositions and recommendations to be indicated by resolutions in Item 15, below. [This information may be included in the Resolution Enclosure; see Section 9.8.5.2, Step 2.]
15. **Board Action** — CCB actions and follow-up actions that will be facilitated and tracked by the CM Administrator are indicated. [Assign-Implement field; see Table 9.8.5-2. Also may be applicable to Resolution Enclosure; see Section 9.8.5.2, Step 2.] Possible CCB dispositions are given as approved, withdrawn, disapproved, and deferred (pending follow-up activities by the indicated schedule date). Further actions are indicated as:
 - Engineering Change Proposal (ECP) — changed scope of contract requirements.
 - Waiver — declaration that certain contract requirements no longer apply.
 - Deviation — change of contract terms or substitution of terms or deliverable requirements.
 - Technical Direction — order by Contracting Officer’s Technical Representative (COTR) to perform certain tasks within the scope of the contract.
 - Contract Modification — changes to the terms of a contract.
 - Document Change Notice (DCN) — notification of changes to published documents.
 - Others — Engineering Change Notice, Change Order, Escalation to higher CCB authority, etc.
16. **CCB Approval** — CCB approval signature authority by CCB Chair or designate. [Assign-Implement field; see Table 9.8.5-2.]
17. **CCR Implemented** — This signature and close-out stamp (Item 7, above) are executed by the CM Administrator witnessing the completion of the CCR implementation process, which is tracked in the Change Request Manager automated tool and updated in Baseline

Manager (XRP-II) for affected version control status changes. [Assign-Implement field; see Table 9.8.5-2.]

Sections 9.8.3 through 9.8.7 define procedures to process a CCR using the Distributed Defect Tracking System (DDTS) application software database tool that implements the Change Request Manager. The procedures, though step-by-step, are not detailed for the novice user. Please refer to the PureDDTS User's Manual whenever further explanation may be required. Relevant sections of the Manual are identified where applicable.

9.8.2 Accessing Change Request Manager

Depending on your site configuration, access to the Change Request Manager, DDTS, will be by clicking an icon from your desktop, or by typing the following at the command line prompt:

➤ `xddts`

The PureDDTS screen is the main screen. It consists of three major areas:

- the CCR Index Display which shows a listing of CCRs;
- the CCR Record page, which displays some of the content of the highlighted CCR in the Index; and
- the Enclosure Display, which shows the initial set of enclosure icons available for CCR update.

From this screen, you initiate all DDTS functions: View CCR, Submit CCR, Change state of CCR, Modify CCR, Print CCR. Reference Chapter 3 of the PureDDTS User's Manual for information concerning the menus and buttons on the DDTS Main Screen.

9.8.3 View a CCR

Entering DDTS brings you to the main screen (PureDDTS). To view any CCR listed in the CCR Index, simply highlight the desired CCR. The CCR is accessed.

9.8.4 Submit a CCR

Clicking the Submit button on the main screen (PureDDTS) will bring up the "Submit A New Change Request" screen. This screen enables the operator to select a class of projects (the Change Request Class is the default class) and a specific project (group of CCRs within the selected class) to which he/she wants to add a CCR. Reference Chapter 2 of the PureDDTS User's Manual for a detailed explanation of the terms, class and project.

As stated above, the selection for class of projects is defaulted for CCR processing, so you won't need to change it:

Submit to which class of projects: Change_Request

To select Project name, either type in your selection or type a question mark as shown:

Project name: ?

A drop-down menu will appear from which to make your selection. (The Configuration Management Administrator can add a project to the list. See the PureDDTS Administrator Manual.)

Click on **Help** to get an explanation for each of the fields shown, how to move within a screen, and how to terminate the submit process.

Once the Configuration Management Administrator enters the desired class of projects and project name, the CCR page displays the CCR record form. This form enables the operator to enter detailed information concerning the proposed change request. Descriptions of the Submit Record fields are listed in Table 9.8.4-1. Table 9.8.4-2 presents the steps performed using DDTS to submit CCRs. It summarizes the procedures as a quick reference. If you are already familiar with the procedures, you may refer to this table. If you are new to the system or have not performed this task recently, please refer to the more detailed steps provided in this section.

Table 9.8.4-1. Submit Record Field Descriptions (1 of 2)

Field Name	Data Type	Size	Entry	Description
CCR Number	character	10	System generated	a unique identifier for this resource change request
Submitted	date	6	System generated	the date this proposed change was first registered
Revision	character	2	Optional	the current revision/amendment to the proposed change
Priority	character	9	Required	the urgency with which a proposed change is needed. Answer must be one of the following: routine, urgent, emergency. The default is routine
Change Class	character	2	Required	the classification that distinguishes change requests according to management level needed for approval. Answer must be I or II. The default is II.
Status	character	17	System generated	the stage this proposed change has reached in its life cycle
Title	character	72	Required	the nomenclature used to identify the proposed change

Table 9.8.4-1. Submit Record Field Descriptions (2 of 2)

Field Name	Data Type	Size	Entry	Description
Originator Name	character	25	Required	name of the person who is the author of the proposed change
Organization	character	30	Required	name of the originator's organization
Phone Number	character	13	Required	phone number where originator can be reached
Organization Evaluation Engineer	character	25	Required	name of the person who initially determines whether or not the proposal has merit and should be entered into the DDTs database
CM Admin. Name	character	8	System generated	name of the individual who registered this proposed change/enters the proposed change into the DDTs database. Note, DDTs uses User's Login ID
Organization	character	5	Required	name of the CM administrator's organization. Answer must be one of the following: ASF, EDC, EOC, GSFC, JPL, LaRC, NSIDC, ORNL, SMC
Phone Number	character	13	Optional	phone number of the CM Administrator

1. Access DDTs by clicking on the DDTs icon from your desktop, or by typing the following command on the command line: **xddts**
2. Enter data in the Submit Record fields.
3. Display the Proposed Change Enclosure Screen by traversing all of the CCR record fields or by clicking on the Proposed Change icon. This enclosure is used to hold additional information about a proposed change. It enables the operator to enter a free text description of the perceived need or problem and a proposed solution. For more information on the enclosure screen see Chapter 3 (Enclosures Section) of the PureDDTs User's Manual.
4. Click the File menu on the enclosure screen and select its "save as" option to save the contents of the enclosure. You will be brought back to the main screen (PureDDTs).
5. When the main screen display reappears, click the "Commit" button to store the CCR record into the DDTs database.

Table 9.8.4-2. Submit a CCR - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	PureDDTS Main Screen. Click on Submit button.	Initiate the CCR record submission process.
2	Enter data in fields and Proposed Change enclosure.	Enter data in Record screen.
3	Click on Commit button.	Store record into DDTS database.

9.8.5 Change State of CCR

The first status (state) assigned to a CCR after it is committed to the DDTS database is “New.” Refer to the upper left corner of the center section of screen for the current status of the CCR. When it is time to move the CCR to its next life cycle state, the Change_State Menu on the main screen is used. See Number 7, Status, in Section 9.8.1, above. Table 9.8.5 presents the steps performed using DDTS to change the state of a CCR. It summarizes the procedures as a quick reference. If you are already familiar with the procedures, you may refer to this table. If you are new to the system or have not performed this task recently, please refer to the more detailed steps provided below and to Sections 9.8.5.1 through 9.8.5.5.

1. Access DDTS by clicking on the DDTS icon from your desktop, or by typing the following command on the command line: **xddts**
2. Click on the Change_State Menu to access the available state options available for the CCR record.
3. Select the next state to be assigned. After the next state is selected, the associated data fields (if any) for this new state are accessed.
4. Enter data into the associated data fields for the state, as indicated on the screen. These vary according to state being entered. For descriptions of these states, see Sections 9.8.5.1 through 9.8.5.5: Assign-Eval, Assign-Implement, Assign-Verify, Verify, Close. For the states Duplicate, Defer, and Forward, refer to the DDTS User’s Manual (also Section 9.8.1, above).

Table 9.8.5-1. Change State of a CCR - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	PureDDTS Main Screen. Click on Change_State menu.	Select State.
2	Enter data in fields	Enter data in applicable record screen.
3	Click on applicable Enclosure icon.	Enter data.
4	Click on Commit button.	Store record into DDTS database.

9.8.5.1 Assign-Eval State

The Assign-Eval state indicates that the change request is being assigned to an engineer for evaluation/analysis. Table 9.8.5.1-1 lists the fields for which values are entered.

Table 9.8.5.1-1 Assign-Eval Field Descriptions (1 of 2)

Field Name	Data Type	Size	Entry	Description
Evaluation Engineer	character	8	Required	name of the responsible engineer designated to analyze the proposed system change. Use Login user name of the engineer
Organization	character	5	Required	name of the evaluation engineer's organization. Answer must be one of the following: SEO, GSFC, LaRC, ASF, EDC, JPL, NSIDC, ORNL, SMC, EOS
Eval. Engr. Email Address	character	25	Optional	electronic mail address of the evaluation engineer
Impact Evaluators (evaluators 1 -12)	character	5	Optional	collection of names of organizations designated to assess the impact of this proposed change. Answer (s) must be from the following: SEO, ESDIS, GSFC, LaRC, ASF, EDC, JPL, NSIDC, ORNL, SMC, EOC, EDF
Sites Affected (sites 1-9)	character	5	Optional	the collection of names of ECS sites affected by this proposed changes. Answer (s) must be from the following: SMC, GSFC, LaRC, ASF, EDC, JPL, NSIDC, ORNL, EOC

Table 9.8.5.1-1. Assign-Eval Field Descriptions (2 of 2)

Field Name	Data Type	Size	Entry	Description
Related CCR#	character	10	Optional	the number of another CCR that is related to/associated with this CCR
CI Affected	character	15	Optional	the identifier of the principal configuration item affected by this proposed system change
Docs. Affected	character	56	Optional	the documents identifiers of the system documents affected by the proposed system change
Release Affected	character	10	Optional	the ECS release in which the proposed change is targeted for implementation
Baselines Affected	character	56	Optional	the identifiers of system baselines affected by the proposed change

1. Enter data in the Assign-Eval fields.
2. Display the Impact Summary Enclosure Screen by traversing all of the Assign-Eval record fields or clicking on the Summary Enclosure icon. This enclosure is used to hold free text information concerning the impact of the proposed change based on inputs received from the evaluators.
3. Click the File menu on the enclosure screen and select its “save as” option to save the contents of the enclosure. You will be brought back to the main screen (PureDDTS).
4. When the main screen display reappears, click the “Commit” button to store the next state data into the DDTS database.
5. The selected state, “Assigned-Eval,” is now shown as the current state (Status) of the CCR record.

9.8.5.2 Assign-Implement State

The Assign-Implement state indicates when the change request is being assigned to an engineer for development. Table 9.8.5.2-1 lists the fields for which values are entered.

Table 9.8.5.2-1. Assign-Implement Field Descriptions

Field Name	Data Type	Size	Entry	Description
Disposition	character	14	Required	the final decision made by a designated approval official concerning this proposed change. Answer must be one of the following: Approved, Approved_w/cmt, Disapproved, Withdrawn, Deferred
CCB Approval Official	character	25	Required	name of the individual whose decision is reflected in the proposed change's disposition
CCB Approval Date	date	6	Required	the date the final decision was made concerning this proposed change. Required format is yymmdd
CCB Org.	character	5	Required	the name of the organization whose configuration control board have authority to approve the change request. Answer must be one of the following: ESDIS, SMC, GSFC, LaRC, ASF, EDC, JPL, NSIDC, ORNL
Implementation Organization	character	5	Required	name of the organization assigned to implement this proposed change. Answer must be one of the following: SEO, GSFC, LaRC, ASF, EDC, JPL, NSIDC, ORNL
Implement. Engineer	character	8	Required	name of the responsible engineer designated to implement the proposed system change. Use Login user name of the engineer
E-mail Address	character	20	Optional	electronic mail address of the implementing engineer
Start Date-	date	6	Required	date implementation activity is to begin. Required format is yymmdd
Estimated Time to Complete	character	20	Optional	estimated time it will take to develop and unit test proposed change in days or months
Completion-Date	date	6	Optional	the date that the proposed change was completed. Required format is yymmdd
Effective Date-	date	6	Optional	the date that the proposed change is go into operation. Required format is yymmdd

1. Enter data in the Assign-Implement fields.
2. Display the Resolution Enclosure Screen by traversing all of the Assign-Implement record fields or by clicking on the Resolution Enclosure icon. This enclosure is used to hold free text description of the solution for the proposed change request.

3. Click the File menu on the enclosure screen and select its “save as” option to save the contents of the enclosure. You will be brought back to the main screen (PureDDTS).
4. When the main screen display reappears, click the “Commit” button to store the Assign-Implement state’s data into the DDTs database.
5. The Implement state (state entered when the proposed change has been developed) is the state that follows Assign-Implement on the Change_State Menu. No data fields are associated with the Implement state. When Implement is selected, the status is simply changed to Implemented.

9.8.5.3 Assign-Verify State

The Assign-Verify state indicates that the developed change is being assigned to an engineer for verification testing. Data fields appear under the heading, “TESTING INFORMATION” on the Record screen. Table 9.8.5.3-1 identifies these fields.

Table 9.8.5.3-1. Assign-Verify Field Descriptions

Field Name	Data Type	Size	Entry	Description
Test. Engr. Name	Character	25	Required	Name of the engineer designated to test the system change
Test Org.	character	5	Required	name of the test engineer's organization. Answer must be one of the following: ASF, EDC, EOC, GSFC, JPL, LaRC, NSIDC, ORNL, SMC
Est. Testing Completion Date	date	6	Optional	the date that the tester expects to have completed his testing activity. Required format is yymmdd

1. Enter data in the Assign-Verify fields.
2. After you have completed your input, the system may automatically bring you back to the main screen (Pure DDTs) or click on **Prev**.
3. When the main screen display reappears, click the “Commit” button to store the Assign-Verify state’s data into the DDTs database.

9.8.5.4 Verify State

The Verify state indicates that a developed change has been tested and verified that it functions properly. The data fields appear under the heading, “VERIFICATION INFORMATION” on the Record screen. Table 9.8.5.4-1. identifies these fields.

Table 9.8.5.4-1. Verify State Field Descriptions

Field Name	Data Type	Size	Entry	Description
Test Status	Character	1	Required	this is an indicator as to whether or not the item (s) being tested has passed the test. Answer must be <u>P</u> assed or <u>F</u> ailed
Enclosure Added	Character	1	Required	this is an indicator as to whether or not an enclosure has been to further describe the testing activity. Answer must be <u>Y</u> es or <u>N</u> o

1. Enter data in the Verify fields.
2. After you have completed your input, the system may automatically bring you back to the main screen (Pure DDTS) or click on **Prev**.
3. When the main screen display reappears, click the “Commit” button to store the Verify state’s data into the DDTS database.

9.8.5.5 Close State

The Close state indicates that all activity specified in the change request has been completed or that the approval authority has decided to close it prior to completion of all activity. Data fields appear under the heading, “CLOSING INFORMATION” on the Record screen. Table 9.8.5.5-1 identifies these fields.

Table 9.8.5.5-1 Close State Field Descriptions

Field Name	Data Type	Size	Entry	Description
Closed By	character	25	Required	name of the individual that is closing the CCR
Closing Date	date	6	Required	date that the CCR is closed. Required format is yymmdd
Closer's Organization-	character	5	Required	name of the closing official's organization. Answer must be one of the following: ASF, EDC, EOC, GSFC, JPL, LaRC, NSIDC, ORNL, SMC

1. Enter data in the Close fields.
2. After you have completed your input, the system may automatically bring you back to the main screen (Pure DDTS) or click on **Prev**.
3. When the main screen display reappears, click the “Commit” button to store the Close state’s data into the DDTS database.

9.8.6 Modify CCR

There will be times when the operator needs to change the information that was entered previously into the database or to enter information into fields that were not completed initially. The Modify Menu enables modification of database data. Table 9.8.6-1 presents the steps performed using DDTS to modify a CCR. It summarizes the procedures as a quick reference. If you are already familiar with the procedures, you may refer to this table. If you are new to the system or have not performed this task recently, please refer to the more detailed steps provided below:

1. Access DDTS by clicking on the DDTS icon from your desktop, or by typing the following command on the command line: **xddts**
2. From the Main Menu (PureDDTS) select the CCR you want to modify.
3. Click the “Modify” menu on the main screen Record to bring up the modify options.
4. Select the “Modify Record” option to change existing information and/or to enter information into fields left blank previously.
5. The cursor appears at the first field that may be modified. The modify record mode enables the operator to go through all of the fields that are associated with the current status of the CCR and make changes where appropriate.
6. Once the changes have been made, return to the main screen (Pure DDTS) and click the Commit” button on the main screen to add the changes to the database.
7. Reference Chapter 3, “Modify Menu and the Enclosure Sections,” of the PureDDTS User’s Manual for additional information as necessary.

Table 9.8.6-1. Modify a CCR - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	From Record screen, click on Modify menu.	Select option.
2	Enter data in fields	Modify record and/or enclosure.
3	Click on Commit button.	Store record into DDTS database.

9.8.7 Print CCR

The DDTS Print option allows the operator to display a CCR or several CCRs in the CCR index in a selected format on his or her monitor; print a CCR or several CCRs in the CCR index to a printer; or print a CCR or several CCRs in the CCR index to a designated file. Table 9.8.7-1 presents the steps performed using DDTS to print CCRs. It summarizes the procedures as a quick reference. If you are already familiar with the procedures, you may refer to this table. If you are new to the system or have not performed this task recently, please refer to the more detailed steps provided below:

1. Access DDTS by clicking on the DDTS icon from your desktop, or by typing the following command on the command line: **xddts**
2. From the main screen (Pure DDTS), select CCR or CCRs to be printed.
3. Click on the Options Menu then select **Print**, or click on the “Print” button, to bring up the Printing Options Screen. This screen provides the operator the capability to print a highlighted CCR or all of the CCRs in the index on the main screen in a full page, index, one-line, or three-line format.
4. Select the desired option under “Where to Print” and provide appropriate information for printer and file options. Refer to Chapter 3, “Setting PureDDTS Options,” of the PureDDTS User’s Manual for additional details about the Printing Options screen.

Table 9.8.7-1. Print a CCR - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	PureDDTS Main Screen. Click on Print button.	Select options.
2	From Format to Print screen, click on Print button..	Store record into DDTS database.

9.8.8 Required Operating Environment

9.8.8.1 Interfaces and Data Types

The DDTS application will interface only with the ClearCase application at each of the sites. This DDTS/ClearCase interface is facilitated by a ClearCase/DDTS Integration COTS package. DDTS has no interfaces external to the ECS.

9.8.8.2 Databases

The PureDDTS database is a proprietary database that supports the SQL 89 standard. Reference Appendixes F and G of the PureDDTS Administrator’s Manual for details about the PureDDTS database.

9.8.8.3 Database Schema

Reference Appendix F of the PureDDTS Administrator’s Manual for a description of DDTS’ database schema.

9.8.8.4 Database Parameters

Reference Appendixes F and G of the PureDDTS Administrator’s Manual for DDTS’ database parameters.

9.8.8.5 Command Line Interface

DDTS interfaces with ClearCase only. This interface is facilitated through a ClearCase/DDTS Integration COTS package. No custom command line interface has been developed. This interface supports a verification query by ClearCase for authorization by maintenance engineering staff to change configuration controlled files based on specific CCR authorization.

9.8.8.6 Event and Error Messages

Standard DDTS event and error messages are used. There are no messages unique to the ECS implementation. A list of the PureDDTS event and error messages is not provided in the PureDDTS User's and Administrator's Manuals. However, messages provided during execution of DDTS are self explanatory.

9.8.9 Reports

Standard DDTS reports are to be used. Reference Chapter 3 of the DDTS User's Manual (Setting PureDDTS Options) for information concerning the printing of a CCR report and a description of the available report formats.

Table 9.8.9-1. Reports

Report Type	Report Description	When and Why Used
Not Applicable		

9.8.9.1 Sample Reports

9.8.9.2 Sample Report (Full Page Format)

Below is a sample CCR report resulting from the use of the DDTS Printing Option (full page format).

ECS_CHNG_REQ

Page 1/3

CCR Number: MSSdd00630 Submitted : 960529 Revision:

Priority : routine Change Class: II

Status : Closed Enclosures : 3

Title:

Revise Data Input Screen (Example Only)

CCR ORIGINATOR INFORMATION

Originator Name: Frank Pace

Organization : LaRC

Phone Number : (999)234-1289

Organization Evaluation Engineer: J. Bellamy

CONFIGURATION MANAGEMENT ADMINISTRATOR

CM Admin. Name: bfloyd

Organization : LaRC

Phone Number : (999)234-1830

ECS_CHNG_REQ

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CCR Number: MSSdd00630

ANALYSIS INFORMATION

Evaluation Engineer : bfloyd

Organization : LaRC

Email Address: bfloyd@larc.com

Impact Evaluators:

1. GSFC 2. LaRC 3. EDF 4. 5. 6.
7. 8. 9. 10. 11. 12.

Sites Affected:

1. GSFC 2. LaRC 3. SMC 4. 5. 6.
7. 8. 9.

Related CCR# :

CI Affected : Planning CSCI

Documents Affected:

Release Affected : Release X

Baselines Affected:

ECS_CHNG_REQ

Page 3/3

CCR Number: MSSdd00630

DISPOSITION: Approved TESTING INFORMATION:

CCB Approval Official: John Wana Engr. Name: Joe Tester

Date: 960607 Organization: LaRC

CCB Organization: ESDIS Est. Testing Completion

Date: 960614

IMPLEMENTATION VERIFICATION INFORMATION:
Organization: SEO Test Status (Pass/Fail): P
Engineer: bfloyd Enclosure Added (Y/N): N
E-mail: efinch@eos.com
Start Date: 960610
Est. Time to Complete: 2 days
Completion Date: 960612
Effective Date: 960710

CLOSING INFORMATION:
Closed by: Authur Closer Date: 960618 Org.: SMC

***** Proposed Change *****
Need or Problem: Describe the need or problem.

The need is ----

Proposed Solution: Describe the proposed solution.

Suggest that the following capability be changed as follows:
- capability changes

***** Impact Summary *****
Summarize the impact statements received from the organizations requested to provide impacts.

Summary of impacts received from GSFC and EDF is -----

Resources Summarized: [description of resources]

Technical Summary:

ROM Summary (BOE, Cost & Schedule):

Recommendation: [Insert Recommendation]

***** Resolution *****
Describe how the request will be resolved/completed.

This request will be resolved as follows:
- Capability x will be modified to ----.

The Resolution Enclosure is the end of the full page format report.

9.8.9.3 Sample Report (Three Line Format)

Below is a sample CCR report resulting from the use of the DDTS Printing Option, Three Line Format. [Note: this document's margins forced the data to a fourth line.]

Submitted 960529, CCR# MSSdd00630, Originator Frank Pace
Title Revise Data Input Screen (Example Only)
Priority routine, Class II, CCB Org. ESDIS, Disp. Approved, Status Closed.

Submitted 960521, CCR# MSSdd00617, Originator Joseph Winkler
Title Add GUI to X11 Program (Example Only)
Priority routine, Class II, CCB Org. LaRC, Disp. Approved, Status Implemented.

9.8.9.4 Sample Report (Index Format)

Below is a sample CCR report resulting from the use of the DDTS Printing Option (Index format). Fields displayed are CCR Identifier, Title, Change Class, Priority, and Status.

MSSdd00630 Revise Data Input Screen(Example Only) II routine C
MSSdd00617 Add GUI to X11 Program (Example Only) II routine R

9.8.9.5 Sample Report (One Line Format)

Below is a sample CCR report resulting from the use of the DDTS Printing Option (One Line format). The operator selects the fields desired for the one line format. In this case, the Identifier, CCR Originator, Originator Organization, Implementing Organization, and Status fields were selected and their data values are displayed.

MSSdd00630 Frank Pace	LaRC	SEO C
MSSdd00617 Joseph Winkler	GSFC	LaRC R

9.8.9.6 Report Customization

Refer to Chapter 8 of the PureDDTS Administrator's Manual for explanations of how to customize DDTS reports. Chapter 8 explains how to customize canned reports and how to create and add new reports.

9.9 Use of the Baseline Manager

9.9.1 Overview

Baseline Manager (BM) is used to record and report the as-built operational baseline of ECS products. It contains the configuration record for each baselined product. It identifies products by CI name, description, location, model/version, and component configured articles. It provides traceability to previous configurations.

XRP-II is a commercially available manufacturing management application specially configured to serve as the ECS Baseline Manager. It helps the M&O staff at the DAACs, EOC, and SMC maintain records that describe what comprises baselined operational system configurations. These records identify baselined versions of hardware and software items as well as their assembly structures and interdependencies. XRP-II keeps chronological histories of baseline changes and traceability of items to predecessor versions and system releases.

Baseline Manager does this primarily by maintaining a catalog of version-controlled items along with data about how they interrelate. The most significant relationship is product structure, which is a parent-component pairing of two control items. Using XRP-II's engineering change notices and effectivity data (active and inactive dates), product structure changes can be reported, checked, and approved before they go into effect, and tracked by control item as well as related Configuration Change Request and/or trouble ticket.

The Baseline Manager data schema is shown in Figure 9.9.1-1. This is a system-level view consistent with the records kept at the System Management Center spanning all ECS sites in one database. Control items may be mapped via development baselines as shown on the right-hand-side (RHS) of the chart known as the *CIL/CAL View* which is derived from the functional mapping of the Configuration Items List (CIL) and the Configured Articles List (CAL), respectively. Control items may also be mapped via operational baselines (ECS, Site, M&O, & Release) as shown on the left-hand-side (LHS) of the chart known as the *Logical Operations View of Baselines* which derives from the on-site implementation of ECS. Both views are traceable to the CAL which constitutes the inventory of ECS product delivered end-items. The RHS provides a hierarchical, functional trace of the CAL to configuration items, subsystems, and common items. The LHS provides logical abstractions of the operational implementation view of the CAL items. The RHS is relatively static since it derives from the ECS design while the LHS is more fluid because it is subject to change with operational modifications due to on-site implementation.

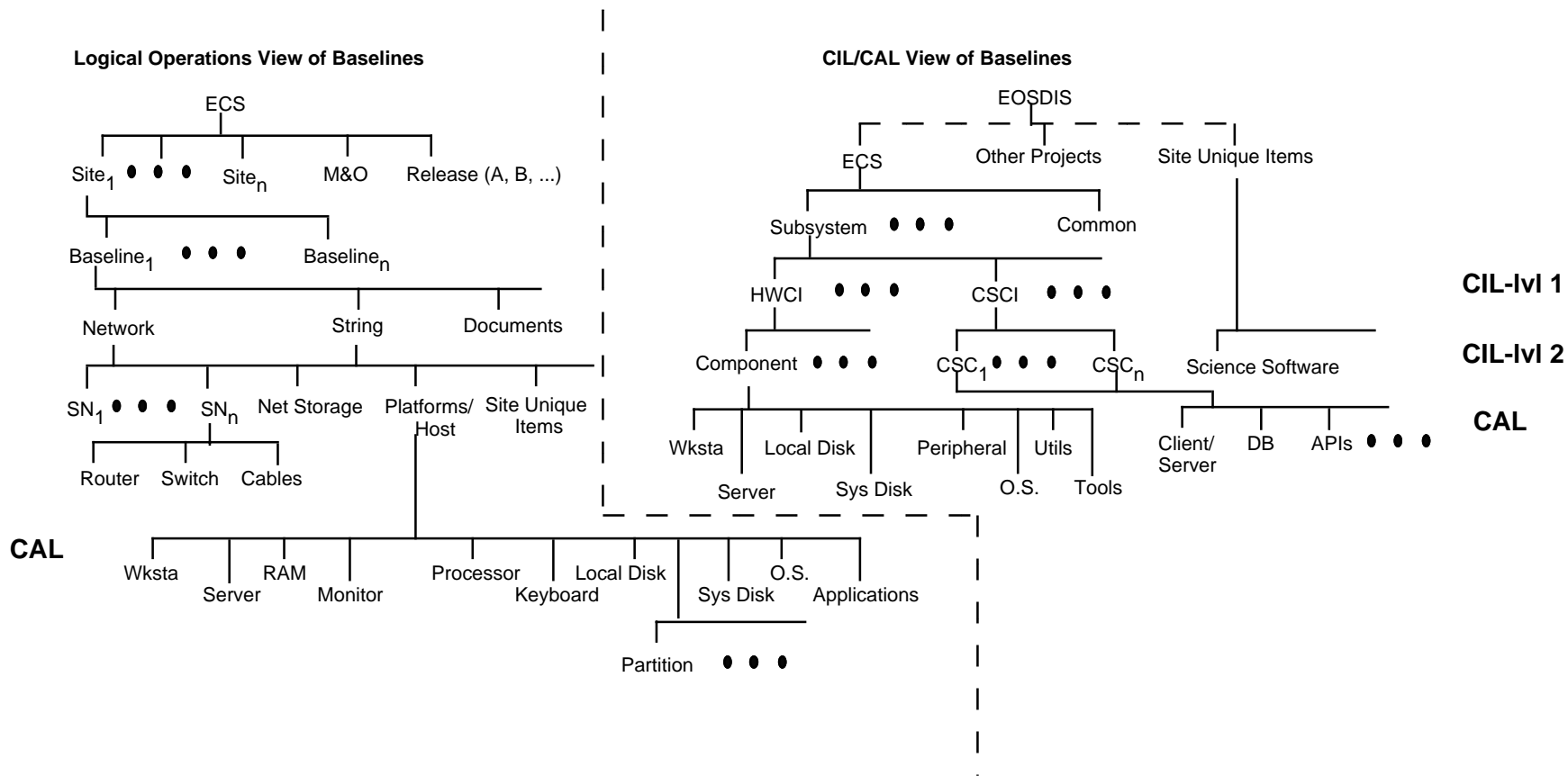
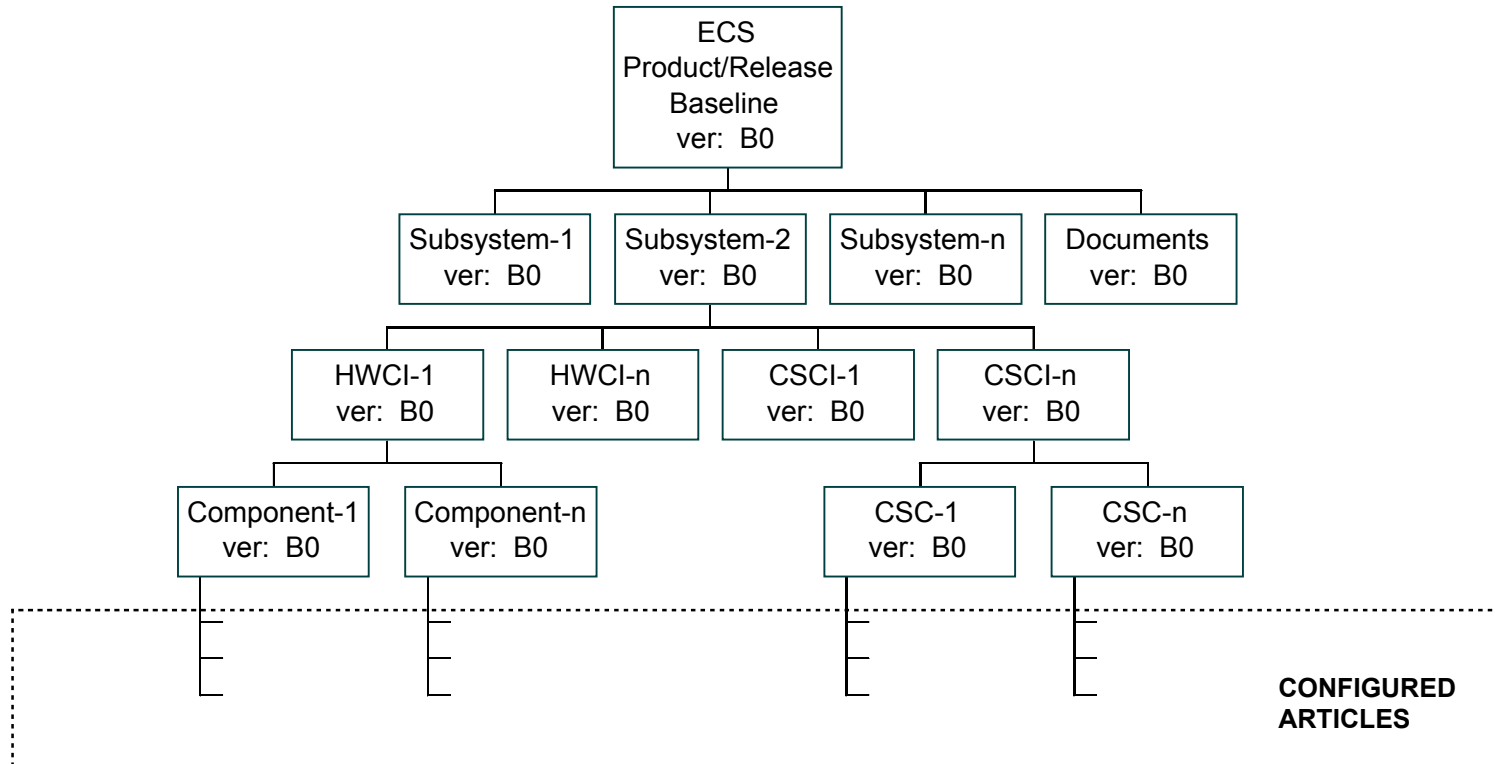


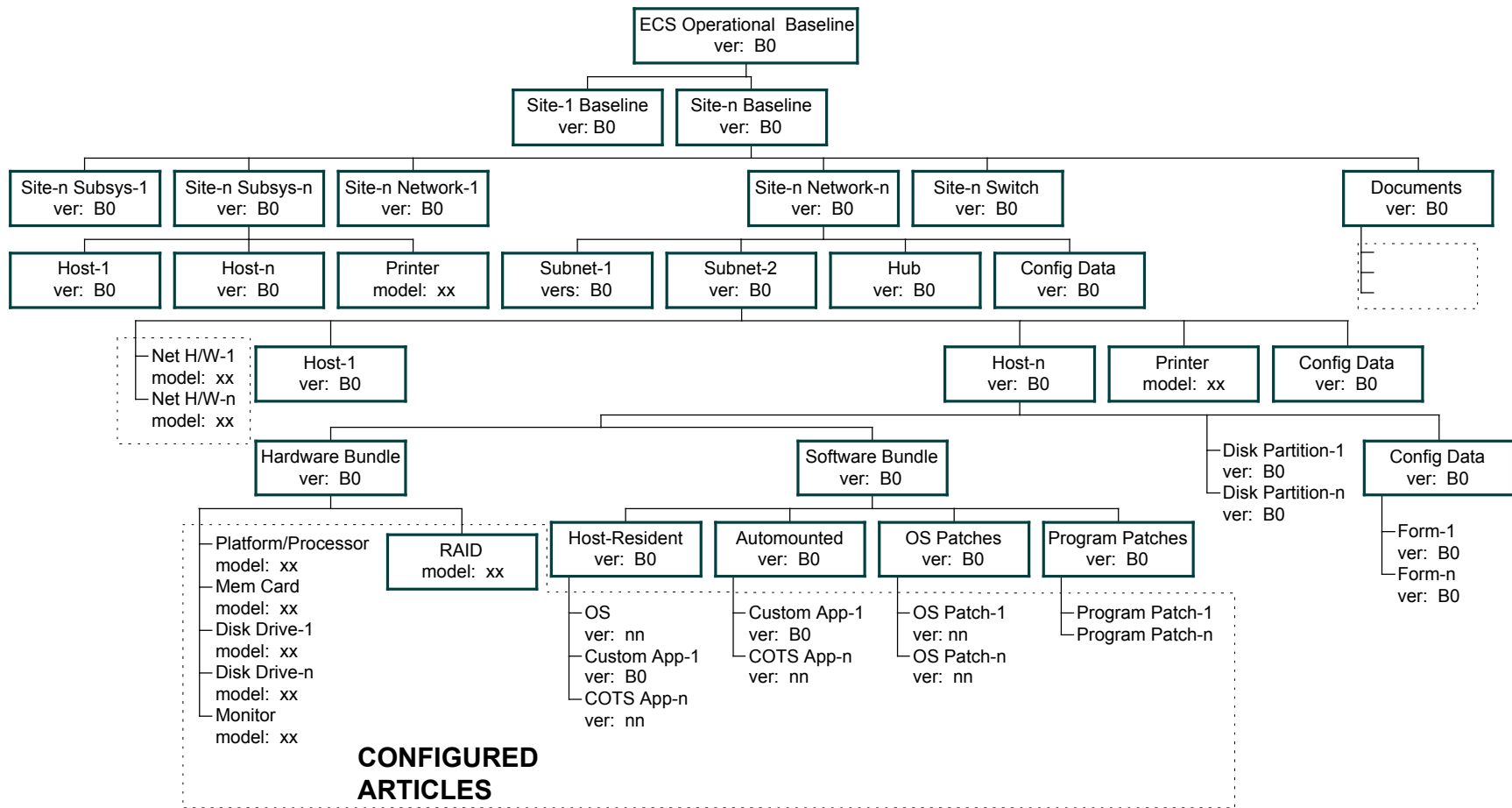
Figure 9.9.1-1. Hierarchy of Control Items for Baseline Management

A further detailed instantiation of the Baseline Manager (BLM) data schema is shown in figures 9.9.1-2 and 9.9.1-3 which show the Design (CIL/CAL) View and the Operational (Logical) View, respectively, for Release B0. These drawings represent the delivered EOSDIS Core System design and on-site build-out, respectively. This is a composite view of the release data delivered to each ECS site. Site-unique items, site created baselines, science software, maintenance changes, and baseline add-ons will be added to produce a site-unique BLM database.



Design (CIL/CAL) View

Figure 9.9.1-2. Design (CIL/ CAL) View



Operational (Logical) View

Figure 9.9.1-3. Operational (Logical) View

A series of Figures 9.9.1-4 (part 1 & 2) for the design view, Figures 9.9.1-5 (parts 1 thru 4) for the operational view, and Figures 9.9.1-6 (part 1 & 2) for details of the operational view introduce the nomenclature for BLM records. This series of figures depicts the major types of records consistent with the database schema. The records are distinguished as a set of record classes with a common set of parameters for the design view and operational view. Further details elaborate necessary parameters of operational records in Figures 9.9.1-6. Subsection 9.9.2.2 will supply detailed procedures for the use of BLM records, screens, and fields.

Parameter	EOSDIS	ECS	Site Unique Items	Science SW Bundle	Common "reserved"
Control Item ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	<site prefix>b<seq #> (e.g., GSFb00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)
Name/ Doc. No. (24 chars max)	EOS Data and Info Sys	EOSDIS Core System	Site Uniques Collection	Science Software Bundle	Common Subsystem
Mnemonic	EOSDIS	ECS	n/a		Common
Description/Title	EOSDIS for AM Launch Ready Release	EOSDIS Core System for AM Launch Ready Release	Collection of Site Unique Control Items for Release B0	System view of science software used for production	Multiple subsystem-level bundle
Item Class	other	design	other	other	design
Item Subclass	program	project	uniques bundle	science bundle	subsystem
Model/ Version	(as appropriate)	B0	(as appropriate)	(as appropriate)	B0
Predecessor/ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)
Configured Article	N (no)	N (no)	N (no)	N (no)	N (no)
Resource Planning	N (no)	N (no)	N (no)	N (no)	N (no)
Scope	C (core)	C (core)	U (site-unique)	U (site-unique)	C (core)
Mfr/Dev	n/a	ECS	GSFC	DAAC mnemonic	ECS
Commodity Code	n/a	ECS	n/a	other	custom
Detail Items					
Notes 1. control item ID	Core: bxxxxxxx 8 char. with "b" (BLM baseline) or "i" (ILM) suffix	Site specific: GSFbxxxxxxx 3 char. prefix for site			

Figure 9.9.1-4. Common Nomenclature for Baseline Manager Design View Items (1 of 2)

Parameter	Subsystem	HWCI	CSCI	HW Component	SW Component (CSC)
Control Item ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)
Name/ Doc. No. (24 chars max)	<i>subsystem name</i> (e.g., System Mgmt Subsystem)	<i>HWCI name</i> (e.g., Mgmt Hardware CI)	<i>CSCI name</i> (e.g., Management Software CI)	<i>hw component name</i> (e.g., Ent Mon Svr Comp)	<i>sw component name</i> (e.g., Mode Mgmt Service CSC)
Mnemonic	<i>mnemonic</i> (e.g., MSS)	<i>mnemonic</i> (e.g., MHCI)	<i>mnemonic</i> (e.g., MCI)	<i>mnemonic</i> (e.g., EMS)	<i>mnemonic</i> (e.g., MMS)
Description/Title	<i>description</i> (e.g., System Management Subsystem (AM-1))	<i>description</i> (e.g., Management Hardware config item (AM-1))	<i>description</i> (e.g., Management Software config item (AM-1))	<i>description</i> (e.g., Enterprise Monitoring Server hw component (AM-1))	<i>description</i> (e.g., Mode Management Service sw component (AM-1))
Item Class	design	design	design	design	design
Item Subclass	subsystem	HWCI	CSCI	component	CSC
Model/ Version	B0	B0	B0	B0	B0
Predecessor/ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)
Configured Article	N (no)	N (no)	N (no)	N (no)	N (no)
Planning Resource	N (no)	N (no)	N (no)	N (no)	N (no)
Scope	C (core)	C (core)	C (core)	C (core)	C (core)
Mfr/Dev	ECS	ECS	ECS	ECS	ECS
Commodity Code	custom	other	other	other	other
Detail Items					
Notes 1. control item ID		Core: bxxxxxxx 8 char. with “b” (BLM baseline) or “i” (ILM) suffix	Site specific: GSFbxxxxxxx 3 char. prefix for site.		

Figure 9.9.1-4. Common Nomenclature for Baseline Manager Design View Items (2 of 2)

Parameter	Release	M&O	Site	Baseline	Network
Control Item ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	<site prefix>b<seq #> (e.g., GSFC00000001)	<site prefix>b<seq #> (e.g., GSFb00000001)	<site prefix>b<seq #> (e.g., GSFb00000001)
Name/ Doc. No. (24 chars max)	Release <id> (e.g., Release B0)	Maintenance & Operations Release	site name GSFC DAAC (e.g., GSFC, LaRC)	baseline name GDAAC Baseline	network name GSFC Local Area Network (e.g., GDAAC LAN)
Mnemonic					
Description/Title	<i>description</i> (e.g., EOS AM-1 Launch Ready ECS Release)	<i>description</i> (e.g., EOS AM-1 Launch Ready ECS Maint Release B0.1)	<i>description</i> (e.g., GDAAC site baseline)	<i>description</i> (e.g., GDAAC Site Operational Baseline for AM-1)	<i>description</i> (e.g., GDAAC Local Area Network for AM-1)
Item Class	baseline	baseline	baseline	baseline	network
Item Subclass	release	maint release	site	site	FDDI <u>or</u> Ethernet <u>or</u> user subnet <u>or</u> segment
Model/ Version	<i>release version</i> (e.g., B0)	<i>baseline version</i> (e.g., B0.x)	<i>site version</i> (e.g., GSFC.B0.x)	<i>baseline version</i> (e.g., GSF.B0.x.n)	<i>network version</i> (e.g., GSFC.B0.x)
Predecessor/ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	<site prefix>b<seq #> (e.g., GSFC00000001)	<site prefix>b<seq #> (e.g., GSFb00000001)	<site prefix>b<seq #> (e.g., GSFb00000001)
Configured Article	N (no)	N (no)	N (no)	N (no)	N (no)
Planning Resource	N (no)	N (no)	N (no)	N (no)	N (no)
Scope	C (core)	C (core) <u>or</u> S (site-specific)	S (site-specific)	U (site-unique)	S (site-specific)
Mfr/Dev	ECS	ECS	ECS	ECS	ECS
Commodity Code	other	other	other	other	other
Detail Items					
Notes 1. control item ID	Core: bxxxxxxx 8 char. with “b” (BLM baseline) or “i” (ILM) suffix	Site specific: GSFbxxxxxxx 3 char. prefix for site,			

Figure 9.9.1-5. Common Nomenclature for Baseline Manager Operational View (1 of 4)

Parameter	Site Subsystem Collection	Host	Documents	Disk Partitions	Configuration Data
Control Item ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)
Name/ Doc. No. (24 chars max)	<i>collection name</i> (e.g., GSFC Collection of MSS Resources)	<i>host name</i> (e.g., g0mss02)	<i>document number</i> (e.g., 102-CD-002-001)	<i>partition name</i> (e.g., MSS Data)	<i>Form or Doc #</i>
Mnemonic	(e.g., GSFC MSS)				
Description/Title	(e.g., Release B0 MSS resources at GSFC)	(e.g., Release B0 MSS CM Server)	(e.g., CM Plan for the Science Data Processing Segment of the ECS Project)	<i>partition desc</i>	<i>document title</i>
Item Class	bundle	host	document	partition	document
Item Subclass	subsystem	<i>host subclass</i> (e.g., server, xterm, workstation)	<i>document type</i> (e.g., plan)	<i>partition type</i> (e.g., system, user)	<i>config data type</i> (e.g., assembly drawing)
Model/ Version	B0	B0	n/a	B0	B0
Predecessor/ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)
Configured Article	N (no)	Y (yes)	Y (yes)	N(o)	N (no)
Planning Resource	N (no)	Y (yes)	N (no)	Y (yes)	N (no)
Scope	S (site-specific)	S (site-specific)	C (core) <u>or</u> S (site-specific) <u>or</u> U (site-unique)	C (core) <u>or</u> S (site-specific) <u>or</u> U (site-unique)	C (core) <u>or</u> S (site-specific) <u>or</u> U (site-unique)
Mfr/Dev	ECS	ECS	ECS	ECS	ECS
Commodity Code		config	COTS <u>or</u> Custom	Custom	custom
Detail Items					
Notes 1. control item ID	Core: bxxxxxxx 8 char. with “b” (BLM baseline) or “i” (ILM) suffix	Site specific: GSFbxxxxxxx 3 char. prefix for site,			

Figure 9.9.1-5. Common Nomenclature for Baseline Manager Operational View (2 of 4)

Parameter	HW Bundle	SW Bundle	Host Resident Bundle	Automount Bundle	Patch Bundle
Control Item ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)
Name/ Doc. No. (24 chars max)	<i>bundle name</i> (e.g., Ingest Svr swbndl)	<i>bundle name</i> (e.g., Ingest Svr hwbndl)	<i>bundle name</i> (e.g., Ingest Svr resbndl)	<i>bundle name</i> (e.g., Ingest Svr autombndl)	<i>bundle name</i> (e.g., SGI ptchbndl for Indigo)
Mnemonic					
Description/Title	(e.g., Core hardware bundle for Ingest Server)	(e.g., Core software bundle for Ingest Server)	(e.g., Core host resident sw bundle for Ingest Server)	(e.g., Core automounted sw bundle for Ingest Server)	(e.g., OS patch bundle for SGI Indigos)
Item Class	hardware	software	software	software	software
Item Subclass	bundle	bundle	resident bundle	automount bundle	OS patch bundle
Model/ Version	B0	B0	B0	B0	B0
Predecessor/ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)
Configured Article	N (no)	N (no)	N (no)	N (no)	N (no)
Planning Resource	N (no)	N (no)	N (no)	N (no)	N (no)
Scope	C (core) <u>or</u> S (site-specific) <u>or</u> U (site-unique)	C (core) <u>or</u> S (site-specific) <u>or</u> U (site-unique)	C (core) <u>or</u> S (site-specific) <u>or</u> U (site-unique)	C (core) <u>or</u> S (site-specific) <u>or</u> U (site-unique)	C (core) <u>or</u> S (site-specific) <u>or</u> U (site-unique)
Mfr/Dev	ECS	ECS	ECS	ECS	ECS
Commodity Code					
Detail Items					
Notes 1. control item ID	Core: bxxxxxxx 8 char. with “b” (BLM baseline) or “i” (ILM) suffix	Site specific: GSFbxxxxxxx 3 char. prefix for site			

Figure 9.9.1-5. Common Nomenclature for Baseline Manager Operational View (3 of 4)

Parameter	Hardware	Software	Patches		
Control Item ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)		
Name/ Doc. No. (24 chars max)	<i>Vendor Product Name</i> (e.g., SPARCstorage Array)	<i>Vendor Product Name</i> (e.g., Clearcase)	<i>Vendor Patch ID</i> (e.g., PHSS_9824)		
Mnemonic		CC			
Description/Title	<i>Vendor Prod Desc</i> (e.g., 6.3 GB SPARCstorage Array)	<i>Vendor Prod Desc</i> (e.g., SW Library, CM Tool)	<i>Vendor description of Patch</i>		
Item Class	hardware	software	software		
Item Subclass	<i>device type</i> (e.g., ext. hard disk)	<i>software type</i> (e.g., application)	<i>patch type</i> (e.g., OS patch)		
Model/ Version	<i>Mfr. Model No.</i> 101	<i>product version</i> (e.g., 2.1 or B0)	<i>product version</i> (e.g., 10.01)		
Predecessor/ID	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)	b<seq #> (e.g., b00000001)		
Configured Article	Y (yes)	Y (yes)	Y (yes)		
Planning Resource	Y (yes)	Y (yes) (OS only)	N (no)		
Scope	C(ore) <u>or</u> S (site-specific) <u>or</u> U (site-unique)	C(ore) <u>or</u> S (site-specific) <u>or</u> U (site-unique)	C(ore) <u>or</u> S (site-specific) <u>or</u> U (site-unique)		
Mfr/Dev	<i>Mfr Code</i> (e.g., SUN)	<i>Developer Code</i> (e.g., ATR)	<i>vendor code</i> <u>or</u> ECS		
Commodity Code	COTS	COTS	COTS <u>or</u> Custom		
Notes 1. control item ID	Core: bxxxxxxx 8 char. with “b” (BLM baseline) or “i” (ILM) suffix	Site specific: GSFbxxxxxxx 3 char. prefix for site,			

Figure 9.9.1-5. Common Nomenclature for Baseline Manager Operational View (4 of 4)

Parameter	Hardware	Software	Host	Document	Disk Partitions
Capacity/Size	<i>Cap/Size Description</i>				
Format	<i>Format Classification</i>				
Mx Exp Slots	<i>Total Expansion Slots</i>				
Total Ports	<i>Number of serial ports or network connections</i>				
IO Protocols	<i>List of Protocols</i>				
Variant		<i>Platform Type</i> (e.g., Sun, HP, SGI, etc.)			
TCP/UDP Port		<i>Port ID</i> (e.g., 1744)			
Principal Dir		<i>Directory Path</i> (e.g., /usr/ecs/OPS/COTS/atria)			
License Type		(e.g., floating, nodelocked, etc.)			
Total Licenses		<i>License Qty</i> (e.g., 150)			
# CPUs			<i>Total CPUs</i> <nnn>		
Processor ID			<i>Mfr's Processor ID</i> (e.g., SuperSPARC+)		
Total RAM			<i>Total RAM (MB)</i> <nnn>		
# Logical Disks			<i># of Logical Partitions</i> <nnn>		
Swap Cache			<i>Cache Size (in blocks)</i> <nnn>		
Disk Cache			<i>Cache Size (in blocks)</i> <nnn>		
MAC Address			<address string>		
IP Address			<address string>		
IO Ports			<i>Desc or List of IO Port</i>		

Figure 9.9.1-6. Common Nomenclature for Baseline Manager Operational View - DETAILS (1 of 2)

Parameter	Hardware	Software	Host	Document	Disk Partitions
Publisher				<i>Publisher's Code</i> (e.g., SUN)	
Publ Date				<i>mm/dd/yy</i>	
Latest Chg Notice				<i>Change Notice ID</i>	
Issue				<i>Document Edition</i> (e.g., draft, final, etc.)	
Directory Name					<i>Logical Name for Device</i> (e.g., /dev/dsk1/...)
Device Name					<i>Phys. Name for Device</i> (e.g., /)
Logical Allocation					(e.g., system, user, etc.)
Partition Size					<i>Partition Size (in blocks)</i>
Block Size					<i>Block Size (in bytes)</i>

Figure 9.9.1-6. Common Nomenclature for Baseline Manager Operational View - DETAILS (2 of 2)

At each site, XRP-II manages data about baselined resources deployed to and established at that site. At the SMC, it also offers a consolidated view of control item baseline data system-wide. A variety of reports can be viewed, printed, or saved in a file for posting to an ECS bulletin board for global viewing, and the DAACs, EOC, and SMC can exchange baseline records and reports electronically via formatted files. Additionally, a special file identifying the resources of an operational, production baseline can be produced for the Planning Subsystem and its operators doing resource planning.

Table 9.9.1-1 summarizes the operator functions that XRP-II supports.

**Table 9.9.1-1. Common ECS Operator Functions Performed with XRP-II
(1 of 2)**

Operating Function	CHUI	Description	When and Why to Use
Catalog control items (Section 9.9.2.2)	Control Item Master menu; Deployment Maintenance screen	Operators select and use a data entry screen to update records identifying individual control items and to identify the sites at which each is (to be) deployed	Used whenever a new control item is to be added or deleted, or when the characterization of an existing one needs changing
Define/Update what comprises baselines and other control item assemblies (Section 9.9.2.3)	Bill Of Material menu	Operators select and use data entry screens to record engineering change notices and maintain product structure records for control.	Used whenever the component structure of a control item has to be defined or changed
Distribute baseline change records for a release (Section 9.9.2.4)	Export Release Records screen	Operators select one or more control items and initiate creation of formatted files which they can ftp to one or more sites. The files contain all appropriate, related records.	Used whenever a baseline change is to be released from one site for distribution to others.
Incorporate release records at a site (Section 9.9.2.5)	Import Data screen	Operators at the sites import data from tar files ftp'ed from the SMC (or other site)	Used any time an XRP-II formatted file containing database updates is available at a site
Provide site baseline change records to the SMC (Section 9.9.2.6)	Export Site- Unique Changes screen	Operators at the sites create files containing site-unique records changed since the last data export, and can ftp the files to the SMC (and other sites if desired.)	Used as required so the SMC can maintain a current, consolidated database of what comprises operational site baselines system-wide.
Incorporate site baseline change records at the SMC (Section 9.9.2.5)	Import Data screen	Operators at the sites import data from tar files ftp'ed from a site	Used any time an XRP-II formatted file containing database updates is available at the SMC

Table 9.9.1-1. Common ECS Operator Functions Performed with XRP-II (2 of 2)

Operating Function	CHUI	Description	When and Why to Use
Maintain control item deployment data (Section 9.9.2.7)	Deployment Maintenance screen	Operators maintain records describing the implementation status and installation dates of control items at a site	Used whenever the installation date or implementation status of a control item is established or changed. (Note: Records in the bill of materials for site "production" baselines are used by Resource Planning to maintain its resource inventory.)
Update dependencies among control items (Section 9.9.2.8)	Control Item Interdependency Maint screen	Operators maintain records that define operator-specifiable relationships between any two control items	Used primarily to identify resources that are version-dependent and to correlate documents with the resources they describe
Query Control Item Records (Section 9.9.2.9)	Query menu	Provides access to data retrieval screens	Used to view information about control items, product structures, and change histories, primarily by operators not authorized to change it
Generate Pre-defined Reports (Section 9.9.2.10)	Report menu	Provides access to a variety of pre-defined reports that can be generated according to operator-specified record selection criteria	Used whenever a hard or soft copy of a report is desired
Perform baseline management master files maintenance (Section 9.9.2.11)	Utilities menu	Provides access to a variety of screens for accomplishing tasks that sustain local baseline management operations	Used whenever changes are needed to reference files for baseline management and to force recalculation of certain underlying codes and dates.
Perform XRP-II master files maintenance (Section 9.9.2.12)	System Utilities menu	Provides access to a variety of screens for accomplishing tasks that sustain XRP-II operations system-wide	Used whenever changes are needed to the system's tunable parameters and reference files used throughout the XRP-II system.

The spreadsheet in Table 9.9.1-2 shows the myriad uses of Baseline Manager by a broad spectrum of ECS Operations personnel. The number sequences in the table have a connotation of access to a defined sequence of BM screens provided via the XRP-II application program.

Table 9.9.1-2. Screen Allocations to Tasks Groups (1 of 9)

Tasks Groups	Tasks	Main	Baseline Management	1. Control Item Master	Data Screens	2. Bill of Material	Data Screens
					1.1 All Control Items		2.1 Engineering Change Entry
					1.2 Hardware Items Only		2.2 Engineering Change Approval
					1.3 Software Items Only		2.3 Product Structure Maint
	N.B.				1.4 Document Items Only		2.4 Replace a Component in All Bills
	1. Access to the XRP-II screens is controlled via Groups as indicated below:						
	a. mrp = programmer's access				1.5 Host Items Only		
	b. xrpadmin = database administrator				1.6 Partition Items Only		
	c. xrpupdate = allows changes to records						
	d. xrpquery = allows queries and reports						
	2. Access to individual screens is controlled by set-up as						
	I = Inquire (query & report), A= Add Record, M= Modify Record & D= Delete Record						
	Data Base Administrator at Site and SMC						
	Establish access permissions for XRP-II users and groups	1					
	Define screen group names	1					
	Register authorized XRP-II users	1					
	Define printer programs	1					
	Edit screen/ report attributes	1					
	Backup data base	1					
	Restore data base	1					
	Install/ verify XRP-II SW updates			Command Line Procedure			
	Site-level CM Admin (DAAC, EOC, & SMC) = xrpadmin						
	Site XRP DBA			All screens plus tools (other applications)			
	I,A,M,D item catalog records	1	2	3	4 (1.1--1.6)		
	I,A,M,D engineering change records	1	2	3			4 (2.1, 2.2)
	I,A,M,D product structure records	1	2	3			4 (2.1, 2.2)
	I,A,M,D implementation status records	1	2	3	4 (1.1--1.6)		
	I,A,M,D interdependency records	1	2	3			
	Generate site-level reports	1	2	3		3	
	Export site-owned record changes to SMC	1					
	Establish/change release/ maintenance baselines	1	2	3	4 (1.1--1.6)	3	4 (2.1, 2.2)
	Define user/group access to XRP	1					
	Synchronize XRP w/other CM tools and sites (###)						
	###DDTS (CCRs)	1	2				
	###ClearCase (SW Versions)						
	###Remedy (Trouble Tickets)						
	###System Updates						
	Import records from SMC						
	Maintain Resp Eng list associated with control items	1	2	3		4	
	Record temp or emergency control item changes	1	2				3 4 (2.1)
	Read all XRP records (incl historical records)	1	2	3			

Table 9.9.1-2. Screen Allocations to Tasks Groups (2 of 9)

Tasks Groups	Tasks	Baseline Management		1. Control Item Master	Data Screens	2. Bill of Material	Data Screens
		Main					
					1.1 All Control Items		2.1 Engineering Change Entry
					1.2 Hardware Items Only		2.2 Engineering Change Approval
					1.3 Software Items Only		2.3 Product Structure Maint
	N.B.				1.4 Document Items Only		2.4 Replace a Component in All Bills
	1. Access to the XRP-II screens is controlled via Groups as indicated below:				1.5 Host Items Only		
	a. mrp = programmer's access				1.6 Partition Items Only		
	b. xrpadmin = database administrator						
	c. xrpupdate = allows changes to records						
	d. xrpquery = allows queries and reports						
	2. Access to individual screens is controlled by set-up as						
	I = Inquire (query & report), A= Add Record, M= Modify Record & D= Delete Record						
	Modify logical operations views of baselines (baseline product structure data)	1	2			3	4
	Generate Resource Planning BOM; forward updated report to RP W/S				Command Line Only		
	XRP Backups				"ACCELL" tool		
	ECS-level CM Admin = xrpadmin (@ SMC) and xrpquery (@ DAAC & EOC)						
	Import XRP records from site/EDF						
	Generate system-level pre-defined reports	1	2	3		3	
	Generate system-level ad hoc reports	1	2	3		3	
	Export (deploy) release records						
	Establish/change ECS-level baselines	1	2			3	4
	Maint Eng/ Sys Admin/ SEO = xrpquery (screens: impstat (M,I) and pdmaint)						
	Read all XRP records (incl historical records)	1	2				
	Modify implementation status for ECN	1	2			3	4
	Maintain Resource Dependency Table						
	Test Engineer (on-site or ECS-level) = xrpquery (screens: impstat (M,I) and pdmaint)						
	Query test string records	1	2			3	4
	Modify implementation status for ECN						
	Resource Planner = xrpquery						
	Generate data output files report				Command Line Only		
	Review processing string control items	1	2				
	ILS (inventory/ audit capability) = xrpupdate; [screen: pibomsa (I)]						
	Read all records (incl historical records)	1	2				
	Generate reports	1	2				
	Modify implementation status	1	2				
	Add records (COTS)	1	2		3 4 (1.1--1.3)		

Table 9.9.1-2. Screen Allocations to Tasks Groups (3 of 9)

Tasks Groups	Tasks	Main	Baseline Management	1. Control Item Master	2. Bill of Material	
					Data Screens	Data Screens
					1.1 All Control Items	2.1 Engineering Change Entry
					1.2 Hardware Items Only	2.2 Engineering Change Approval
					1.3 Software Items Only	2.3 Product Structure Maint
	N.B.					
	1. Access to the XRP-II screens is controlled via Groups as indicated below:				1.4 Document Items Only	2.4 Replace a Component in All Bills
	a. mrp = programmer's access				1.5 Host Items Only	
	b. xrpadmin = database administrator				1.6 Partition Items Only	
	c. xrpupdate = allows changes to records					
	d. xrpquery = allows queries and reports					
	2. Access to individual screens is controlled by set-up as					
	I = Inquire (query & report), A= Add Record, M= Modify Record & D= Delete Record					
	Audit property against CIL/ CAL	1		2		
	Trainer = xrpquery					
	Generate reports for OJT/formal training	1		2		
	Librarian = xrpupdate; [screen: pibomsa (I)]					
	Update document records	1		2	3, 4 (1.4)	
	Maintain document/control item trace records	1		2		

Table 9.9.1-2. Screen Allocations to Tasks Groups (4 of 9)

Table 9.9-2: Screen Allocations (2)

Tasks Groups	Tasks	3. Query	Data Screens	4. Report	Data Screens	5. Utilities	Data Screens
			3.1 Control Items Query		4.1 Multilevel Bill Reports		5.1 Unit Of Measure Manager
			3.2 Hardware Items Query		4.2 Summarized Bill Report		5.2 Unit Of Measure Conversion
	N.B.		3.3 Software Items Query		4.3 Multilevel Where-Used Reports		5.3 Vendor Master Manager
	1. Access to the XRP-II screens is controlled via Groups as indicated below:		3.4 Host Items Query		4.4 Config Items List - One		5.4 Control Item Interdependency Mgr
	a. mrp = programmer's access		3.5 Document Items Query		4.5 Config Items List - Two		5.5 Implementation Status
	b. xrpadmin = database administrator		3.6 Partition Items Query		4.6 Configured Articles List		5.6 Control Item Date Manager
	c. xrpupdate = allows changes to records		3.7 Product Structure Query		4.7 Version Description Reports		5.7 Low Level Code Manager
	d. xrpquery = allows queries and reports		3.8 Engineering Change Query		4.8 Site Baseline Report		5.8 Responsible Engineer Maintenance
	2. Access to individual screens is controlled by set-up as				4.9 Change History		5.9 Item Class Manager
	I = Inquire (query & report), A = Add Record, M = Modify Record & D = Delete Record				4.10 BOM Comparison Report		
Data Base Administrator at Site and SMC	Establish access permissions for XRP-II users and groups						
	Define screen group names						
	Register authorized XRP-II users						
	Define printer programs						
	Edit screen/ report attributes						
	Backup data base						
	Restore data base						
	Install/ verify XRP-II SW updates						
Site-level CM Admin (DAAC, EOC, & SMC) = xrpadmin	Site XRP DBA						
	I,A,M,D item catalog records	3	4 (3.1--3.5)				
	I,A,M,D engineering change records	3	4 (3.8)				
	I,A,M,D product structure records	3	4 (3.7)			3	4
	I,A,M,D implementation status records					3	4 (5.5)
	I,A,M,D interdependency records					3	4 (5.4)
	Generate site-level reports			3	4 (4.1--4.10)		
	Export site-owned record changes to SMC						
	Establish/change release/ maintenance baselines						
	Define user/group access to XRP						
	Synchronize XRP w/other CM tools and sites (###)						
	###DDTS (CCRs)			3		4	
	###ClearCase (SW Versions)						
	###Remedy (Trouble Tickets)						
	###System Updates						
	Import records from SMC						
	Maintain Resp Eng list associated with control items	3	4				
	Record temp or emergency control item changes						
	Read all XRP records (incl historical records)	3	4 (3.1--3.8)			3	4 (5.1--5.9)

Table 9.9.1-2. Screen Allocations to Tasks Groups (5 of 9)

Tasks Groups	Tasks	3. Query	Data Screens	4. Report	Data Screens	5. Utilities	Data Screens
			3.1 Control Items Query		4.1 Multilevel Bill Reports		5.1 Unit Of Measure Manager
			3.2 Hardware Items Query		4.2 Summarized Bill Report		5.2 Unit Of Measure Conversion
	N.B.		3.3 Software Items Query		4.3 Multilevel Where-Used Reports		5.3 Vendor Master Manager
	1. Access to the XRP-II screens is controlled via Groups as indicated below:		3.4 Host Items Query		4.4 Config Items List - One		5.4 Control Item Interdependency Mgr
	a. mrp = programmer's access		3.5 Document Items Query		4.5 Config Items List - Two		5.5 Implementation Status
	b. xrpadmin = database administrator		3.6 Partition Items Query		4.6 Configured Articles List		5.6 Control Item Date Manager
	c. xrpupdate = allows changes to records		3.7 Product Structure Query		4.7 Version Description Reports		5.7 Low Level Code Manager
	d. xrpquery = allows queries and reports		3.8 Engineering Change Query		4.8 Site Baseline Report		5.8 Responsible Engineer Maintenance
					4.9 Change History		5.9 Item Class Manager
	2. Access to individual screens is controlled by set-up as				4.10 BOM Comparison Report		
	I = Inquire (query & report), A= Add Record, M= Modify Record & D= Delete Record						
	Modify logical operations views of baselines (baseline product structure data)						
	Generate Resource Planning BOM; forward updated report to RP W/S						
	XRP Backups						
ECS-level	CM Admin = xrpadmin (@ SMC) and xrpquery (@ D)						
	Import XRP records from site/EDF						
	Generate system-level pre-defined reports			3	4 (4.1--4.10)		
	Generate system-level ad hoc reports	3	4 (3.1--3.8)	3	4	3	4 (5.3--5.5, 5.8)
	Export (deploy) release records						
	Establish/change ECS-level baselines						
Maint Eng/ Sys Admin/ SEO = xrpquery (screens: impstat (M,I))							
	Read all XRP records (incl historical records)	3	4 (3.1--3.8)			3	4 (5.1--5.7, 5.8)
	Modify implementation status for ECN						
	Maintain Resource Dependency Table					3	4 (5.4)
Test Engineer (on-site or ECS-level) = xrpquery (screens: impstat (M,I))							
	Query test string records	3	4 (3.1--3.6)				
	Modify implementation status for ECN						
Resource Planner = xrpquery							
	Generate data output files report						
	Review processing string control items						
ILS (inventory/ audit capability) = xrpupdate; [screen: pibomsa]							
	Read all records (incl historical records)	3	4 (3.1--3.7)				
	Generate reports			3	4 (4.1--4.10)		
	Modify implementation status					3	4 (5.5)
	Add records (COTS)						

Table 9.9.1-2. Screen Allocations to Tasks Groups (6 of 9)

Tasks Groups	Tasks	3. Query	Data Screens	4. Report	Data Screens	5. Utilities	Data Screens
			3.1 Control Items Query		4.1 Multilevel Bill Reports		5.1 Unit Of Measure Manager
			3.2 Hardware Items Query		4.2 Summarized Bill Report		5.2 Unit Of Measure Conversion
	N.B.		3.3 Software Items Query		4.3 Multilevel Where-Used Reports		5.3 Vendor Master Manager
	1. Access to the XRP-II screens is controlled via Groups as indicated below:		3.4 Host Items Query		4.4 Config Items List - One		5.4 Control Item Interdependency Mgr
	a. mrp = programmer's access		3.5 Document Items Query		4.5 Config Items List - Two		5.5 Implementation Status
	b. xrpadmin = database administrator		3.6 Partition Items Query		4.6 Configured Articles List		5.6 Control Item Date Manager
	c. xrpupdate = allows changes to records		3.7 Product Structure Query		4.7 Version Description Reports		5.7 Low Level Code Manager
	d. xrpquery = allows queries and reports		3.8 Engineering Change Query		4.8 Site Baseline Report		5.8 Responsible Engineer Maintenance
	2. Access to individual screens is controlled by set-up as				4.9 Change History		5.9 Item Class Manager
	I = Inquire (query & report), A = Add Record, M = Modify Record & D = Delete Record				4.10 BOM Comparison Report		
	Audit property against CIL/ CAL			3	4 (pick your reports)		
	Trainer = xrpquery						
	Generate reports for OJT/formal training	3	4 (3.1--3.8)	3	4 (4.1--4.10)		
	Librarian = xrpupdate; [screen: pibomsa (I)]						
	Update document records	3	4 (3.4)				
	Maintain document/control item trace records					3	4 (5.4)

Table 9.9.1-2. Screen Allocations to Tasks Groups (7 of 9)

Tasks Groups	Tasks	6. System Utilities	Data Screens	Data Screens	7. System Tools	Data Screens
			6.1 System Parameters Manager	6.9 Site Master Manager		7.1 Screen Manager
			6.2 System Defaults Manager	6.10 Machine Network Maintenance		7.2 User Manager
	N.B.		6.3 Note Code Maintenance	6.11 Commodity Code Maintenance		7.3 Groups Manager
	1. Access to the XRP-II screens is controlled via Groups as indicated below:					7.4 Screen Permission Control
	a. mrp = programmer's access		6.4 Data Delete Utility	6.12 Import BLM Records		7.6 Printer Management
	b. xrpadmin = database administrator		6.5 Calendar Utility	6.13 Export Release Records		
	c. xrpupdate = allows changes to records		6.6 Calendar Report	6.14 Export Site-Unique Change Records		7.7 Data Dump Utility
	d. xrpquery = allows queries and reports		6.7 Transaction Log	6.15 Export SMC Change Records		7.8 Data Load Utility
			6.8 Transaction Archive			
	2. Access to individual screens is controlled by set-up as					
	I = Inquire (query & report), A= Add Record, M= Modify Record & D= Delete Record					
Data Base Administrator at Site and SMC						
	Establish access permissions for XRP-II users and groups				2	3 (7.4)
	Define screen group names				2	3 (7.3)
	Register authorized XRP-II users				2	3 (7.2)
	Define printer programs				2	3 (7.6)
	Edit screen/ report attributes				2	3 (7.1)
	Backup data base				2	3 (7.7)
	Restore data base				2	3 (7.8)
	Install/ verify XRP-II SW updates					
Site-level CM Admin (DAAC, EOC, & SMC) = xrpadmin						
	Site XRP DBA					
	I,A,M,D item catalog records					
	I,A,M,D engineering change records					
	I,A,M,D product structure records	2		3		3
	I,A,M,D implementation status records	2		3		3
	I,A,M,D interdependency records	2		3		3
	Generate site-level reports					
	Export site-owned record changes to SMC	2			3 (6.14)	
	Establish/change release/ maintenance baselines					
	Define user/group access to XRP				2	3 (7.2--7.4)
	Synchronize XRP w/other CM tools and sites (###)					
	###DDTS (CCRs)					
	###ClearCase (SW Versions)					
	###Remedy (Trouble Tickets)					
	###System Updates					
	Import records from SMC	2			3	
	Maintain Resp Eng list associated with control items					
	Record temp or emergency control item changes					
	Read all XRP records (incl historical records)	2	3 (6.1--6.3, 6.5, 6.7, 6.9--6.11)		2	3 (7.1--7.6)

Table 9.9.1-2. Screen Allocations to Tasks Groups (8 of 9)

Tasks Groups	Tasks	6. System Utilities	Data Screens	Data Screens	7. System Tools	Data Screens
		6.1 System Parameters Manager		6.9 Site Master Manager		7.1 Screen Manager
		6.2 System Defaults Manager		6.10 Machine Network Maintenance		7.2 User Manager
	N.B.	6.3 Note Code Maintenance		6.11 Commodity Code Maintenance		7.3 Groups Manager
	1. Access to the XRP-II screens is controlled via Groups as indicated below:	6.4 Data Delete Utility		6.12 Import BLM Records		7.4 Screen Permission Control
	a. mrp = programmer's access	6.5 Calendar Utility		6.13 Export Release Records		7.6 Printer Management
	b. xrpadmin = database administrator	6.6 Calendar Report		6.14 Export Site-Unique Change Records		7.7 Data Dump Utility
	c. xrpupdate = allows changes to records	6.7 Transaction Log		6.15 Export SMC Change Records		7.8 Data Load Utility
	d. xrpquery = allows queries and reports	6.8 Transaction Archive				
	2. Access to individual screens is controlled by set-up as					
	I = Inquire (query & report), A= Add Record, M= Modify Record & D= Delete Record					
	Modify logical operations views of baselines (baseline product structure data)					
	Generate Resource Planning BOM; forward updated report to RP W/S					
	XRP Backups					
	ECS-level CM Admin = xrpadmin (@ SMC) and xrpquery (@ D					
	Import XRP records from site/EDF	2			3	
	Generate system-level pre-defined reports					
	Generate system-level ad hoc reports					
	Export (deploy) release records	2			3	
	Establish/change ECS-level baselines					
	Maint Eng/ Sys Admin/ SEO = xrpquery (screens: impstat (M,I)					
	Read all XRP records (incl historical records)					
	Modify implementation status for ECN					
	Maintain Resource Dependency Table					
	Test Engineer (on-site or ECS-level) = xrpquery (screens: imp					
	Query test string records					
	Modify implementation status for ECN					
	Resource Planner = xrpquery					
	Generate data output files report					
	Review processing string control items					
	ILS (inventory/ audit capability) = xrpupdate; [screen: pibomsa					
	Read all records (incl historical records)					
	Generate reports					
	Modify implementation status					
	Add records (COTS)					

Table 9.9.1-2. Screen Allocations to Tasks Groups (9 of 9)

Tasks Groups	Tasks	6. System Utilities	Data Screens	Data Screens	7. System Tools	Data Screens
			6.1 System Parameters Manager	6.9 Site Master Manager		7.1 Screen Manager
			6.2 System Defaults Manager	6.10 Machine Network Maintenance		7.2 User Manager
	N.B.		6.3 Note Code Maintenance	6.11 Commodity Code Maintenance		7.3 Groups Manager
	1. Access to the XRP-II screens is controlled via Groups as indicated below:		6.4 Data Delete Utility	6.12 Import BLM Records		7.4 Screen Permission Control
	a. mrp = programmer's access		6.5 Calendar Utility	6.13 Export Release Records		7.6 Printer Management
	b. xrpadmin = database administrator		6.6 Calendar Report	6.14 Export Site-Unique Change Records		7.7 Data Dump Utility
	c. xrpupdate = allows changes to records		6.7 Transaction Log	6.15 Export SMC Change Records		7.8 Data Load Utility
	d. xrpquery = allows queries and reports		6.8 Transaction Archive			
	2. Access to individual screens is controlled by set-up as					
	I = Inquire (query & report), A = Add Record, M = Modify Record & D = Delete Record					
	Audit property against CIL/ CAL					
	Trainer = xrpquery					
	Generate reports for OJT/formal training					
	Librarian = xrpupdate; [screen: pibomsa (I)]					
	Update document records					
	Maintain document/control item trace records					

9.9.2 Procedures

9.9.2.1 Getting Started

XRP-II has a character-based user interface which employs screens for data entry and report generation, and menus for navigating to the screens. Data is entered via the keyboard in fields that are traversed from left to right row by row. On data entry screens, labels for fields whose values can be modified are displayed in upper case; those that can not are in initial caps. The database is updated every time a field's value changes, and a record of that change is written to a transaction log. The System Reference Manual describes how to use XRP-II's menus and screens.

Most data entry screens have a form and a table view. Form views offer full screen layouts of a data record's fields, whereas table views offer rows of records in a window that is panned to see columns of fields. System limitations, however, preclude all Baseline Manager form view fields from being displayed in table view.

Numerous functions can be performed at data entry screens. Commands available to an operator are screen-dependent and are listed near the bottom of each screen (hence their name: bottom-line commands). The More command helps the operator cycle through them. Most bottom-line functions are described in the System Reference Manual and Product Information Manual. Any that were added for Baseline Manager are described in the sections below along with the screens to which they pertain.

It is important to note that the UNIFY database management system that XRP-II uses does not support rules requiring entries in specific fields. Baseline Manager attempts some enforcement via the data entry screens, either by establishing default values where feasible when new records are created, or by blocking an operator from cursoring past a null field when in Add, Insert, or Modify modes. However, database updates can occur in ways that bypass these mechanisms. Operators must take care to enter all data needed for generating reports and for producing configuration profiles for resource planners.

To invoke XRP-II, double-click on its icon on the ECS Desktop. This executes a script named "pcs" which determines the operator's terminal type from the environment, prompts for a terminal id, and establishes a Baseline Manger operating environment. The script then starts XRP-II, passing it the operator's userid which it obtains from the system.

The first screen¹ an operator sees upon logging onto² XRP-II varies depending on the entry menu and screen group assigned to the operator. These assignments are made in the "users" configuration file described in section D.5 of the System Reference Manual. The assignments are made by groups of allocated tasks and functions that are controlled by the CM Administrator

¹ By convention, XRP-II uses the term "screen" when referring to a window containing a Datalook data entry form or table. Other windows, like the one described here, are called "menus", navigation paths to screens.

² An ECS customization bypasses XRP-II's standard login screen, normally the first screen an XRP-II system user would see.

as explained in Table 9.9.1-2, Section 9.9.2.12 *Edit Groups File*, and Section 9.9.3 *Tunable Parameters*.

All XRP-II menus are similar in appearance and function the same way. Only the titles and selections vary. See the System Reference Manual for details on using the menus and screens.

9.9.2.2 Cataloging the Control Items

Data about one or more control items can be added, modified, or deleted by selecting an appropriate data entry screen from the Control Item Master menu. These screens modify the master file (or catalog) that describes control items individually. Each screen accesses a particular set of records and contains a unique set of fields corresponding to a control item's class. However, all screens function the same and all but one have identical bottom-line commands.

Control item master screens are Baseline Manager equivalents of the Part Master Maintenance screen described in section 3.4 of the Product Information Manual. Their fields are tailored for baseline management and the following bottom-line commands are added:

- Bom - navigates the operator to a Multilevel Bill of Materials Query screen for the current item. There, an operator can examine the historical record of first-level components for the item, then exit back to the All Control Items screen.
- Where - navigates the operator to a Multilevel Where-Used Query screen for the current control item. There, an operator can determine where the item (or any other item) is used in any bill of material, then exit back to the All Control Items screen.
- Ec - navigates the operator to an Engineering Change Query screen for the current item, where an operator can view each historical engineering change recorded for the item.

The screens neither set item effectivity dates nor link items to baseline records. Therefore, operators can add or modify control item data anytime a new item is established or whenever details about a previously recorded control item change, without affecting any bills of materials. Operators cannot use these screens to delete an item if the item is a component in another's bill. In this case, the Data Delete system utility must be used instead (see Section 9.9.2.12).

Most fields in a control item's master record are for information only. However, the following play a role in XRP-II processing.

- Control item identifier - Every item in the catalog has its own record and must have a unique identifier. By convention, core and site-specific control items are assigned numerical designators; site-unique control items (those established by a site) are given a 3-character site prefix. XRP-II relies on this differentiation when synchronizing site baseline changes with the database at the SMC (see Section 4.3.3.4 *Special Constraints*).
- Item class - as previously mentioned, the class to which a control item is assigned determines the set of characteristics or details that can be recorded about the item and the screens to be used to update and view the data.

- Planning resource - items marked as planning resources will be reported when Baseline Manager receives requests from resource planners for resource configuration data.
- Config Article - items marked as configuration articles form the basis for several custom ECS reports, including the Configured Articles List and the Version Description Report.
- Deployment - deployment data recorded for a control item influences:
 - a) the contents of several ECS custom reports which use deployment site data for selecting and ordering data;
 - b) resource configuration data generated for resource planners, which is generated for operational baselines whose implementation status is “production”

The subsections below describes the screens and corresponding fields.

9.9.2.2.1 All Control Items Screen

The All Control Items screen adds, modifies, and deletes general identification information about individual control items. It accesses every control item record, but does not contain fields describing an item’s detailed characteristics. Details are handled by class-specific data entry screens described in Sections 9.9.2.2.2 thru 9.9.2.2.6.

Fields on this screen serve as a template for all control item master screens, and are described in Table 9.9.1-3. The following bottom-line command, however, is unique to this screen:

- **.Details** - navigates the operator to a control item update screen where details can be recorded about the current control item record.

Use bottom-line commands such as Select, Find, Next, and Prior to locate a record, and use Add, Insert, Modify, and Delete to enter update mode. Then edit the catalog via the keyboard, or use the Zoom command (on fields where it is active) to pick values from a list. Use Copypart to create a new item with data values from an existing one. When finished, exit database update mode. Then either proceed to other records or exit the screen.

Table 9.9.1-3. All Control Items Field Description (1 of 3)

Field Name	Data Type	Size	Entry	Description
control item id	string	20	required	Unique code for a version- or configuration-controlled item
name/ doc #	string	24	optional	Name by which a specific item, engineer, or vendor is known
description/title	string	54	optional	Textual characterization of an entity
mnemonic	string	8	optional	Code (or short name) by which item is referenced (e.g., MLCI)

Table 9.9.1-3. All Control Items Field Description (2 of 3)

item class	string	16		Group name for control items having common attribute types (software, software, design, document, host, network, site, baseline, partition, project, ...)
item subclass	string	16	optional	Group name that distinguishes among types of control items within a class
model/version	string	24	optional	Textual identifier for a level of functional capability for a control item
pred item	string	20	optional	Identifier of the previous version of a control item
current revision	string	3	(system supplied)	Identifier for the currently-active revision level of the item's product structure
highest revision	string	3	(system supplied)	Identifier for a control item's latest product structure revision
config article	string	1	Y, N	Code for distinguishing between control items that are configured articles and those that are not
planning resource	string	1	Y, N	Code for distinguishing between control items that are reportable for PDPS resource planning and those that are not
scope	string	1	optional ; c, s, u	Code indicating whether an item is core, site-specific or site-unique
deployment	N/A		“optional; zoom to list of deployment records	Link to the deployment table containing the list of sites to which a control item is deployed together with the installation date and implementation status of the control item at each site

Table 9.9.1-3. All Control Items Field Description (3 of 3)

mfr/dev	string	3		Coded name of the company/organization that produced a hardware control item
resp engineer	string	6	optional; zoom to list of engineers	Link to the name, address, and phone number of an item's responsible engineer or organization
commodity code	string	8	optional	Classification for how the item was produced or obtained (COTS, custom, mod-COTS, GFE, shareware, freeware, other)
site	string	6	optional	Code for the site where the control item record was created
project	string	10	optional; defaults to "ECS"	Name of the principal project under which the item was procured or developed
comment	string	60	optional	Miscellaneous information specific to the control item
code	string	2	optional	Identifier for a type or category of message that can be associated with a control item
note	string	30	optional	A message, used in conjunction with a code, that can be associated with a control item

9.9.2.2.2 Hardware Items Only Screen

The Hardware Items Only screen adds, modifies, and deletes information that identifies and characterizes hardware control items. These would typically be processor units, tape drives, disk systems, CD-ROM drives, and other similar system and network equipment. Only those catalog records whose Item Class field contains the value "hardware" are accessed.

Fields that identify a control item are the same as discussed in Section 9.9.2.2.1. Fields that store the detailed characteristics applicable only to hardware items are described in Table 9.9.2.2-1.

Use this screen the same way as described earlier for the All Control Items screen.

Table 9.9.2.2-1. Hardware Items Only Field Description

Field Name	Data Type	Size	Entry	Description
mfr	string	6	<ul style="list-style-type: none"> • optional • zoom to list of manufacturers and developers 	Coded name of the company/ organization that produced a hardware control item
capacity/size	string	10	optional	Total capacity (e.g. storage) for a control item
format	string	10	optional	Classification that distinguishes hardware control items according to some technical specification
max exp slots	numeric	4	optional	Number of expansion slots an item contains
total ports	numeric	8	optional	Number of ports (e.g., serial ports, network connections) a control item has
io protocols	string	60	optional	List of protocols a hardware control item supports
install inst	text	N/A	optional	Text containing/ specifying where to find instructions for installing the control item

9.9.2.2.3 Software Items Only Screen

The Software Items Only screen adds, modifies, and deletes information that identifies and characterizes software control items. These would typically be application clients, application servers, databases, and patches whether custom or COTS. It accesses only those catalog records whose Item Class field contains the value “software”.

Fields that identify a control item are the same as discussed in Section 9.9.2.2.1. Fields that store the detailed characteristics applicable only to software items are described in Table 9.9.2.2-2.

Use this screen the same way as described earlier for the All Control Items screen.

Note: The installation instructions field is a text field. Text fields can only be displayed in a text box window activated via the Zoom bottom-line command. A “T” at the field indicates data exists in the text box.

Table 9.9.2.2-2. Items Only Field Description

Field Name	Data Type	Size	Entry	Description
variant	string	4	optional	Name of the type of computer on which a software control item has been built to run
tcp/udp port	numeric	8	optional	Numeric identifier of port used for communicating with control item
principal dir	string	50	optional	Pathname(s) at which the item is stored
license type	string	10	optional	Method by which software licenses are assigned (floating, user, machine, site...)
total licenses	numeric	4	optional	Number of seats, computers, or persons authorized to use a COTS application concurrently
install inst	text	N/A	optional	Text containing, or specifying where to find, instructions for installing the control item

9.9.2.2.4 Document Items Only Screen

The Document Items Only screen adds, modifies, and deletes information that identifies and characterizes baselined documents, such as specifications, manuals, and version-controlled forms. The screen accesses only catalog records whose Item Class field contains the value “document”.

Fields that identify a control item are the same as discussed in Section 9.9.2.2.1. Fields that store the detailed characteristics applicable only to document items are described in Table 9.9.2.2-3.

Use this screen the same way as described earlier for the All Control Items screen.

Table 9.9.2.2-3. Document Items Only Field Description

Field Name	Data Type	Size	Entry	Description
title	string	54	optional	Nomenclature used to identify document volumes
document number	string	24	optional	Code by which a document is known
publisher	string	3	optional	Coded name of the company/organization that authored a document control item
publ date	date	N/A	optional	Date associated with a document
latest chg notice	string	6	optional	The most recent change notice or the list of change notices issued for a document
issue	string	8	optional	Nomenclature used to distinguish among versions of a single edition of a document (e.g., draft, final, ...)
refs	N/A		<ul style="list-style-type: none"> • optional • zoom to list of related control items 	List of other, associated control items

9.9.2.2.5 Host Items Only Screen

The Host Items Only screen adds, modifies, and deletes information that identifies and characterizes control items that are system hosts. These would be assemblies of processors, software and peripherals such as fully configured servers and workstations, but may include other network-addressable resources for which the data fields on this screen are suited, including routers and switches. The screen accesses only those catalog records whose Item Class field contains the value “host”.

Fields that identify a control item are the same as discussed in Section 9.9.2.2.1. Fields that store the detailed characteristics applicable only to host items are described in Table 9.9.2.2-4.

Use this screen the same way as described earlier for the All Control Items screen.

Table 9.9.2.2-4. Host Items Only Field Description

Field Name	Data Type	Size	Entry	Description
DNS name/host id	string	24	optional	Local name by which the host is accessed; its Domain Name System name
# cpu's	numeric	4	optional	Number of CPUs in a control item
processor id	string	20	optional	Vendor-provided name for a family of processors
total ram	numeric	4	optional	Amount of main memory (in MB) the item contains
# logical disks	numeric	8	optional	Number of logical disk partitions in the bill of materials for a host
swap cache	numeric	8	optional	Total swap space (in blocks) allocated on a host
disk cache	numeric	8	optional	Total disk cache (in blocks) for a host
MAC address	string	17	optional	Machine's Media Access Control number
IP address	string	15	optional	Network address for a host
IO ports	string	60	optional	List of ports and associated services on a host
install inst	text	N/A	optional	Text containing, or specifying where to find, instructions for installing the control item

9.9.2.2.6 Partition Items Only Screen

The Partition Items Only screen adds, modifies, and deletes information that identifies and characterizes boot and data disk partitions associated with a host computer. It accesses only those catalog records whose Item Class field contains the value “partition”.

Fields that identify a control item are the same as discussed in Section 9.9.2.2.1. Fields that store the detailed characteristics applicable only to disk partition items are described in Table 9.9.2.2-5.

Use this screen the same way as described earlier for the All Control Items screen.

Table 9.9.2.2.-5. Partition Items Only Field Description

Field Name	Data Type	Size	Entry	Description
directory name	string	50	optional	Logical name used to access a device
device name	string	32	optional	Physical name used by a machine to access the device
logical allocation	string	32	optional; usually either "system" or "user"	Classification that distinguishes between disk partitions used by the system and those available for use by applications
block size	numeric	4	optional	Size of a block (in bytes) on a device
install inst	text	N/A	optional	Text containing, or specifying where to find, instructions for installing the control item

9.9.2.3 Define/Update What Comprises Baselines and Other Control Item Assemblies

Baselines are control items containing various components, each of which is itself another control item. Accordingly, baselines are sets of control items and can be thought of as assemblies.

XRP-II uses product structure records to describe assemblies. Each such record defines a single parent-component control item pair and contains data pertinent to the pairing, such as its effective dates and the quantity of the component needed to form the parent.

Product structure records are the basis for XRP-II's bill of material processing. They are used to generate most ECS reports, to extract data for resource planning, and to select control item records to distribute when a baseline change is released. Once the component structure of a baseline (or other configuration assembly) has been recorded, operators can generate multilevel bill of material reports to determine what comprised the baseline on any given date.

Control items and their product structure records are associated with engineering change notices (ECNs) in order to implement engineering change control. An engineering change notice is an XRP-II construct that defines for an item the addition of a new first-level component or a change in component quantity, unit of measure, or effective dates. Control items can be affected by more than one engineering change, and an engineering change can encompass more than one assembly. Operators can assign a revision code to a control item that undergoes a product structure change which doesn't affect its form, fit, or function. (This is not the same as an item's version code, which operators assign when an item's form, fit, or function does change.)

Operators also assign a configuration change request and/or trouble ticket number for the ECN in order to document the basis for implementing the change. Engineering changes can be recorded in Baseline Manager at any time, but they must be marked “approved” before any effective dates can be recorded.

The four data entry screens operators use to maintain product structure data are each accessed from the Bill of Material menu which lists

- Engineering Change Entry,
- Engineering Change Approval,
- Product Structure Maintenance, and
- Replace a Component in all Bills.

The first two screens are discussed in the subsections below. The last two are fully described in section 4.4 of the Product Information Manual.

9.9.2.3.1 Engineering Change Entry Screen

Operators use the Engineering Change Entry screen whenever an engineering change for a control item is to be defined or modified. The screen is similar to the Engineering Change Maintenance screen described in the Product Information Manual. Differences are:

- Fields Project, CCR #, TT, Baseline/Release and Approval Date appear in lieu of certain other fields not pertaining to baseline management. Each is an information only field. These fields are described in Table 9.9-9.
- Neither the approval code nor active and inactive dates can be updated from this screen; an Engineering Change Approval screen is used instead (see Section 9.9.2.3.2). This allows operators to record new product structure data without setting an effective date or causing premature adjustments to existing bills of material. Both active and inactive dates are automatically set to the latest system date: Jan 5, 2072.
- The Items command can be used irrespective of the approval code’s value.

Enter information about the change using Table 9.9.2.3-1 as a guide, then use the Items command to modify the list of components in the parent control item’s product structure. The Items page is the same as that described in Section 4.3 of the Product Information Manual, but without the “offset” field which is not used in Baseline Manager. Be sure to enter an appropriate quantity for each component. Components having zero quantity will not appear in their parent’s bill of materials.

Table 9.9.2.3-1. Engineering Change Entry Field Description

Field Name	Data Type	Size	Entry	Description
parent part	string	20	required; zoom to a list of control items	Identifier of the control item associated with the engineering change
engineering change	string	8	required	Number that uniquely identifies every product structure change action
description	string	54	system supplied	Textual characterization of an entity
project	string	10	optional; defaults to "ECS"	Name of the principal project under which the item was procured or developed
date entered	date		system supplied	Date that the ECN was created
operator id	string		system supplied	Identifier of the operator who created the ECN
approval date	date	N/A	system supplied	Date an engineering change is formally sanctioned by an approval authority
approval code	string	1	system supplied; defaults to "E" for entered	Code that distinguishes among lifecycle stages for engineering changes; must be "A" (approved) for active date to be set
ccr #	string	30	optional	Reference to the CCR authorizing the configuration change
tt	string	15	optional	Reference to the trouble ticket authorizing the configuration change
sort order	string	1	optional ; P, R, or S	Code that specifies how component parts are to be sorted on an engineering change screen's items page
drawing	string	20	optional	Control item identifier of a drawing associated with a control item and engineering change
revision	string	3	optional	Change level for a control item that has undergone a product structure change
implementation code	string	2	optional	Code that distinguishes between permanent and temporary changes
baseline/ release	string	3	optional	Name, version, description, or identifier of a baseline with which an engineering change is associated
active date	date		system supplied (Jan 5, 2072)	Date on which a product structure relationship between two control items is effective
inactive date	date		system supplied (Jan 5, 2072)	Date on which the subject product structure is to be obsoleted or superceded

9.9.2.3.2 Engineering Change Approval Screen

Operators use the Engineering Change Approval screen whenever the approval status of an engineering change is to be modified. This screen is the same as the Engineering Change Entry screen, except that it can modify the approval code and date. Follow the field definitions in Table 9.9.2.3-2 for data entries. Changing the approval code to “A” for approved enables active and inactive date fields, allowing operators to set effectivity dates for new product structures.

Enter the new approval code and optional approval date, then add an active and inactive date. These active and inactive entries are used as defaults by the Items page when adding records to the parent’s component list. The Copy_dates bottom-line function can be used to propagate active and inactive dates to component items already in the list.

Table 9.9.2.3-2. Engineering Change Approval Field Description (1 of 2)

Field Name	Data Type	Size	Entry	Description
parent part	string	20	required	Identifier of the control item associated with the engineering change
engineering change	string	8	required	Number that uniquely identifies every product structure change action
description	string	54	system supplied	Textual characterization of an entity
project	string	10	optional	Name of the principal project under which the item was procured or developed
date entered	date	N/A	system supplied	Date that the ECN was created
operator id	string	8	system supplied	Identifier of the operator who created the ECN
approval date	date		optional	Date an engineering change is formally sanctioned by an approval authority
approval code	string	1	optional; default is “E” (entered)	Code that distinguishes among lifecycle stages for engineering changes; must be “A” (approved) for active date to be set
ccr #	string	30	optional	Reference to the CCR authorizing the configuration change
tt	string	15	optional	Reference to the trouble ticket authorizing the configuration change

Table 9.9.2.3-2. Engineering Change Approval Field Description (2 of 2)

Field Name	Data Type	Size	Entry	Description
sort order	string	1	P, R, or S	Code that specifies how component parts are to be sorted on an engineering change screen's items page
drawing	string	20	optional	Control item identifier of a drawing associated with a control item and engineering change
revision	string	3	optional	Change level for a control item that has undergone a product structure change
implementation code	string	2	optional	Code that distinguishes between permanent and temporary changes
baseline/release	string	3	optional	Name, version, description, or identifier of a baseline with which an engineering change is associated
active date	date	N/A	optional; default is latest system date (Jan 5, 2072)	Date on which a product structure relationship between two control items is effective
inactive date	date	N/A	optional; default is latest system date (Jan 5, 2072)	Date on which the subject product structure is to be obsoleted or superceded

9.9.2.4 Distribute Baseline Change Records for a Release

Appropriate baseline management data can be distributed to affected sites whenever a new baseline, configuration item, or other control item is released. This data includes control item catalog, product structures, engineering changes, and deployment records pertaining to the control item being released and all the items in its bill of materials.

Operators use the Export Release Records utility to generate and tar formatted files that can be shipped to any ECS site for loading into XRP-II there. The program is accessed via the System Utilities menu and is described in Section 9.9.2.12.

9.9.2.5 Incorporate Release Records at a Site/ SMC

Occasionally, bulk Baseline Manager data must be loaded into XRP-II. The data, stored as a tar file, is usually received in support of a new release being distributed or a consolidation of site baseline changes at the SMC.

Operators load this data using XRP-II's Import Data utility. This program is accessed via the System Utilities menu and is described in Section 9.9.2.12.

9.9.2.6 Provide Site Baseline Change Records to the SMC

The Baseline Manager at the SMC can maintain consolidated records about operational baselines system-wide. Records created at local sites are shipped to the SMC where they are added to records centrally created at the SMC. To distinguish among them, centrally-created records begin with a number, while records originating at a site have a 3-character site prefix.

Baseline Manager supports this cross-site database synchronization with a transaction log and a program accessed via the System Utilities menu. XRP-II automatically logs a transaction whenever the contents of a Baseline Manager field changes. Operators at the sites periodically use the Export Site-Unique Changes utility to generate a formatted data file based on transactions logged but not previously reported. Operators can have XRP-II ftp the file to the SMC where SMC operators can load the data into the Baseline Manager there. Details about the transaction log and the Export Site-Unique Changes utility can be found in the discussions about system utilities within Section 9.9.2.12.

9.9.2.7 Maintain Control Item Deployment Data

Baseline Manager can maintain status information about the implementation of control items. For each item, an operator can create a record for a site and specify its implementation status and installation date. Deployment records about enterprise control items would normally be maintained at the SMC and distributed whenever a set of release records is shipped to the sites. The implementation status of these items is maintained at the sites as are like records about site-unique control items (those establish the sites). Status updates for the site-unique control items are shipped to the SMC whenever site-unique changes are reported (see Sections 9.9.2.6 and 9.9.2.12 (13) Export Site-Unique Changes Screen). Site updates to enterprise control item records remain at the sites so that SMC deployment data is preserved.

Operators must maintain deployment records because several Baseline Manager functions depend on them. For example, any report which lists control items according to site is generated using the deployment records to determine the site(s) under which the item should appear. This includes the Configuration Item List reports, the Configured Article List report, and the Version Description report. Also, the resource configuration file created for resource planners is built using these records to determine which of the site's operational baseline records has "production" status.

Operators use the Implementation Status Maintenance data entry screen to create and update records. This screen can be accessed via both the Utilities and System Utilities menus. The data entry screen is described in Section 9.9.2.11 (3) *Deployment Maintenance*.

9.9.2.8 Update Dependencies Among Control Items

Individual control items can have relationships -- or interdependencies -- among each other that need to be tracked. For example, application software needs certain operating system versions in

order to function correctly, specification documents are associated with specific subsystems and configuration items, certain manuals describe particular configured articles, and each operational baseline derives from a specific release baseline.

XRP-II correlates interdependent pairs of control items via the Control Item Interdependency Maintenance screen. The screen is accessible from the Utilities menu and is described along with other baseline management utilities within Section 9.9.2.11.

9.9.2.9 Query Control Item Records

Operators granted read only permissions to Baseline Manager can retrieve, sort, filter and generate ad hoc reports of XRP-II database records using eight query screens all control items, hardware items, software items, document items, product structure, host items, partition items, and engineering change which are accessed from the Query menu. The six “items” screens closely mirror data base update screens described in Section 9.9.2.2, with an added field to display an item’s local implementation status. The menu also has two screens for querying product structure and engineering change records, respectively.

Use the Control Items Query screen to browse the entire control item catalog minus its configuration details. To view full configuration details, use the individual query screens designed specially for hardware, software, document, host, and disk partition items.

Use the Product Structure Query screen to browse historical product structure records and display information about any parent-component control item pair. This is helpful, for example, when trying to determine why a control item is not appearing in a bill of materials as expected. Descriptions of this screen’s fields can be found in section 4 of the Product Information Manual.

Use the Engineering Change Query screen to browse the chronology of changes to a particular control item and examine which control items were affected by each engineering change. Refer to Section 4 of the Product Information Manual and Section 9.9.2.3.1 above for descriptions of the screen’s fields.

9.9.2.10 Generate Pre-defined Reports

XRP-II produces several reports specifically tailored to support ECS configuration management activities. All contain information derived from records stored only in the XRP-II database on the host where the report is requested. Reports are written to the default printer in effect via the operator’s environment settings when XRP-II is started, unless XRP-II has been configured to recognize specific print device destinations (see Section 9.9.2.12 (7) Edit Printers File Screen).

Some reports accept a range of control items on which to report. Ranges are specified the same way as when using the Select and Find bottom-line commands on data entry screens. Section 3.4.5 in the System Reference Manual explains how to enter range selection specifications.

All pre-defined reports available to the operator are accessed via XRP-II’s Report menu of screens which includes selections for

- (1) **Multi-Level Bill Reports** - defined in Section 6.5 of the XRP-II Product Information Manual.
- (2) **Summarized Bill Reports**- defined in Section 6.6 of the XRP-II Product Information Manual.
- (3) **Multi-Level Where Used Reports**- defined in Section 6.7 of the XRP-II Product Information Manual.
- (4) **Configuration Items List - One**: Table 9.9.2.10-1 describes the screen's fields.

Specify a site or range of sites, a date for the configuration, and the number of copies of the report wanted. Then enter "E" for execute. XRP-II will report all ECS configuration items active and deployed at the specified sites as of the specified date.

**Table 9.9.2.10-1. Configuration Items List - One Menu Screen
Field Description**

Field Name	Data Type	Size	Entry	Description
site or range	string	16	required; zoom to select from a list of sites	Short name for an ECS site
date of configuration	date	N/A	required	"As of " date used in selecting records from the configuration history of the site(s)
note	string	40	optional	Textual information to be added to the header of the report
configuration items list-1	numeric	2	required	Number of copies wanted

- (5) **Configuration Items List - Two**: Operators use this report to produce a list of ECS configuration item components - both hardware and software - grouped by subsystem and configuration item. Table 9.9.2.10-1 above describes the screen's fields.

Specify a site or range of sites, a date for the configuration, and the number of copies of the report wanted. Then enter "E" for execute. XRP-II will report all ECS design components active and deployed at the specified sites as of the specified date.

- (6) **Configured Articles List**: This report generates a list of the approved set of ECS configured articles in effect on a specified date at a specified site or sites, grouping the articles by parent configuration item. Table 9.9.2.10-1 above describes the menu screen's fields.

Specify a site or range of sites, a date for the configuration, and the number of copies of the report wanted. Then enter "E" for execute. XRP-II will report all active ECS configured articles for the specified sites as of the specified date.

(7) Version Description Reports: The Version Description Reports are used to generate a summarized bill of the approved set of ECS version controlled configured articles for a specified configuration item, subsystem, or release. Table 9.9.2.10-1 above describes the screen's fields.

Specify a site or range of sites, a date for the configuration, and the number of copies of the report wanted. Then enter "E" for execute. XRP-II will report all active ECS configured articles for the specified sites as of the specified date.

(8) Site Baseline Report: Operators use the Site Baseline Report to produce an indented bill of materials that lists what comprises one or more sites' operational baselines down to the configured article level. The screen works the same as the multilevel bill screen described in section 6.5 of the Product Information Manual, except it rejects identifiers for items that are not members of class "baseline".

Specify the identifier of the baseline control item and date of bill, then set the remaining parameters for the report. Enter "E" for execute. XRP-II will report all ECS configured articles active and deployed as part of the specified baseline.

(9) Change History: The Change History report generates a list containing the revision history of an ECS control item. Table 9.9.2.10-2 describes the screen's fields.

Specify the control item's identifier, then enter "E" for execute. XRP-II will report all versions and product structure revisions for the specified item together with details associated with the item change.

Table 9.9.2.10-2. Change History Field Description

Field Name	Data Type	Size	Entry	Description
control item id	string	20	required; zoom to select from a list of control items	Unique code for a version- or configuration-controlled item
note	string	40	optional	Textual information to be added to the header of the report
change history report	numeric	2	required	Number of copies wanted

(10) BOM Comparison Reports: The BOM Comparison Reports menu screen generates a list of the differences in the bills of material for any two control items. Operators use it, for example, to determine how approved operational baselines at two sites differ. Table 9.9.2.10-3 describes the screen's fields.

Specify identifiers for the two control items whose bills are to be compared. Next, indicate a bill of materials date for the comparison and the number of report copies wanted. Then enter "E" for execute, and XRP-II will produce a four-part report. For

each of the two control items, XRP-II will first list all the control items that are in its bill and in the other's, then all the control items in its bill that are not in the other's.

Table 9.9.2.10-3. BOM Comparison Reports Field Description

Field Name	Data Type	Size	Entry	Description
control item id	string	20	required; zoom to select from a list of control items	Unique code for a version- or configuration-controlled item
date of bill	date		required	"As of " date used in selecting records from the configuration history of the control item
note	string	40	optional	Textual information to be added to the header of the report
bom comparison reports	numeric	2	required	Number of copies wanted

Screens for generating Multilevel Bill, Summarized Bill, and Multilevel Where Used Reports are fully described in Sections 6.5, 6.7, and 6.9 of the Product Information Manual. Section 9.9.8 contains sample reports.

9.9.2.11 Perform Baseline Management Master Files Maintenance

XRP-II groups together several programs that help standardize values for certain baseline management data, support product structure administration, and manage types of data for which a separate menu is not warranted. The screens supporting these programs are accessed via the Utilities menu.

The Unit of Measure Maintenance screen maintains codes and descriptions for Baseline Manager's units of measure. These codes are used on bill of material data entry screens, which can access them via "zoom" command to facilitate data entry and promote data consistency. The screen is described in section 3.2 of the Product Information Manual.

The Unit of Measure Conversion screen maintains factors used for converting between units of measure. This standard XRP-II capability, not used by Baseline Manager, is retained for use with inventory, logistics, and maintenance management functions scheduled for delivery in Release B. It is described in section 3.3 of the Product Information Manual.

The Control Item Date Maintenance screen supports a utility that is functionally equivalent to the Part Master Date Maintenance utility described in section 4 of the Product Information Manual. It cycles through product structure and product history files, determining the earliest and latest dates on which each control item is employed as a parent or component, and updates the active and inactive dates in the control item records accordingly. This utility should be run periodically

(perhaps monthly), but need only be run if any product structures have been (or may have been) deleted, or if the bill of material screen “Replace a Component in All Bills” has been used. This utility is described in section 7.2 of the Product Information Manual.

The items that follow provide details for the Baseline Manager Utility menu’s screens not discussed above

(1) Vendor Master Maintenance Screen: This screen maintains a list of companies in order to facilitate entering manufacturer and developer codes for control items and promote data consistency across control item records. An operator updating the control item catalog can select manufacturer/developer codes from this list via the “zoom” command on control item master screens.

Use this screen to update the list of manufacturers or developers. Table 9.9.2.11-1 describes its data entry fields.

Table 9.9.2.11-1. Vendor Master Maintenance Field Description

Field Name	Data Type	Size	Entry	Description
vendor id	string	6	required	Coded name of the company/organization that produced a control item
name	string	30	optional	Name by which a specific manufacturer or developer is known
qualification code	string	1	optional	Code that distinguishes vendors according to status as a source for a control item

(2) Control Item Interdependency Maintenance Screen: This screen maintains information about dependencies between any two control items. Any control item pair can have multiple dependency relationships; however, each of the control items must exist in the control item catalog. Dependency types are operator-specified and non-constrained. Baseline Manager does not maintain an on-line chronological history of dependencies or dependency changes for a control item, but records can be both downloaded and printed so they can be saved for historical purposes.

Use this screen to add, delete, modify, or browse dependency records. The table view is particularly well-suited for displaying lists of all dependencies associated with a given control item. Placing the cursor on either of the control items activates the bottom-line commands “Where” and “Bom”. Use the “Where” command to view product structure records in which the control item is a component in some other item’s bill. Use the “Bom” command to view product structure records in which the control item is a parent with a bill containing other control items.

This screen’s fields are described in Table 9.9.2.11-2.

**Table 9.9.2.11-2. Control Item Interdependency Maintenance
Field Description**

Field Name	Data Type	Size	Entry	Description
item one	string	20	required; zoom to select from control items list	Unique code for a version- or configuration-controlled item (normally, a control item id) that is the subject of the dependency relationship.
name	string	24	system supplied	Name by which a specific item, engineer, or vendor is known
description	string	54	system supplied	Textual characterization of an entity
version	string	24	system supplied	Textual identifier for a level of functional capability for a control item
revision	string	3	system supplied	Identifier for the currently-active revision level of the item's product structure
dependency type	string	20	required	Code or nomenclature describing the relationship between two control items
item two	string	20	required; zoom to select from control items list	Unique code for a version- or configuration-controlled item (normally, a control item id) that is the object of the dependency relationship

(3) Control Item Deployment Maintenance Screen: This screen maintains information about the deployment and implementation of control items system-wide. One record can be created for each control item for each site. The control item must exist in the control item catalog, and the site must exist in the site list (see Section 9.9.12 (8) *Site Master Maintenance Screen*). Baseline Manager does not maintain a chronological history of deployment data or deployment data changes for a control item or a site.

Use this screen to maintain and browse all control item deployment records. Use the table view to display comprehensive lists of the sites to which a control item is (being) deployed and of the control items (being) deployed to a site.

Note: The field “Implementation Status” has special significance in extracting resource profiles for resource planners. Control records are selected only if the items they describe are in the bill of materials of site operational baselines whose implementation status is “production”.

Table 9.9.2.11-3. Control Item Deployment Maintenance Field Description

Field Name	Data Type	Size	Entry	Description
control item id	string	20	required; zoom to select from control items list	Unique code for a version- or configuration-controlled item
site	string	6	required; zoom to select from a list of sites	Mnemonic or short name for an ECS site
installation date	date	N/A	optional	Designated date a control item is to be or was installed at a site
implementatio n status	string	20	optional;	Classification of a control item according to operational life cycle state (e.g., projected, installed, production, inactive, maintenance, and test

(4) Low Level Code Maintenance Screen: This utility is equivalent to the Low Level Code Maintenance utility described in section 4 of the Product Information Manual, except options are available for specifying a subset of records to process. It regenerates low level codes maintained in the control item file by the system logic for its own use (see section 4.2 of the Product Information Manual). These codes affect the efficiency of certain XRP-II processing. They also appear in the headers of bill of material and where used reports to identify the deepest level at which a subject control item is found in any recorded product structure tree.

This utility should be run periodically (perhaps monthly), but need only be run if any product structure records have been (or may have been) deleted. The screen explains options provided to operators.

(5) Responsible Engineer Maintenance Screen: This screen maintains data about individuals in order to facilitate identifying points of contact for individual control items. An operator updating the control item catalog can select a code for an engineer from this list via the “zoom” command on control item master screens.

Use this screen to update the list of responsible engineers for control items. Table 9.9-17 describes its data entry fields.

Table 9.9.2.11-4. Responsible Engineer Field Description

Field Name	Data Type	Size	Entry	Description
engineer	string	6	required	Organization or task code assigned to an engineer assigned responsibility for a control item
name	string	30	optional	Name of the responsible engineer
address	string	30	optional	Street address where the responsible engineer is located
city	string	20	optional	Name of the city in which the responsible engineer is located
state	string	2	optional	Name of the state in which the responsible engineer is located
zip	string	10	optional	Postal code where the responsible engineer is located
phone	string	8	optional	Phone number for the responsible engineer

(6) Serial Numbers Maintenance Screen: The Serial Numbers Maintenance screen maintains a list of ECS-issued serial numbers or other inventory-related identifier numbers indexed to control items, providing a rudimentary inventory tracking mechanism. The same serial/inventory number can be used in multiple records, one for each control item associated with it.. Similarly, a control item identifier can be used in multiple records, one for each serial number associated with it. Multiple records for a serial- or inventory- control item pair can also be maintained so item movements can be tracked by date. The fields for this screen are described in Table 9.9.2.11-5.

Table 9.9.2.11-5. Serial Numbers Maintenance Field Description

Field Name	Data Type	Size	Entry	Description
serial number	string	12	required	Identifier for a control item unit produced or deployed
control item id	string	20	optional; zoom to select from control item list	Unique code for a version- or configuration-controlled item
date	date	N/A	optional	Date of transaction
site	string	6	optional	Mnemonic or short name for an ECS site

9.9.2.12 Perform XRP-II Master Files Maintenance

XRP-II groups together several programs that help standardize values for all of XRP-II and support system administration functions such as user access control and inter-site data exchange. The screens supporting these programs are accessed via the System Utilities menu. The Note Code Maintenance, Data Delete Utility, and Shop Calendar Utility are fully described in the System Reference Manual. The remaining utilities are discussed in the items that follow.

(1) System Parameter Maintenance Screen: This screen maintains system-wide, XRP-II parameters and is principally used when first installing the system. Since Baseline Manager uses only a subset of the full XRP-II capabilities, this is a scaled down version of the screen described in section 6 of the System Reference Manual. It contains only the fields needed to tailor the system to the site at which it operates as summarized in Table 9.9.2.12-1.

The system parameter key is the key field of the system parameter file. The value “A” designates the active record, which is set when the database is created and must always be present in order for XRP-II to function.

In the site identifier field, enter the code for the ECS site where the copy of XRP-II that the operator is using is installed. This data is used primarily in report headers and file names that XRP-II creates.

In the last control item identifier field, enter a value XRP-II is to use in determining the next available identifier when an operator requests a default for a new item being added or inserted in the control item catalog. The value must end in a numeral, which XRP-II automatically increments. This identifier should always have the site’s designated prefix: the first three characters of the site identifier.

Table 9.9.2.12-1. System Parameters Maintenance Field Description

Field Name	Data Type	Size	Entry	Description
system parameter key	string	1	required	Code that designates the active record in XRP-II’s system parameter table
site	string	6	optional; zoom to select from a list of sites	Mnemonic or short name for an ECS site
last control item id	string	20	optional	Unique code for a version- or configuration-controlled item

(2) Transaction Log Screen: This screen allows operators to browse, and maintain if necessary, the database transaction log file. All fields in this file as described in Table 9.9.2.12-2, are system supplied. When a transaction is processed, the system provides the next available transaction number and records sufficient information to determine when any field was modified and by whom.

The log is an essential element in coordinating database changes among sites. The Export DAAC-Unique Changes utility analyzes the transactions to determine the database records that have been modified but not yet exported for transfer. It also sets the Transferred flag so the transaction can be bypassed next time the utility runs.

Table 9.9.2.12-2. Transaction Log Field Description

Field Name	Data Type	Size	Entry	Description
transaction key	numeric	5	system supplied	Number that uniquely identifies each update transaction
field number	numeric	8	system supplied	Identifier for the XRP-II field affected by the transaction
table name	string	10	system supplied	Name of the XRP-II table affected by the update transaction
operator id	string	8	system supplied	Userid of the operator making the update transaction
date	date	N/A	system supplied	Date of the update transaction
time	time	N/A	system supplied	Time of the update transaction
transaction type	string	1	system supplied	Code for the type of transaction: A (add), M (modify), or D (delete)
transferred	string	1	system supplied	Code that indicates that the transaction has been used to export and transfer database records that have changed.
record location	numeric	8	system supplied	Identifier for the transaction record's location within XRP-II

(3) Transaction Archive Screen: Control item data update transactions should periodically be deleted from the database after changed records have been exported. This makes room to log new transactions.

This screen copies to a named file the records of transactions that occurred on or prior to a specified cutoff date. It then deletes the records from the database.

Specify the date of the last transaction to archive and the name of a file in which to store the data as described in Table 9.9.2.12-3.

Table 9.9.2.12-3. XRP II GUI/CHUI Field Description

Field Name	Data Type	Size	Entry	Description
file name	string	8	required	Name of the file in which to store transaction records being archived
cutoff date	date	N/A	required	Date of the most recent transaction to be archived

(4) Serial Numbers Maintenance Screen: This screen maintains a list of ECS-issued serial numbers indexed to control items, providing a rudimentary inventory tracking mechanism. The screen can be accessed via the System Utilities menu for the convenience of the XRP-II administrator. It also appears on the Utilities menu and is described in detail in item (6) above.

(5) Edit Groups File Screen: The Edit Groups File screen provides access to a means for re-configuring Baseline Manager to recognize new groups of XRP-II menus and screens. Groups enable system administrators to grant access to menus and screens collectively rather than individually. Groups are identified and defined in a “groups” configuration file. The file specifies what menus and screens an operator is allowed to access. It does not define the menu from which a submenu or data entry screen can be accessed.

The Edit Groups File screen displays a descriptive message and prompts for confirmation to proceed before executing the “vi” program against the “groups” configuration file. Edit the file, then exit “vi”. The screen automatically recompiles group configuration binaries, making the new group definitions available to XRP-II’s menu handler program. Note: This utility should not be run when other operators are logged on the system.

Section D.5 of the System Reference Manual describes the “groups” file in detail.

(6) Edit Users File Screen: The Edit Users File screen provides access to XRP-II’s list authorized Baseline Manager operators, the “users” file. The list contains userids and specifies which group of menus and screens an operator can use. It can also specify an entry menu for each user as well as any deviations for the user from default permissions associated with each data entry screen.

The screen displays a descriptive message and prompts for confirmation to proceed before executing the “vi” program against the file. Edit the file, then exit “vi”. XRP-II automatically recompiles user configuration binaries, making the new user definitions available to its menu handler program. Note: This utility should not be run when other operators are logged on the system. After it runs, you will receive a warning message then get logged out of XRP-II at your next keystroke. Simply log back in.

Section D.5 of the System Reference Manual describes the “users” file in detail.

(7) Edit Printers File Screen: The Edit Printer File screen provides access to XRP-II’s list that defines printer selections and options available for generating both custom and ad hoc reports. The screen displays a descriptive message and prompts for confirmation to proceed before executing the “vi” program against the “msprinters” configuration file. After editing the file, operators exit “vi”. The screen automatically recompiles printer configuration binaries, making the new printer definitions available to all operators.

Section 8.1.4 of the System Reference Manual describes the printers file’s format and use.

(8) Site Master Maintenance Screen: The Site Master Maintenance screen lets operators maintain an index of ECS-related sites. This data is used solely to generate a site pick list to facilitate entering control item deployment data and report generation parameters on

other screens. This screen is identical to the Branch Master Maintenance screen described in the section 6.8 of the System Reference Manual, except that two “site” labels are used in lieu of “branch” labels and the tax code field has been deleted. Baseline Manager does not implement the organizational branch processing described in the System Reference Manual, so site entries are not required for any XRP-II processing. Table 9.9.2.12-4 describes the “site” fields that were tailored for ECS.

Table 9.9.2.12-4. Site MasterMaintenance Field Description

Field Name	Data Type	Size	Entry	Description
site	string	6	required	Mnemonic or short name for an ECS site.
site name	string	46	optional	Full name of an ECS site.
phone number	string	8	optional	Phone number of a point of contact at the site
street address	string	30	optional	Address for the site
city	string	20	optional	Name of the city in which the site is located
state	string	2	optional	Abbreviation for the state in which the site is located
zip	string		optional	Postal code for the site
country	string		optional	Code for the country in which the site is located

(9) Machine Network Maintenance Screen: Operators use the Machine Network Maintenance screen to keep a list of MSS CM Server hosts to which Baseline Manager records may be shipped. Entries are accessible to the two System Utilities screens used when exporting site-unique records for the SMC and when exporting release records from the SMC to the sites, respectively. The list is not required; it exists solely as an aid for correctly specifying the target host for an ftp session.

Table 9.9.2.12-5. Machine Network Maintenance Field Description

Field Name	Data Type	Size	Entry	Description
machine name	string	32	required; must be	Full, network-addressable name of a host
site	string	6	optional; zoom to select from a list of sites	Mnemonic or short name for an ECS site
description	string	30	optional	Textual characterization of a host machine

- (10) Commodity Code Maintenance:** The Commodity Code Maintenance screen maintains standard codes and names that are used to classify a control item according to how it was produced or obtained for the project. This data, used as a pick list by control item update screens, promotes data standardization and facilitates recording control item data.

Use this screen to update the list of commodity codes to use for control items. Table 9.9.2.12-6 describes its data entry fields.

Table 9.9.2.12-6. Commodity Code Maintenance Field Description

Field Name	Data Type	Size	Entry	Description
commodity code	string	8	required	Classification for how a control item was produced or obtained (e.g., COTS, heritage, GFE, custom, mod-COTS, shareware, freeware, etc.)
description	string	20	optional	Full name for the commodity type

- (11) Import Data Screen:** The screen initiates loading of XRP-II data from tar files created by Baseline Manager’s data export utilities. Selecting “Y” at the prompt causes XRP-II to process all files in the directory named in the IMPORTPATH environment variable. Tar files -- whose names identify the destination host, originator’s site, and date and time created -- are processed in alphabetical order.. Upon completion, the original files are moved to an archive directory named in the IMPORTARC environment variable.
- (12) Export Release Records Screen:** Operators use this screen to prepare for distribution those records associated with the release of a specified baseline, configuration item, or other control item. They can choose to have XRP-II ftp the files to up to six remote hosts via a SEND NOW feature.

The screen with fields as defines in Table 9.9.2.12-7 extracts data about a specified item and all other items in its bill of materials as of a given date. XRP-II copies appropriate records from control item master, product structure, engineering change, interdependency, and deployment tables and stores them in the directory named in the EXPORTPATH environment variable in a format compatible with the Import Data utility. One tar file is created for each destination and given a name that identifies the destination machine name and site, the control item’s identifier, and the effective date used for the bill. If the SEND NOW feature is used, XRP-II ftp’s the files then moves them to the archive directory named in the EXPORTARC environment variable. If not, the files remain in the export directory to be transferred manually or until a subsequent export operation employs the SEND NOW feature.

Enter the identifier of one or more control items, then specify one or more hosts to receive the data. (Include domain names, or use IP addresses. Machine names can be selected from a managed list by using the “zoom” command.) Next, enter an effective date to use for the item’s bill, and choose whether or not to ftp the files automatically.

Begin data extraction by using the “execute” command. XRP-II will prompt for a login account and a password if it’s been instructed to perform the ftp.

Table 9.9.2.12-7. Export Release Record Field Description

Field Name	Data Type	Size	Entry	Description
control item id	string	20	required; zoom to select from a control item list	Unique code for a version- or configuration-controlled item
machine	string	40	required; zoom to select from a list of machines	Full, network-addressable name of a host
date of release	date	N/A	required	“As of” date used in selecting records from the configuration history of a control item
send now	string	1	Y or N	Code that indicates whether or not to ship files immediately

(13) Export Site-Unique Changes Screen: This screen is used to extract copies of site-unique records that are to be transferred to another site such as the SMC. Extracted data is stored in a collection of files compatible with XRP-II’s Import Data utility and converted to tar format. The tar file is then ftp’ed to specified hosts if the operator so chooses.

XRP-II analyzes the transaction log to determine which records have changed since the last time the utility was run and exports those associated with control items having a designated site prefix. (XRP-II expects that the site prefix to be the first three characters of the code for the site specified in the system parameters table (see item (1) above). Tar files are stored in the directory named in the EXPORTPATH environment variable. Once they have been ftp’ed, the files are moved to an archive directory named in the EXPORTARC environment variable.

Enter the name of one or more machines in the format described in Table 9.9.2.12-8 to receive the data (using their domain names or IP addresses), and choose whether or not to ftp the data files immediately after they are created. Names can be selected from a managed list by using XRP-II’s “zoom” command. Use the “execute” command to begin data extraction. If the file is to be transferred too, supply the name of a login account and a password for the ftp when XRP-II prompts.

Table 9.9.2.12-8. Export Site-Unique Changes Field Description

Field Name	Data Type	Size	Entry	Description
name	string	40	required; zoom to select from a list of machines	Full domain name or network address of the host to receive the exported data file(s)

(14) Export SMC Data Screen: This screen extracts, and distributes to remote sites, copies of records about centrally-managed control items that have changed since the last time this function was used. (XRP-II expects centrally-managed control items to have identifiers that begin with a numeral.) XRP-II can ftp the files to up to ten remote hosts specified by the operator.

XRP-II analyzes the transaction log to determine what data has changed and which control items were affected. Records that reference qualifying control items are then copied from control item master, product structure, and engineering change tables into files compatible with XRP-II's Import Data utility (see section xxx). XRP-II uses ftp to transfer the files that are stored in a local directory (named in the EXPORTPATH environment variable) to a directory (named in the IMPORTPATH environment variable) on the remote hosts. Once they have been transferred, the files are moved from the export directory to an archive directory named in the EXPORTARC environment variable.

Enter the name of one or more hosts in the format described in Table 9.9.2.12-9 to receive the data (using either domain names or IP addresses), and choose whether or not to ftp the data files immediately after they are created. Names can be selected from a list of servers (see section xxx) by using the "zoom" command. Use the "execute" command to begin data extraction. If the file is to be transferred too, supply the name of a login account and a password for the ftp when XRP-II prompts.

Table 9.9.2.12-9. Export SMC Data Field Description

Field Name	Data Type	Size	Entry	Description
name	string	40	required; zoom to select from a list of machines	Full domain name or network address of the host to receive the exported data file(s)

9.9.3 Setting Tunable Parameters

XRP-II can be configured to limit access to authorized operators and regulate the operations each can perform. A system administrator at each site maintains group lists of related screens that operators can be assigned to access for performing work tasks. They also maintain a list of

operators authorized to use XRP-II, together with their group assignments and any special access privileges.

XRP-II can also be configured to define system printers. Again, a system administrator at each site maintains a list of approved printer destinations for XRP-II reports. While specific printers can be named, the list often just offers operators choices of orientation and pitch for output that will be printed to their default printers.

Special programs, accessible via the System Utilities menu, are available to help maintain the files that contain these lists. They require that UNIX vi be used to edit the files. Section 5 of the System Reference Manual describes formats and use of the groups and users files; section 8.1.4 describes the printer file.

Table 9.9.3-1. Tunable Parameters (1 of 2)

Operator Task	Affected Data/Parameter	Range of Values	Source	Tool/Change Control	Description
Modify "groups" list	menu and data entry screen sets	alpha-numeric strings	File \$MSPATH/xrp/mms/menudata/groups	XRP-II and UNIX vi	defines named groups of menus/screens to which operators can be given access; can also specify inquire, add, modify, and delete privileges by screen in each group
Modify "users" list	operator authorizations	userid; group names; operator permissions (I, A, M, D)	File \$MSPATH/xrp/mms/menudata/users	XRP-II and UNIX vi	Identifies users authorized to run XRP-II, assigning to each a group of menus/screens that can be accessed; can also specify for each user an entry menu and changes to the list of screens and associated privileges the group has
Modify "printers" list	valid report destinations	printer names (may have up to 12 alpha-numeric chars); printer programs (limited to 20 characters)	File \$MSPATH/xrp/lib/msprinters	XRP-II and UNIX vi	Identifies names by which system printers are known to XRP-II, and specifies printer program arguments for each

9.9.4 Special Constraints

The ECS environment imposes the following constraints on how XRP-II is used :

- Control item identifiers - XRP-II uses centralized database technology and is separately installed at each ECS site. This necessitates a special scheme for assigning identifiers to control items so that sites may safely exchange database records. For example, the SMC must be able to distribute centrally-maintained release records to multiple sites without interfering with records the sites locally maintain there. Similarly, the SMC must be able to absorb copies of site-maintained records forwarded by the sites to form the consolidated picture of system-wide baselines without contaminating centrally-maintained data. To distinguish between centrally-maintained and site-maintained records, Baseline Manager expects that identifiers of site-maintained control items have a 3-character prefix that matches the first three characters of the site's code (see Section 9.9.2.12, item (1)). To preclude confusion, identifiers of centrally-maintained control items should begin with a numeral.
- Database schemas - The XRP-II database schema must be identical at all ECS sites so that database records can be uniformly exchanged among them.
- Data entry screens - Table view driver programs cannot handle the number and size of fields used in the form view of many Baseline Manager data entry screens. Where limitations exist, fields that appear in table view were chosen either because they help identify control items or because they are likely to be used in multi-record operations.

9.9.5 Command Line Interface

Operators run XRP-II primarily via its menus and data entry screens. However, several standard utility programs can be run from the command line. These are documented in numerous places in the XRP-II System Reference and Product Information manuals.

An additional interface, configured specially for ECS, generates resource configuration files needed by resource planners using the Planning Subsystem. Usually employed on demand via Tivoli, operators can invoke it via the command line and view output in file “/usr/tmp/resplan” on the XRP-II host.

Table 9.9.5-1. Command Line Interfaces

Command Line Interface	Description and Format	When and Why Used
resplan	resplan mm/dd/yy (rolename), where: <ul style="list-style-type: none"> • mm/dd/yy is a valid date • rolename is a code for signalling Tivoli which sentry-log and administrator is to receive status messages resulting from the operation. 	Used to generate a resource configuration file, primarily for resource planners. This operation is normally invoked by Tivoli

9.9.6 Outputs

XRP-II is a database application whose principal outputs as Baseline Manager are formatted data files. These files are used to exchange records among XRP-II systems, to describe production baseline configurations for resource planners, and to store copies of reports. Other, ancillary files are occasionally produced in the course of processing, but they are for XRP-II's internal use and generally of no interest to operators. Table 9.9.6-1 lists and describes each of the above types of outputs.

Table 9.9.6-1. Outputs (1 of 2)

Output	Description and Format
export/import tar files	Produced by XRP-II's "export" utilities, these are archives containing one or more .dasc files. (See sections 4.3.3.1.5 and 4.3.3.1.7 above.)
.dasc files	Transient, ASCII files produced by XRP-II's "export" utilities and used by its import utility. Each file contains a header record followed by one or more detail records from a particular XRP-II database table. Each detail record contains values for a single database record, separated by pipe symbols. The header record contains the specification of the dump, identifying the database table and the names of the fields that correspond to values in the detail records. (See section 1.6 of the Database Tools and Techniques Manual.)
.dspc files	Transient, ASCII files produced by XRP-II's import and export utilities. Each file identifies the name of a database file (table) and the names of fields in that file in the order required to load data in the database. Data is separated by pipe symbols. (See section 1.6 of the Database Tools and Techniques Manual.)

Table 9.9.6-1. Outputs (2 of 2)

Output	Description and Format
resplan data file	An ASCII file consisting of one header record followed by one or more detail records. Each detail record identifies a control item that is marked as a planning resource and is part of a specified production baseline; it also identifies specific characteristics about the item. The header record contains a message that identifies the production baseline that was specified. This file is stored in directory /usr/tmp on the MSS CM Server, and a copy of it is transmitted, via Tivoli, to the requestor. (See section xxx above.)
print files	ASCII text files that contain reports requested via XRP-II data entry and report generation screens. These files are stored in the operator's home directory.
temporary files	Various working files XRP-II creates for its own internal use. These are stored in directory /usr/tmp on the MSS CM Server but not deleted by XRP-II.

9.9.7 Event and Error Messages

XRP-II issues both status and error messages to those using it. Unify manuals discuss common messages an operator may encounter, but no listing of standard XRP-II messages is provided in the COTS documentation. Messages are generally self-explanatory; however, some refer operators to log files which, in most cases, are intended for XRP-II programmers and require special training to interpret.

In addition, XRP-II records every database update event in a Transaction Log. This log, stored in the database, can be browsed via the Transaction Log screen (see Section 9.9.2.12, item (2)) to determine the date, time, operator, and type of changes made to XRP-II database tables. The transaction log does not contain messages, per se, and is not monitored or used by ECS' system management applications.

Many errors XRP-II reports result from an error returned by the Unify RDBMS. Details about fatal errors are written to the following error log files located within the XRP-II principal directory:

- /bin/errlog
- /def/errlog
- /dicty/errlog
- /bin/dbrbld.err
- /bin/uniload.err
- /dicty/uniload.err

These files generally do not contain the actual messages displayed to the operator, and they are meaningful mainly to the system administrator or XRP-II programmer. Appendix E of the Unify Direct HLI Programmer's reference manual describes some of the common messages written to the logs.

9.9.8 Reports

XRP-II can generate the pre-defined reports listed in Table 9.9.8-1. Each can be routed to the operator's display, a named file, or a printer. The reports are drawn on an as-required basis to meet operational needs.

XRP-II may make several printers available for a particular report. These printers often represent formatting choices rather than specific devices. Reports directed to a printer that does not correspond to a specific device will be printed on the operator's default printer device.

All of the pre-defined reports are generated according to specifications that are "compiled" using XRP-II's Datarite report writer. Authorized operators can develop custom specifications. See Section 8 of the Datalook/Datarite Reference Manual for details.

Table 9.9.8-1: Reports (1 of 2)

Report Type	Report Description	Example
Bill of Materials	A list that identifies and describes an assembly's constituent control items	Figure 9.9-7
Indented Bill of Materials	A list that identifies and depicts the full assembly structure of a control item	Figure 9.9-8
Summarized Bill Report	A list that identifies the control items in an assembly along with the quantity of each	Figure 9.9-9
Multilevel Where Used Display	A list that identifies and describes the assemblies in which a specified control item is used	Figure 9.9-10
Multilevel Where Used Report	A list that identifies and describes the assemblies in which a specified control item is used together with the effectivity dates for each	Figure 9.9-11
Configuration Items List - Level One	A list of all ECS configuration items active and deployed at the specified sites as of a specified date	Figure 9.9-12
Configuration Items List - Level Two	A list of all ECS design components active and deployed at the specified sites as of a specified date	Figure 9.9-13
Configured Articles List	A list of all active ECS configured articles for specified sites as of a specified date	Figure 9.9-14
Version Description Report	A list of all active ECS configured articles for specified sites as of a specified date	Figure 9.9-15
Site Baseline	A list of all ECS configured articles active and deployed as part of a specified baseline	Figure 9.9-16
Change History	A list of all versions and product structure revisions for the specified item together with details associated with the item change	Figure 9.9-17

Table 9.9.8-1: Reports (2 of 2)

Report Type	Report Description	Example
BOM Comparison Report	A list that identifies the control items that two bills have in common as well as the control items in one that are not in the other.	Figure 9.9-18
Hardware - Software Map	A list of software control items in a specified baseline as of a specified date. Items are listed by subsystem then host. Three formats are available for this report. The first lists software items contained in any software or hardware bundle mapped to the host, identifying the bundle to which it belongs and the version number of the item. The second is similar to the first, except it does not list items from any hardware bundles mapped to the host. The third lists only the items in software bundles mapped to a host and does not identify the item's version.	Figure 9.9-19 Figure 9.9-20 Figure 9.9-21
Hardware Map	A list of hardware control items in a specified baseline as of a specified date. Items are listed by subsystem then host.	Figure 9.9-22
Hardware-Patch Map	A list of the patches and patch bundles in a specified baseline as of a specified date. Patch items are listed by subsystem then host.	Figure 9.9-23
COTS Software Version Baseline	Descriptions of the software control items in a specified baseline as of a specified date. Two formats are available for the report. One lists the control item ids for each software item, and the other doesn't.	Figure 9.9-24 Figure 9.9-25
Patch Baseline Report	Descriptions of the patches in a specified baseline as of a specified date	Figure 9.9-26
Site - Host Map	A matrix presenting the names of the ECS hosts performing corresponding functions across the various sites for a specified baseline as of a specified date	Figure 9.9-27
Baselined Documents (Title Order)	A list of documents sorted by title for a specified baseline as of a specified date	Figure 9.9-28
Baselined Documents (Number Order)	A list of documents sorted by number for a specified baseline as of a specified date	Figure 9.9-29

9.9.8.1 Sample Reports

The figures that follow contain samples of Baseline Manager's pre-defined reports. One sample is provided for each report listed in Table 9.9.8-1.

(pibomr0)
 System Monitoring and Coordination Center BILL OF MATERIALS
 Control Items IDs: b00009071
 Explosion quantity: 1

DATE: 04/13/99 TIME: 14:33
 PAGE: 1
 Number of levels: 99
 Date of bill: 04/13/99

Control Item ID: b00009071 Project: ECS
 ECS-wide Subsystem Baseline, Drop 4PX uom: EA Resp. Org.: ECS
 Current Revision: Version: 4PX

LVL	CONTROL ITEM ID	DESCRIPTION	QUANTITY PER	CUOM
===	=====	=====	=====	=====
	b00010011	ECS Operational Subsystem Baseline, Drop 4PX	1.0000	EA
	b00010041	EDC Operational Subsystem Baseline, Drop 4PX	1.0000	EA
	b00010126	EDC ASTER Subsystem	1.0000	EA
	b00047430	ASTER LUT Database Server 01	1.0000	EA
	b00048520	HW Bundle for ASTER LUT DB Server 01	1.0000	EA
	b00014139	DISK-Pak (6x4.2GB)	2.0000	EA
6	b00021670	SUN,Ultra 170	1.0000	EA
5	b00051162	eOass01 Hardware Dependent Patch Bundle	1.0000	EA
6	b00050296	Ultra 1 (non-E) Standalone Flash PROM Update	1.0000	EA
4	b00046620	ASTER LUT Database Server 02	1.0000	EA
5	b00047960	HW Bundle for ASTER LUT Database Server 02	1.0000	EA
6	b00014139	DISK-Pak (6x4.2GB)	2.0000	EA
6	b00021760	SUN,Ultra 2/1170	1.0000	EA
5	b00051164	eOass02 Hardware Dependent Patch Bundle	1.0000	EA
6	b00050194	Ultra 2 Standalone Flash PROM Update	1.0000	EA
6	b00050200	/kernel/drv/hme	1.0000	EA
6	b00050254	fixes in handling multicast addresses	1.0000	EA
6	b00050312	POINT PATCH for BSI chip error and nf_snmd bugs	1.0000	EA
4	b00047420	ASTER DEM Workstation	1.0000	EA
5	b00048510	HW Bundle for ASTER DEM Workstation	1.0000	EA
6	b00014130	Multi-Pak (2x9GB)	1.0000	EA
6	b00021740	SUN,Ultra 2	1.0000	EA
5	b00051166	eOass03 Hardware Dependent Patch Bundle	1.0000	EA
6	b00050194	Ultra 2 Standalone Flash PROM Update	1.0000	EA
6	b00050200	/kernel/drv/hme	1.0000	EA

.
 .
 .

There are 26471 components in this bill.

Figure 9.9.8.1-1. Bill of Materials Report

(pisumr)
 System Monitoring and Coordination Center
 Control Item ID: b00009071

SUMMARIZED BILL REPORT

DATE: 04/13/99 TIME: 12:47
 PAGE: 1
 Date of Configuration: 04/13/99

ASSEMBLY	DESCRIPTION	NAME	CLASS		
b00009071	ECS-wide Subsystem Baseline, Drop 4PX	ECS-wide Subsystem B/L	baseline		
COMPONENT	DESCRIPTION	NAME	CLASS	UOM	QUANTITY
b00010011	ECS Operational Subsystem Baseline, Drop 4PX	ECS Operational Subsystem B/L	baseline	EA	1.000
b00010023	EDF Subsystem Baseline, Drop 4PX	EDF Subsystem B/L	baseline	EA	1.000
b00010024	EDF Subsystem Baseline, Ver.2.0, Drop 4PX	EDF Subsystem B/L	baseline	EA	1.000
b00010026	VATC Subsystem Baseline, Ver.2.0, Drop 4P1	VATC Subsystem B/L	baseline	EA	1.000
b00010027	Mini-DAAC SMC Subsystem B/L, Drop 4PX	Mini-DAAC SMC Subsystem B/L	baseline	EA	2.000
b00010028	VATC-SMC Subsystem B/L, Ver.2.0, Drop 4P1	VATC-SMC Subsystem B/L	baseline	EA	1.000
b00010031	GSFC Operational Subsystem Baseline, Drop 4PX	GSFC Operational Subsystem B/L	baseline	EA	1.000
b00010032	SMC Operational Subsystem Baseline, Drop 4PX	SMC Operational Subsystem B/L	baseline	EA	1.000
b00010033	VATC Subsystem Baseline, Drop 4PX	VATC Subsystem B/L	baseline	EA	2.000
b00010034	EDF Mini-DAAC Subsystem Baseline, Ver.2.0, Drop 4PX	EDF Mini-DAAC Subsystem B/L	baseline	EA	1.000
b00010035	NSIDC Operational Subsystem Baseline, Drop 4PX	NSIDC Operational Subsystem BL	baseline	EA	1.000
b00010036	Mini-DAAC SMC Subsystem B/L, Ver.2.0, Drop 4PX	Mini-DAAC SMC Subsystem B/L	baseline	EA	1.000
b00010037	VATC-SMC Subsystem B/L, Drop 4PX	VATC-SMC Subsystem B/L	baseline	EA	2.000
b00010041	EDC Operational Subsystem Baseline, Drop 4PX	EDC Operational Subsystem B/L	baseline	EA	1.000
b00010049	LaRC Operational Subsystem Baseline, Drop 4PX	LaRC Operational Subsystem B/L	baseline	EA	1.000
b00010051	EDF Mini-DAAC Subsystem Baseline, Drop 4PX	EDF Mini-DAAC Subsystem B/L	baseline	EA	2.000
b00010056	GSFC ASTER Subsystem	GSFC AST Subsystem	other	EA	1.000
b00010061	GSFC Data Server Subsystem	GSFC DSS Subsystem	other	EA	1.000
b00010071	GSFC Data Processing Subsystem	GSFC DPS Subsystem	other	EA	1.000
b00010076	GSFC Client Subsystem	GSFC CLS Subsystem	other	EA	1.000
b00010081	GSFC Communications Subsystem	GSFC CSS Subsystem	other	EA	1.000
b00010091	GSFC Data Management Subsystem	GSFC DMS Subsystem	other	EA	1.000
b00010101	GSFC Ingest Subsystem	GSFC INS Subsystem	other	EA	1.000
b00010111	GSFC System Management Subsystem	GSFC MSS Subsystem	other	EA	1.000
b00010113	GSFC Internetworking Subsystem	GSFC ISS Subsystem	other	EA	1.000
b00010116	GSFC Interoperability Subsystem	GSFC IOS Subsystem	other	EA	1.000
b00010121	GSFC Planning Subsystem	GSFC PLS Subsystem	other	EA	1.000
b00010126	EDC ASTER Subsystem	EDC AST Subsystem	other	EA	1.000
b00010131	EDC Data Server Subsystem	EDC DSS Subsystem	other	EA	1.000
b00010141	EDC Data Processing Subsystem	EDC DPS Subsystem	other	EA	1.000
b00010151	EDC Client Subsystem	EDC CLS Subsystem	other	EA	1.000
b00010161	EDC Communications Subsystem	EDC CSS Subsystem	other	EA	1.000

There are 2096 parts in this summarized bill.

Figure 9.9.8.1-3. Summarized Bill Report

```

(piwurl)
TIME: 09:43
ECS Development Fac
PAGE: 1
Components: b0101412
levels: 99
DATE: 10/04/96
Number of

-----
MULTI-LEVEL WHERE-USED DISPLAY
-----
Component: b0101412      Clearcase Client for Sun Solaris 2.5.1
Project: ECS

LEVEL      CONTROL ITEM ID      CMDTY      QUANTITY      CUOM
=====      =====      =====      =====      =====
1          b0101410             Other      1.0000        EA
          TRMM Release of SCM
.2         b0101400             Other      1.0000        EA
          TRMM Release of MLCI
..3        b0100001             Other      1.0000        EA
          TRMM Release of MSS
...4       b0000001             1.0000    EA
          EOSDIS Core System for TRMM
1          b01200               Other      1.0000        EA
          SPRE4SUN Software
.2         b01000               Other      1.0000        EA
          QUEUING Workstation
..3        b010                 Other      1.0000        EA
          TRMM with Extension for ...
..3        b011                 Other      1.0000        EA
          TRMM with Extension for ...
..3        b0100               Other      1.0000        EA
          Science Processing String
...4       b010                 Other      1.0000        EA
          TRMM with Extension for ...
There are 16 assemblies using this component.
-----

```

Figure 9.9.8.1-4. Where-Used Display

(piwur)
 System Monitoring and Coordination Center
 Components: b00015000

MULTI-LEVEL WHERE-USED REPORT

DATE: 04/13/99 TIME: 12:24
 PAGE: 1
 Number of levels: 2
 Date of Configuration: 04/13/99

 Component: b00015000 Project: ECS uom: EA
 Configuration Management Low level code: 6 Resp. Org.: MSS
 Active date: 07/21/98 Inactive date: **/**/**

LEVEL	CONTROL ITEM ID	NAME	MODEL/VERSION	CUOM	EXTENDED QUANTITY	ACTIVE DATE	INACTIVE DATE
1	b00041380	Planning/Mgmt WS 01 S/W bundle	4PX	EA	1.0	09/28/98	**/**/**
.2	b00045000	t1sms10	4PX	EA	1.0	01/22/99	**/**/**
.2	b00045110	t1pls02	4PX	EA	1.0	09/28/98	**/**/**
.2	b00046020	l0pls02	4PX	EA	1.0	09/28/98	**/**/**
.2	b00047360	e0pls03	4PX	EA	1.0	09/28/98	**/**/**
.2	b00045690	n0pls02	4PX	EA	1.0	09/28/98	**/**/**
.2	b00045490	m0mss12	4PX	EA	1.0	09/28/98	**/**/**
.2	b00046220	g0pls01	4PX	EA	1.0	09/28/98	**/**/**
1	b00040850	PDPS DBMS Server S/W bundle	4PX	EA	1.0	09/28/98	**/**/**
.2	b00045120	t1pls01	4PX	EA	1.0	09/28/98	**/**/**
.2	b00046030	l0pls01	4PX	EA	1.0	09/28/98	**/**/**
.2	b00046480	e0pls02	4PX	EA	1.0	09/28/98	**/**/**
.2	b00045700	n0pls01	4PX	EA	1.0	09/28/98	**/**/**
.2	b00046210	g0pls02	4PX	EA	1.0	09/28/98	**/**/**
1	b00040860	Planning/Mgmt WS 02 S/W bundle	4PX	EA	1.0	09/28/98	**/**/**
.2	b00046490	e0pls01	4PX	EA	1.0	09/28/98	**/**/**
.2	b00045680	n0pls03	4PX	EA	1.0	09/28/98	**/**/**
.2	b00046200	g0pls03	4PX	EA	1.0	09/28/98	**/**/**
1	b00040870	CM Server S/W bundle	4PX	EA	1.0	09/28/98	**/**/**
.2	b00045040	t1sms05	4PX	EA	1.0	09/28/98	**/**/**
.2	b00045160	t1mss03	4PX	EA	1.0	09/28/98	**/**/**
.2	b00046050	l0mss01	4PX	EA	1.0	09/28/98	**/**/**
.2	b00046530	e0mss02	4PX	EA	1.0	09/28/98	**/**/**
.2	b00045740	n0mss02	4PX	EA	1.0	09/28/98	**/**/**
.2	b00045510	m0mss02	4PX	EA	1.0	09/28/98	**/**/**
.2	b00046270	g0mss02	4PX	EA	1.0	09/28/98	**/**/**
1	b00061440	CM Server S/W bundle	4PY	EA	1.0	03/12/99	**/**/**
.2	b00061216	t1sms05	4PY	EA	1.0	03/12/99	**/**/**
.2	b00061196	t1mss03	4PY	EA	1.0	03/12/99	**/**/**
.2	b00061106	n0mss02	4PY	EA	1.0	03/12/99	**/**/**

There are 150 assemblies affected by this component.

Figure 9.9.8.1-5. Multilevel Where-Used Report

```

(cill)
TIME: 19:26
ECS Development Fac
PAGE: 1
SITE: GSFC
bill: 05/30/96
DATE: 08/19/96
ECS CONFIGURATION ITEMS LIST - LEVEL ONE
Date of
-----
Subsystem:  MSS           Management Subsystem
CI MNEMONIC CI NAME           CI CONTROL ITEM ID   CI DESCRIPTION       CI MODEL/VERSION
CI SCOPE
=====
MACI         Management Agent       b0101100            Management Agent CSCI A.IT.01
core
MCI         Management Software    b0101200            Management Software CSCI A.IT.01
core
MHCI        Management Hardware    b0101300            Management Hardware CI  A.IT.01
core
MLCI        Management Logistics   b0101400            Management Logistics CSCI A.IT.01
core
-----
Subsystem:  CSS           Communication Subsystem
CI MNEMONIC CI NAME           CI CONTROL ITEM ID   CI DESCRIPTION       CI MODEL/VERSION
CI SCOPE
=====
DCCI         Distr Computing Software b0102100            Distributed Computing Sof A.IT.01
core
DCHCI       Distr Computing Hardware b0102200            Distributed Computing Har A.IT.01
core
-----
.
.
.

```

Figure 9.9.8.1-6. Configuration Items List - Level One

```

(cil2)
19:48 ECS Development Facility          ECS CONFIGURATION ITEMS LIST - LEVEL TWO
PAGE: 1
Site or range: EDF                      Date of bill:
05/30/96
Subsystem: MSS      : Management Subsystem      Version: A.IT.01
CI Item: MHCI      : Management Hardware        Version: A.IT.01
COMPONENT          COMPONENT
MNEMONIC COMPONENT NAME      CONTROL ITEM ID      COMONENT DESCRIPTION      COMPONENT
MODEL/VERSION      COMP SCOPE
=====
=====
core      Enterprise Mgmt Svr b0101310      TRMM Release of EMC Server      A.IT.01
core      Local Sys Mgmt Svr  b0101320      TRMM Release of LSM Server      A.IT.01
core      Enterprise Mgmt Wks b0101330      TRMM Release of EMC Wkstation   A.IT.01
core      Local Sys Mgmt Wks  b0101340      TRMM Release of LSM Wkstation   A.IT.01
core      Management Printer  b0101350      TRMM Release of MSS Printer     A.IT.01
core
CI Item: MLCI      Management Logistics CSCI      Version: A.IT.01

```

Figure 9.9.8.1-7: Configuration Items List - Level Two

```

(cal7)
TIME: 20:12
ECS Development Fac
PAGE: 1
Site(s): EDF
Configuration: 05/30/96
DATE: 08/19/96
ECS CONFIGURED ARTICLES LIST
Date of
-----
CONFIGURATION ITEM: Management Logistics CSCI CONTROL ITEM ID: b0101400
CONFIGURED ARTICLE NAME MOD/VER CONTROL ITEM ID IMPL STATUS ITEM SUBCLASS
CMDTY CD SCOPE
=====
ClearCase Client 2.1 b0101412 production appl-client
COTS core
ClearCase Server 2.0.2 b0101414 production appl-server
COTS core
ClearCase Scripts A.IT.01 b0101416 production appl-scripts
custom core
-----
CONFIGURATION ITEM: Management Software CSCI CONTROL ITEM ID: b010120

```

Figure 9.9.8.1-8. Configured Articles List

```

(vdd)
ECS Development Fac
Control Item ID: b0000001
Site: EDF
SITE: EDF : ECS Development Fac
Subsystem: MSS : Management Subsystem Control Item ID: b0100001
Configuration Item: MLCI : Management Logistics Control Item ID: b0101400
Component: SCM : Software Change Mgr Control Item ID: b0101410

```

DATE: 09/05/96 TIME: 08:47
PAGE: 1
Date of Configuration: 06/03/96

CONTROL ITEM NAME	MODEL/VERSION	CONTROL ITEM ID	MFR/DEV	CLASS	SUB CLASS	NUM LIC	DATE	DATE	CODE	SCOPE
ClearCase Scripts	A.IT.01	b0101616	ECS	software	appl-scripts	99999	05/23/96	**/**/**	custom	Core
ClearCase Server	2.0.2	b0101414	ATR	software	appl-server	75	05/23/96	**/**/**	COTS	Core
ClearCase Client	2.1	b0101412	ATR	software	appl-client	75	05/23/96	**/**/**	COTS	Core
ClearCase DDTs Integrati	2	b0101418	ATR	software	appl-scripts	75	05/23/96	**/**/**	COTS	Core
Component: CRM	: Change Request Mgr	Control Item ID: 0101420								
CONTROL ITEM NAME	MODEL/VERSION	CONTROL ITEM ID	MFR/DEV	CLASS	SUB CLASS	NUM LIC	DATE	DATE	CODE	SCOPE
Dist Defect Track'g Sys	A.IT.01	b0101422	PUR	software	application	250	05/23/96	**/**/**	COTS	Core
Component: BLM	: Basseline Manager	Control Item ID: 0101430								
CONTROL ITEM NAME	MODEL/VERSION	CONTROL ITEM ID	MFR/DEV	CLASS	SUB CLASS	NUM LIC	DATE	DATE	CODE	SCOPE
XRP-II	3.0	b0101432	HTG	software	application	50	05/23/96	**/**/**	COTS	Core
UNIFY DBMS	5.0.7.2.0	b0101434	UNI	software	application	50	05/23/96	**/**/**	COTS	Core

Figure 9.9.8.1-9. Version Description Report

(sitebase)		SITE BASELINE REPORT		DATE: 08/19/96	TIME: 20:22	
ECS Development Fac				PAGE: 1		
All Control Items				Number of levels: 99		
				Date of configuration: 05/30/96		

Baseline: bLAR010						
TRMM Baseline with LaRC extenstions for ...						
LEVEL	CONTROL ITEM ID	DESCRIPTION	MFR/DEV	MODEL/VER	ACTIVE DATE	INACTIVE DATE
1	bLAR01000	Queuing Server		A...	05/01/96	**/**/**
2	bLAR73005	Queuing Server boot partition	ECS	A...	05/23/96	**/**/**
.2	bLAR73006	Queuing Server user partition	ECS	A...	05/23/96	**/**/**
.2	bLAR1100	spr17sun Hardware		A...	05/23/96	**/**/**
..3	b01101	SUN SPARCSTATION SX 20/71	SUN	SPARCSTATION SX 20/71	05/23/96	**/**/**
..3	b01102	20 INCH COLOR MONITOR	SUN		05/23/96	**/**/**
..3	b01103	EXPANDED 101 KEYBOARD	SUN		05/23/96	**/**/**
..3	b01104	3 BUTTON TRACKBALL MOUSE	SUN		05/23/96	**/**/**
..3	b01105	64 MB EXP MEM MODULE	SUN		05/23/96	**/**/**
..3	b01107	IBM 1.05GB INTERNAL DISK DRIVE	IBM		05/23/96	**/**/**
..3	b01109	SBUS FAST SCSI-2 ETHERNET CARD	SUN		05/23/96	**/**/**
..3	b01112	INTERNAL CD ROM	SUN	Ultra 2	05/23/96	**/**/**
.2	b01200	spr17sun Software	ECS	A...	05/23/96	**/**/**
..3	b0101414	ClearCase Server for Sun Solar	ATR	2.0.2	05/23/96	**/**/**
..3	b0101416	ClearCase Scripts for TRMM	ATR	A	05/23/96	**/**/**
..3	b01201	SOLARIS OS	SUN	Solaris 2.4	05/23/96	**/**/**

Figure 9.9.8.1-10. Site Baseline Report

(chghist)						DATE: 10/28/96	TIME: 15:04
ECS Development Fac		CHANGE HISTORY REPORT					PAGE: 1
Control Item ID: b0101401		: Management Logistics		Project: ECS			
Management Logistics CSCI							
Mfr/Dev: ECS	Model/Version: A.IT.01					Latest Inactive Date: **/**/**	
Current Revision: 1						Earliest Active Date: 04/17/96	

REVISION	ENG CHANGE	CCR #	TROUBLE TICKET	ACTIVE DATE	INACTIVE DATE	APPROVAL DATE	
=====	=====	=====	=====	=====	=====	=====	
0	96001	ESDIS001		12/13/96	04/22/97	10/23/96	
1	GSF96001	GSFed02826		04/23/97	**/**/**	04/07/97	

Figure 9.9.8.1-11. Change History Report

(bomcmp)

DATE: 10/04/96 TIME: 11:33

ECS Development Fac

BILL OF MATERIAL COMPARISON REPORT

PAGE: 1

```

Control Item One: b0101400          Control Item Two: b0101400
Version: 0                          Version: 0
Description: TRMM Release of MLCI    Description: TRMM Release of MLCI
Revision: 0                          Revision: 1
Date of Configuration: 09/08/96      Date of Configuration: 10/04/96

```

```

Items in b0101400          found in: b0101400
Cfg Date: 09/08/96        Cfg Date: 10/04/96

```

CONTROL ITEM ID	DESCRIPTION	MFR/DEV	MODEL/VERSION	CLASS	SUBCLASS
b0101410	TRMM Release of SCM	ECS	A.IT.01	design	CSC
b0101420	TRMM Release of CRM	ECS	A.IT.01	design	CSC
b0101430	TRMM Release of BM	ECS	A.IT.01	design	CSC
b0101412	Clearcase Client for Sun Solaris 2.4	ATR	2.1	software	appl-client
b0101416	ClearCase Scripts for TRMM	ATR	A.IT.01	software	appl-scripts

```

Items in b0101400          NOT found in: b0101400
Cfg Date: 09/08/96        Cfg Date: 10/04/96

```

CONTROL ITEM ID	DESCRIPTION	MFR/DEV	MODEL/VERSION	CLASS	SUBCLASS
b0101414	ClearCase Server for Sun Solaris 2.4	ATR	2.0.2	software	appl-server

```

Items in b0101400          found in: b0101400
Cfg Date: 10/04/96        Cfg Date: 09/08/96

```

CONTROL ITEM ID	DESCRIPTION	MFR/DEV	MODEL/VERSION	CLASS	SUBCLASS
b0101410	TRMM Release of SCM	ECS	A.IT.01	design	CSC
b0101420	TRMM Release of CRM	ECS	A.IT.01	design	CSC
b0101430	TRMM Release of BM	ECS	A.IT.01	design	CSC
b0101412	Clearcase Client for Sun Solaris 2.4	ATR	2.1	software	appl-client
b0101416	ClearCase Scripts for TRMM	ATR	A.IT.01	software	appl-scripts

```

Items in b0101400          NOT found in: b0101400
Cfg Date: 10/04/96        Cfg Date: 09/08/96

```

CONTROL ITEM ID	DESCRIPTION	MFR/DEV	MODEL/VERSION	CLASS	SUBCLASS
b0101415	ClearCase Server for Sun Solaris 2.4	ATR	3.0	software	appl-server

Figure 9.9.8.1-12. BOM Comparison Report

(hwsmap)
 System Monitoring and Coordination Center
 Baseline Item ID: b00010041
 Doc #: 920-TDG-nnn Rev 0

HARDWARE-SOFTWARE MAP
 EDC Operational Subsystem Baseline, Drop 4PX

DATE: 04/13/99 TIME: 10:04
 PAGE: 1
 Date of bill: 04/12/99
 EDC DMS Subsystem

 EDC DMS Subsystem

** e0dmh01 ** DMGHW Sybase Backup Server b00047230

- - > Sybase Backup Svr H/W bundle b00048300 < -----
 (No reportable software items in bundle)

- - > Sybase Backup Svr S/W bundle b00041260 < -----

COTS/FREE/SHARE PRODUCT NAME	CUSTOM SW NAME	MODEL/VERSION	ITEM SUBCLASS	CONTROL ITEM ID	RC	CSCI	ORG
	.EcCsCommon.pkg	4PX	package	b00040712		MSS/MACI	
	.EcCsCommon.iu	4PX	installable unit	b00042640		DCCI	ECS
	EcSeAuthnProg	4PX	program	b00042880		DCCI	IDG
	EcSeLoginProg	4PX	program	b00042870		DCCI	IDG
	EcUtCopyExec	4PX	program	b00042872		STMGT	DSS
	ftp_popen	4PX	program	b00042868		STMGT	DSS
- Anlpassword		2.3	program	b00014751		MCI	MSS
- DBTools.h++		2.1.1	program	b00015051		DCCI	IDG
- DCE Cell Manager Host Agent		1.6.2	program	b00015173		DCCI	IDG
- DCE Client		1.5	program	b00015072		DCCI	IDG
- Flare Code (RAID Controller)		8.61	program	b00015284		AQAHW	SED-HW
- Gnu Unzip		1.2.4	program	b00015413	A	DCCI	IDG
- Gnu Zip		1.2.4	program	b00015412	A	DCCI	IDG
- HP-UX		10.20	OS	b00015492		DCCI	IDG
- Kerbnet		1.0	program	b00015664		DCCI	MSS
- Legato Networker Client		5.5	program	b00015684		MCI	MSS
- Legato Networker Client		4.2.3	program	b00015681		MCI	MSS
- Net.h++		7.0.2	program	b00015771		DCCI	IDG
- Open Client/C (isql & bcp)		10.0.4	program	b00015840		DCCI	DDM
- Open Client/C (no isql, bcp)		11.1.0	program	b00015831		DCCI	DDM
- PERL		5.003	program	b00015931	A	DCCI	IDG
- RAID PROM		1.63	program	b00016045		AQAHW	SED-HW
- Replication Server		11.0.3	program	b00016070		SRSRV	DDM
- SQL Server 11.0.3.3		11.0.3.3	program	b00016206	P	DCCI	DDM
- TCL/Tk: Expect		5.22.0	program	b00015417	A	MCI	MSS
- TCL/Tk: Expectk		5.22.0	program	b00015418	A	MCI	MSS
- TCL/Tk: Tclsh		7.6p2	program	b00016282	A	MCI	MSS
- TCP Wrappers		7.4	program	b00016311		MCI	MSS
- Tivoli Client: Admin		3.0	program	b00016331		MCI	MSS
- Tivoli Client: Courier		3.0	program	b00016335		MCI	MSS
- Tivoli Client: Ent Console Log		3.0	program	b00016344		MCI	MSS
- Tivoli Client: Mgt Platform		3.1	program	b00016340		MCI	MSS

Ref Codes: A = automounted; I = remotely installed; P = platform; R = RAID (switchable); r = RAID (other)

EDC DMS Subsystem: e0dmh01

Figure 9.9.8.1-13. Hardware-Software Map Report (hw & sw bundles)

(hswsmap)
 ECS Development Facility
 Baseline Item ID: b00010041
 Doc #: 920-TDG-nnn Rev 0

HARDWARE-SOFTWARE MAP
 EDC Operational Subsystem Baseline, Drop 4PX

DATE: 03/22/00 TIME: 15:04
 PAGE: 1
 Date of bill: 04/12/99

EDC DMS Subsystem

** e0dmh01 ** DMGHW Sybase Backup Server b00047230

```

- - > Sybase Backup Svr S/W bundle b00041260 < - - - - -
- COTS/FREE/SHARE PRODUCT NAME CUSTOM SW NAME MODEL/VERSION ITEM SUBCLASS CONTROL ITEM ID RC CSCI ORG
-----
- .EcCsCommon.pkg 4PX package b00040712 MSS/MACI
- .EcCsCommon.iu 4PX installable unit b00042640 DCCI ECS
- EcSeAuthnProg 4PX program b00042880 DCCI IDG
- EcSeLoginProg 4PX program b00042870 DCCI IDG
- EcUtCopyExec 4PX program b00042872 STMGMT DSS
- ftp_popen 4PX program b00042868 STMGMT DSS
- .EcDbDDM.pkg 4PX package b00040432 MCI ECS
- .EcDbDDM.iu 4PX installable unit b00040434 MCI ECS
- (No Executables) 4PX program b00042902 ECS
- Anlpassword 2.3 program b00014751 MCI MSS
- DBTools.h++ 2.1.1 program b00015051 DCCI IDG
- DCE Cell Manager Host Agent 1.6.2 program b00015173 DCCI IDG
- DCE Client 1.5 program b00015072 DCCI IDG
- Flare Code (RAID Controller) 8.61 program b00015284 AQAHW SED-HW
- Gnu Unzip 1.2.4 program b00015413 A DCCI IDG
- Gnu Zip 1.2.4 program b00015412 A DCCI IDG
- HP-UX 10.20 OS b00015492 DCCI IDG
- Kerbnet 1.0 program b00015664 DCCI MSS
- Legato Networker Client 5.5 program b00015684 MCI MSS
- Net.h++ 7.0.2 program b00015771 DCCI IDG
- Open Client/C (isql & bcp) 10.0.4 program b00015840 DCCI DDM
- Open Client/C (no isql, bcp) 11.1.0 program b00015831 DCCI DDM
- PERL 5.003 program b00015931 A DCCI IDG
- RAID PROM 1.63 program b00016045 AQAHW SED-HW
- Replication Server 11.0.3 program b00016070 SDSRV DDM
- SQL Server 11.0.3.3 11.0.3.3 program b00016206 P DCCI DDM
- TCL/Tk: Expect 5.22.0 program b00015417 A MCI MSS
- TCL/Tk: Expectk 5.22.0 program b00015418 A MCI MSS
- TCL/Tk: Tclsh 7.6p2 program b00016282 A MCI MSS
- TCP Wrappers 7.4 program b00016311 MCI MSS
- Tivoli Client: Admin 3.0 program b00016331 MCI MSS
- Tivoli Client: Courier 3.0 program b00016335 MCI MSS
- Tivoli Client: Ent Console Log 3.0 program b00016344 MCI MSS
- Tivoli Client: Mgt Platform 3.1 program b00016340 MCI MSS
- Tivoli Client: Sentry 3.0 program b00016365 MCI MSS
  
```

Ref Codes: A = automounted; I = remotely installed; P = platform; R = RAID (switchable); r = RAID (other)

EDC DMS Subsystem: e0dmh01

Figure 9.9.8.1-14. Hardware-Software Map Report (sw bundles only)

(hwsmap)
 Goddard Space Flight Center
 Baseline Item ID: b00010030
 nnn-TDG-001-nn

HARDWARE-SOFTWARE MAP
 GSFC Operational Subsystem Baseline, Ver.2.0, Drop 4P1

DATE: 09/04/98 TIME: 15:20
 PAGE: 25
 Date of bill: 09/04/98

HOST/HWCI	FUNCTION	COTS/FREE/SHARE	PRODUCT NAME	PACKAGE	INSTALLABLE UNIT	PROGRAM	DATABASE	DATA	RC	CSCI	ORIG

GSFC INS Subsystem											

** g01cg01 **	ICLRW	Ingest Server (P)									
		DTS Courier									
				.EcDsStINJSTSRVR.pkg	.EcDsStIngestFtpServer.iu	EcDsStIngestFtpServer				STMGT	ECS
					.EcDsStStagingDiskServer.iu	EcDsStStagingDiskServer				STMGT	ECS
				.EcInINJSTSRVR.pkg	.EcInCommon.iu	EcInDBCleanUp				INGST	ECS
						EcInGWCClientDrv				INGST	ECS
						EcInInitPasswd				INGST	ECS
					EcInInter.iu	EcInInter				INGST	ECS
					EcInPolling.iu	EcInPolling				INGST	ECS
				.EcInINTFCSVR.pkg	.EcInAuto.iu	EcInAuto				INGST	ECS
					EcInDB.iu		Ingest			INGST	INS
					EcInGran.iu	EcInGran				INGST	ECS
					EcInReqMgr.iu	EcInReqMgr				INGST	ECS
				.EcMsAgGlobalShared.pkg	.EcMsAgAgent.iu	EcMsAgAgent				MACI	ECS
					EcMsAgEncps.iu	EcMsAgEncps				MACI	ECS
					EcMsAgGenProxy.iu	EcMsAgGenProxy				MACI	ECS
					EcMsAgSubAgent.iu	EcMsAgSubAgent				MACI	ECS
		Anpassword								MCI	MSS
		BuilderXcessory								DCCI	IDG
		ClearCase Client								MLCI	MSS
		DBTools.h++								DCCI	IDG
		DCE Client								DCCI	IDG
		EMACS								DCCI	IDG
				(TBS)	(TBS)		EcDsDistributionServer			DDIST	DSS
				(TBS)	(TBS)		EcDsDistributionServer_TS1			DDIST	DSS
				(TBS)	(TBS)		EcDsDistributionServer_TS2			DDIST	DSS
		Epak/GraphPak								DCCI	IDG
		Flase Code								AQAHW	SED-HW
		Gnu Zip/Unzip								DCCI	IDG
		IRIX								DCCI	IDG
		IRIX NFS								DCCI	IDG
				(TBS)	(TBS)		Ingest			INGST	INS
				(TBS)	(TBS)		Ingest_TS1			INGST	INS
				(TBS)	(TBS)		Ingest_TS2			INGST	INS
		KerpNet								DCCI	IDG
		Legatto Networker								MCI	IDG
		Net.h++								DCCI	IDG
		Netscape Enterprise Server								WRBCH	IDG
		OSF/Motif								DCCI	IDG
		Open Client/C								DCCI	DDM
		PERL								DCCI	IDG
		PROM								AQAHW	SED-HW
		Performance Co-Pilot (PCP)								STMGT	IDG
		RAID Driver								DCCI	SED-HW
		SNMP Agent								MACI	MSS
		SQL Monitor								DCCI	IDG
		SQL Server								DCCI	IDG
		TCLTk: GroupKit								DCCI	IDG
		TCLTk: Incr Tcl (iTcl)								DCCI	IDG
		TCLTk: TCL-DP								DCCI	IDG
		TCLTk: TCLX								DCCI	IDG
		TCLTk: Tix								DCCI	IDG

Ref Codes: A = automounted; P = platform; R = RAID (switchable); x = RAID (other)

Figure 9.9.8.1-15. Hardware - Software Map Report (no bundles, no version #s)

```

(hwmap)
12:17 System Monitoring and Coordination Center HARDWARE MAP PAGE:
1 Baseline Item ID: b00060014 GSFC Operational Subsystem Baseline, Drop 4PY Date of bill:
12/30/99 Doc #: 920-TDG-nnn Rev 0 GSFC DSS
Subsystem
-----
1 GSFC DSS Subsystem
-----
2 ** g0acg01 ** APC Server (P) ACMHW b00060840
Class: host Total RAM: 2000 # CPUs: 10 Net Attach Type(s):
Subclass: server Total Disk: 6 Proc Id:
3 APC Server (P) H/W bundle b00060430
QTY PER HARDWARE ITEM NAME ITEM SUBCLASS MFR/ DEV MODEL/VERSION CAPACITY/ SIZE FORMAT CONTROL ITEM ID RESP ORG
-----
4 3.00 90 GB Raid RAID SGI
4 1.00 SGI,PC XL platform SGI PC XL Y b00013990 SED-HW
4 1.00 Wyse Terminal terminal WYE Y b00021440 SED-HW
4 1.00 Wyse Terminal terminal WYE Y b00014030 SED-HW
-----
2 ** g0acg05 ** APC Server (S) ACMHW b00060842
Class: host Total RAM: 2000 # CPUs: 10 Net Attach Type(s):
Subclass: server Total Disk: 6 Proc Id:
3 APC Server (S) H/W bundle b00060434
QTY PER HARDWARE ITEM NAME ITEM SUBCLASS MFR/ DEV MODEL/VERSION CAPACITY/ SIZE FORMAT CONTROL ITEM ID RESP ORG
-----
4 1.00 SGI,PC XL platform SGI PC XL Y b00021440 SED-HW
4 1.00 Wyse Terminal terminal WYE Y b00014030 SED-HW
-----
2 ** g0acs02 ** Operations WS 01 ACMHW b00060844
Class: host Total RAM: 64 # CPUs: 1 Net Attach Type(s):
Subclass: server Total Disk: 4 Proc Id:
3 Operations WS 01 H/W bundle b00060528
QTY PER HARDWARE ITEM NAME ITEM SUBCLASS MFR/ DEV MODEL/VERSION CAPACITY/ SIZE FORMAT CONTROL ITEM ID RESP ORG
-----
4 1.00 SUN,Ultra 170E platform SUN Ultra 170E Y b00021710 SED-HW
.
.
.
GSFC DSS Subsystem: g0acs02

```

Figure 9.9.8.1-16. Hardware Map Report

hwpatmap)
 18:50
 System Monitoring and Coordination Center
 40
 Baseline Item ID: b00010041
 12/30/99
 Doc #:
 Subsystem

HARDWARE-PATCH MAP

DATE: 03/10/99 TIME:

PAGE:

EDC Operational Subsystem Baseline, Drop 4FX

Date of bill:

EDC DSS

 --
 EDC DSS Subsystem

 --

** e0acg01 ** ACMHW APC Server (P) b00047020

- - > APC Server (P) H/W bundle b00048110 < - - - - -
 (No reportable patch items in bundle)

- - > APC Server (P) S/W bundle b00041070 < - - - - -

PATCH ITEM NAME	DESCRIPTION	ITEM SUBCLASS	MODEL/VERSION	CONTROL ITEM ID	ORG
ClearCase IRIX64 Patch Bundle	Clearcase Patches for Irix64 6.2	bundle, patch	6.2	b00048857	-
3.1.1-20	Clearcase Patch 3.1.1-20 for Irix 6.2 (64 bit)	patch, appl	6.2	b00048858	IDG
3.1.1-30	Clearcase Patch 3.1.1-30 for Irix 6.2 (64 bit)	patch, appl	6.2	b00048860	IDG
3.1.1-37	Clearcase Patch 3.1.1-37 for Irix 6.2 (64 bit)	patch, appl	6.2	b00048861	IDG
3.1.1-37	Clearcase Patch 3.1.1-37 for Irix 6.2 (64 bit)	patch, appl	6.2	b00048862	IDG
3.1.1-40	Clearcase Patch 3.1.1-40 for Irix 6.2 (64 bit)	patch, appl	6.2	b00048863	IDG
3.1.1-41	Clearcase Patch 3.1.1-41 for Irix 6.2 (64 bit)	patch, appl	6.2	b00048864	IDG
SG0001503	Objectserver crash with graphics cards	patch, appl	6.2	b00048859	IDG
SG0001591	IO4prom 4.21 rollup patch for Challenge, Power Challen	patch,		b00050392	-
SG0001632	libfpe patch for 7.1 compilers on irix 6.2	patch, OS	6.2	b00048832	IDG
SG0001637	C++ Exception handling for 7.00 (and above) compilers	patch, OS	6.2	b00048833	IDG
SG0001678	Fix License Manager security hole by removing setuid p	patch,		b00050408	-
SG0001707	WorkShop 2.6.4 Patch	patch,		b00050410	-
SG0001721	MIPSpro 7.1 Fortran 77 patch for datapool element alig	patch,		b00050412	-
SG0001775	rollup - libfastm for ido7.1	patch,		b00050416	-
SG0001787	rollup - bug fixes for libm, libmx, and libm43 - for i	patch,		b00050420	-
SG0001809	SpeedShop 1.1 Patch	patch,		b00050422	-
SG0001949	c frontend patch on 7.1 / 7.1.1	patch,		b00050424	-
SG0001982	OpenGL remote rendering	patch,		b00050432	-
SG0002072	MIPSpro 7.1 Compiler Back-end rollup #3	patch,		b00050440	-
SG0002102	c++ frontend rollup #3 for 7.1	patch,		b00050444	-
SG0002312	libftn rollup for 6.2 and 7.1 compilers on irix 6.2	patch,		b00050468	-
SG0002371	InfiniteReality (Onyx) Diagnostics Fifth Release, Augu	patch,		b00050480	-
SG0002373	Showcase for 6.2 fix for printing of 3D objects	patch,		b00050482	-
SG0002435	Fcom with -g, structure alignment, and namelist proble	patch,		b00050492	-

EDC DSS Subsystem:

e0acg01

Figure 9.9.8.1-17. Hardware-Patch Map

(picotsbl)
 System Monitoring and Coordination Center
 Control Item ID: b0010011
 Doc #: 910-TDA-nnn Rev n

COTS SOFTWARE VERSION BASELINE REPORT
 ECS Operational Subsystem Baseline, Drop 4PX

DATE: 04/13/99 TIME: 10:25
 PAGE: 1
 Date of Configuration: 04/12/99

ECS NAME	* RESP ORG	VARIANT	MFR/DEV NAME	VERSION	PRINCIPAL DIRECTORY	CONTROL ITEM ID	COMMENT	

Bar Code Software								
Zebra Bar-One Platinum	DSS	PC	Platinum Technology	3.3.20	(c:) barone/bin	b00016500	Product sw/hw. A small plug that must be attached to the PC.	
Zebra Bar-One Platinum	DSS	PC	Platinum Technology	4.3	(c:) barone/bin	b00016501	For EDC only	
Compilers, C								
MIPSpro C Compiler	IDG	SGI	Silicon Graphics Inc	7.2.1	/usr/bin/cc	b00014872	Y	
Compilers, C++								
MIPSpro C++ (Cpp)	IDG	SGI	Silicon Graphics Inc	7.2.1	/usr/lib/cpp	b00014922	Y	
Compilers, FORTRAN								
FORTRAN 77 Compiler	IDG	SUN	SUN Microsystems Inc	4.0	/opt/SUNwapro	b00015360		
MIPSpro FORTRAN 77 Compiler	IDG	SGI	Silicon Graphics Inc	7.2.1	/usr/Workshop/usr/bin	b00015352	Only on Sci. Processors	
MIPSpro FORTRAN 90 Compiler	IDG	SGI	Silicon Graphics Inc	7.2.1	/usr/Workshop/usr/bin	b00015382	Only on Science Processors	
Compilers, FORTRAN Checker								
FORCHECK	IDG	SUN	Computerware Inc	12.30	/usr/ecs/emode>/COTS/forcheck	b00015310		
Compilers, Java Devel								
jre	F	CLS	SUN Microsystems Inc	1.1.5	/usr/ecs/emode>/COTS/jre	b00015640		
Compression Tool								
Gnu Unzip	F	IDG	HP	Freeware	/tools/bin	b00015413		
Gnu Unzip	F	IDG	SUN	Freeware	/tools/bin	b00015411		
Gnu Zip	F	IDG	HP	Freeware	/tools/bin	b00015412		
Gnu Zip	F	IDG	SUN	Freeware	/tools/bin	b00015410		
Configuration Management								
ACCELL	MSS	SUN	Unify Corp	2.0.7.2.0	/usr/ecs/emode>/COTS/accell	b00014660	Includes the Unify RDBS	
ClearCase	MSS	SGI	Rational Software Corp	3.1.1	/usr/atria	b00015004	cl./svr. Deploy/CCS owns in the EDF; Dev/MSS at the sites	
ClearCase	MSS	SUN	Rational Software Corp	3.1.1	/usr/atria	b00015000	cl./svr. Deploy/CCS owns in the EDF; Dev/MSS at the sites	
ClearCase Lic./Registry Host	MSS	SUN	Rational Software Corp	3.1.1	/usr/atria	b00015006		
DDTS	MSS	SUN	Rational Software Corp	4.1	/usr/ecs/emode>/COTS/ddts	b00050080		
XRP II	MSS	SUN	HTG Corporation	3.1 (patch 1)	/usr/ecs/emode>/COTS/xrp	b00016471		
DCE								
DCE App. Develop. Tool Kit	IDG	HP	Hewlett Packard Corp	1.5	/usr/lib	b00015140		
DCE App. Develop. Tool Kit	IDG	SUN	Transarc Corporation	1.1	/usr/lib	b00015160		
DCE Cell Manager Host Agent	IDG	HP	Chisom Technology	1.6.2	/opt/cellmgr/bin	b00015173	Client component	
DCE Cell Manager Host Agent	IDG	SGI	Chisom Technology	1.6.2	/opt/cellmgr/bin	b00015172	Client component	
DCE Cell Manager Host Agent	IDG	SUN	Chisom Technology	1.6.2	/opt/cellmgr/bin	b00015171	Client component	
DCE Cell Manager Mgmt. Agent	IDG	HP	Chisom Technology	1.6.2	/opt/cellmgr/bin	b00015170	Reside in MSS Server: Server Component	
DCE Client	IDG	HP	Hewlett Packard Corp	1.4.2	/opt/dcelocal	b00015070	Equivalent to OSF Version 1.1. For HP-UX 10.10.	
DCE Client	IDG	HP	Hewlett Packard Corp	1.5	/opt/dcelocal	b00015072	Equivalent to OSF Version 1.1, patch PHSS_10565, PHSS_10566.	
DCE Client	IDG	SGI	Silicon Graphics Inc	1.1C	/opt/dcelocal	b00015080	Equiv: OSF v1.1, patch 2912 & 2913; includes App Dev Toolkit.	
DCE Client	IDG	SUN	Transarc Corporation	1.1	/opt/dcelocal	b00015090	Equivalent to OSF Version 1.1. CP11 patch.	
DCE Server	IDG	SUN	Transarc Corporation	1.1	/opt/dcelocal	b00015175	Equivalent to OSF Version 1.1; CP11 patch.	
OODCE	IDG	SUN	EOSDIS Core System	1.4	/opt/dcelocal	b00015811	Static libraries for development	
Development Suite								
IMAKE	IDG	SGI	Silicon Graphics Inc	TBD	TBD	b00015521		
IMAKE	IDG	SUN	SUN Microsystems Inc	Source code vers. 1.7	/usr/openwin/bin/	b00015520	Source code version	
ProDev Workshop	IDG	SGI	Silicon Graphics Inc	2.7	/usr/CaseVision	b00015990	Includes cvd debugger. (Formerly CaseVision). No Compilers	
SoftBench for C++	IDG	HP	Hewlett Packard Corp	5.2.5	/usr/ecs/emode>/COTS/softbench	b00016150	Includes C/C++ Compilers	
Visual Workshop	IDG	SUN	SUN Microsystems Inc	2.1	/usr/WorkShop	b00016391		
Development Suite, GUI								
BuilderXcessory	MSS	HP	Integrated Computer Solutions	3.5.1	/tools/bx	b00014842		
BuilderXcessory	MSS	SGI	Integrated Computer Solutions	3.5.1	/tools/bx	b00014844		
BuilderXcessory	MSS	SUN	Integrated Computer Solutions	3.5.1	/tools/bx	b00014840		
Epak/GraphPak	IDG	HP	Integrated Computer Solutions	2.5	/tools/bx/epak25/doc	b00015252		
Epak/GraphPak	IDG	SGI	Integrated Computer Solutions	2.5	/tools/bx/epak25/doc	b00015251		
Epak/GraphPak	IDG	SUN	Integrated Computer Solutions	2.5	/tools/bx/epak25/doc	b00015250		
Development Suite, GUI, TCL								
TCL/Tk: Expect	F	MSS	SGI	Freeware	/tools/bin	b00015416	Y	
TCL/Tk: Expect	F	MSS	SUN	Freeware	/tools/bin	b00015417		
TCL/Tk: Expectk	F	MSS	SGI	Freeware	/tools/bin	b00015419	Y	
TCL/Tk: Expectk	F	MSS	SUN	Freeware	/tools/bin	b00015418		
TCL/Tk: Incr Tcl (iTcl)	F	MSS	SUN	SUN Microsystems Inc	2.2.2patch 2	/tools/bin	b00015544	OOP for Tcl/Tk
TCL/Tk: TCL-DP	F	MSS	SUN	Freeware	/tools/bin	b00016294	Distributed Internet TCL programming	
TCL/Tk: TCLX	F	MSS	SUN	Freeware	/tools/bin	b00016304	Allows more control of unix commands	
TCL/Tk: Tclsh	F	MSS	HP	Freeware	/tools/bin	b00016282		
TCL/Tk: Tclsh	F	MSS	SGI	Freeware	/tools/bin	b00016283		
TCL/Tk: Tclsh	F	MSS	SUN	Freeware	/tools/bin	b00016281	Y	
TCL/Tk: Wish	F	MSS	HP	Freeware	/tools/bin	b00016285		
TCL/Tk: Wish	F	MSS	SGI	Freeware	/tools/bin	b00016286		
TCL/Tk: Wish	F	MSS	SUN	Freeware	/tools/bin	b00016284	Y	

* Commodity Codes: F = freeware; S = shareware

Figure 9.9.8.1-18. COTS Software Version Baseline Report

(picotsabl)
 Goddard Space Flight Center
 Control Item ID: B0010050
 Doc #: nnn-TDL-001-nn

COTS SOFTWARE VERSION BASELINE REPORT
 LARC Operational Subsystem Baseline, Ver.2.0, Drop 4P1

DATE: 09/04/98 TIME: 15:21
 PAGE: 1
 Date of Configuration: 09/04/98

FUNCTION	ECS NAME	* RESP ORG	VARIANT	MFR/DEV NAME	VERSION	PRINCIPAL DIRECTORY	COMMENT
EMACS	EMACS	IDG	SGI	Unknown	19.13	/tools/bin/emacs	
SNMP Agent	PC	MSS	PC	Freeware			
TCL/Tk	<TBD>	IDG	SUN	<TBD>	7.6	/usr/ecs/<mode>/COTS/tcl	
Ada 95 Compiler	SGI	IDG	SGI	Silicon Graphics Inc	1.2		(For Langley DAAC only)
Compilers, C	C Compiler	IDG	SGI	Silicon Graphics Inc	7.1	/usr/bin/cc	7.2 only on Science Processors
Compilers, C	C Compiler	IDG	SGI	Silicon Graphics Inc	7.2	/usr/bin/cc	7.2 only on Science Processors
Compilers, C	C Compiler (IRIX Devel)	IDG	SGI	Silicon Graphics Inc	6.2	/usr/bin/cc	Builds the OS kernel after AMASS installation
Compilers, C	C (SPARC Compiler)	IDG	SUN	SUN Microsystems Inc	4.0	/opt/SUNWpro	
Compilers, C++	C++ (Cpplib)	IDG	SGI	Silicon Graphics Inc	7.1	/usr/lib/cpp	7.2 only on Science Processors
Compilers, C++	C++ (Cpplib)	IDG	SGI	Silicon Graphics Inc	7.2	/usr/lib/cpp	7.2 only on Science Processors
Compilers, C++	C++ (SparCompiler)	IDG	SUN	SUN Microsystems Inc	4.1	/opt/SUNWpro	
Compilers, FORTRAN	FORTRAN 77 Compiler	IDG	SGI	Silicon Graphics Inc	7.1	/usr/Workshop/usr/bin	
Compilers, FORTRAN	FORTRAN 77 Compiler	IDG	SGI	SUN Microsystems Inc	7.1	/usr/Workshop/usr/bin	
Compilers, FORTRAN	FORTRAN 77 Compiler	IDG	SGI	Silicon Graphics Inc	7.2	/usr/Workshop/usr/bin	7.2 only on Science Processors
Compilers, FORTRAN	FORTRAN 90 Compiler	IDG	SGI	Silicon Graphics Inc	7.1		
Compilers, FORTRAN	FORTRAN 90 Compiler	IDG	SGI	Silicon Graphics Inc	7.2		
Compilers, FORTRAN	NA990 Compiler	IDG	SGI	Numerical Algorithms Group Inc	2.2	/usr/Workshop/usr/bin	old 32 bit only for SGI; patch ngcs22-334
Compilers, FORTRAN Checker	FORCHECK	IDG	SUN	Unknown	12.30	/usr/ecs/<mode>/COTS/forcheck	
Compilers, Java Devel	jre	CLS	SUN	SUN Microsystems Inc	1.1.5	/usr/ecs/<mode>/COTS/jre	
Compression Tool	Gnu Zip/Unzip	IDG	HP	Freeware	NA		
Compression Tool	Gnu Zip/Unzip	IDG	SGI	Freeware	NA		
Compression Tool	Gnu Zip/Unzip	IDG	SUN	Freeware	NA		
Configuration Management	ACCELL	IDG	SUN	Integrated Data Systems	2.0.7.2.0	/usr/ecs/<mode>/COTS/accell	Includes the Unify RBBS
Configuration Management	ClearCase Client	MSS	SGI	Rational Software Corp	3.1.1	/usr/atria, usr/adm/atria	cl./svr. Deploy/CCS owns in the EDF; Dev/MSS at the sites
Configuration Management	ClearCase Client	MSS	SGI	Rational Software Corp	3.1.1	/usr/atria, usr/adm/atria	cl./svr. Deploy/CCS owns in the EDF; Dev/MSS at the sites
Configuration Management	ClearCase DOTS Integration	IDG	SUN	Rational Software Corp	2.1		
Configuration Management	DOTS	IDG	SUN	Rational Software Corp	3.2.1		
Configuration Management	XRP II	MSS	SUN	HTG Corporation	3.0	/usr/ecs/<mode>/COTS/dots	Checked in CM
DCE	DCE Cell Manager	IDG	HP	Chisalm Technology	1.6.2	/usr/Workshop/usr/bin	Reside in MSS Server (DCE ReplicationServer, SunSparc20)
DCE	DCE Client	IDG	HP	Hewlett Packard Corp	1.4.2	/opt/dcelocal	
DCE	DCE Client	IDG	SGI	Silicon Graphics Inc	1.16	/opt/dcelocal	
DCE	DCE Client	IDG	SUN	Transarc Corporation	1.1	/opt/dcelocal	
DCE	DCE Server	IDG	SGI	Silicon Graphics Inc	1.1	/opt/dcelocal	
DCE	DCE Server	IDG	SUN	Transarc Corporation	1.1	/opt/dcelocal	
DCE	DCE Server (Time Server only)	IDG	HP	Hewlett Packard Corp	4.4.2	/opt/dcelocal	
Development Suite	IMAKE	IDG	SUN	SUN Microsystems Inc	Source code vers. 1.7	/usr/openwin/bin/	Source code version
Development Suite	IMAKE	IDG	SUN	Silicon Graphics Inc	Source code vers. 1.7	/usr/openwin/bin/	Source code version
Development Suite	ProDev Workshop	IDG	SGI	Silicon Graphics Inc	5.0.3		Includes cvd debugger. (Formerly CaseVision)
Development Suite	SoftBench for C++	IDG	HP	Hewlett Packard Corp	5.0.3	/usr/ecs/<mode>/COTS/softbench	
Development Suite	Visual Workshop	IDG	SUN	SUN Microsystems Inc	1.1		(formerly SparcWorks, TeamWare, Impact, C, C++)
Development Suite, GUI	BuilderXcessory	IDG	HP	Integrated Computer Solutions	3.5.1	/tools/bx	
Development Suite, GUI	BuilderXcessory	IDG	SGI	Integrated Computer Solutions	3.5.1	/tools/bx	
Development Suite, GUI	BuilderXcessory	IDG	SUN	Integrated Computer Solutions	3.5.1	/tools/bx	
Development Suite, GUI	Epak/GraphPak	IDG	SGI	Integrated Computer Solutions	2.5	/tools/bx/epak	
Development Suite, GUI, TCL	TCL/Tk	IDG	SUN	<TBD>	4.1		
Development Suite, GUI, TCL	TCL/Tk: Incr Tcl (tcl)	IDG	HP	SUN Microsystems Inc	2.2.2patch 2		OOP for Tcl/Tk
Development Suite, GUI, TCL	TCL/Tk: Incr Tcl (tcl)	IDG	SGI	SUN Microsystems Inc	2.2.2patch 2		OOP for Tcl/Tk
Development Suite, GUI, TCL	TCL/Tk: Incr Tcl (tcl)	IDG	SUN	SUN Microsystems Inc	2.2.2patch 2		OOP for Tcl/Tk
Development Suite, GUI, TCL	TCL/Tk: TCL-DP	IDG	HP	<TBD>	3.5b3		Distributed Internet TCL programming
Development Suite, GUI, TCL	TCL/Tk: TCL-DP	IDG	SGI	<TBD>	3.5b3		Distributed Internet TCL programming
Development Suite, GUI, TCL	TCL/Tk: TCL-DP	IDG	SUN	<TBD>	3.5b3		Distributed Internet TCL programming
Development Suite, GUI, TCL	TCL/Tk: TCLX	IDG	HP	<TBD>	7.6	/usr/ecs/<mode>/COTS/tcl	Allows more control of unix commands
Development Suite, GUI, TCL	TCL/Tk: TCLX	IDG	SGI	<TBD>	7.6	/usr/ecs/<mode>/COTS/tcl	Allows more control of unix commands
Development Suite, GUI, TCL	TCL/Tk: TCLX	IDG	SUN	<TBD>	7.6	/usr/ecs/<mode>/COTS/tcl	Allows more control of unix commands
Development Suite, GUI, Tk	TCL/Tk: GroupKit	IDG	HP	<TBD>	4.3.3		Real-Time Processing
Development Suite, GUI, Tk	TCL/Tk: GroupKit	IDG	SGI	<TBD>	4.3.3		Real-Time Processing
Development Suite, GUI, Tk	TCL/Tk: GroupKit	IDG	SUN	<TBD>	4.3.3		Real-Time Processing
Development Suite, GUI, Tk	TCL/Tk: Tix	IDG	HP	<TBD>	4.1.0		Library for over 40 mega widgets
Development Suite, GUI, Tk	TCL/Tk: Tix	IDG	SGI	<TBD>	4.1.0		Library for over 40 mega widgets
Development Suite, GUI, Tk	TCL/Tk: Tix	IDG	SUN	<TBD>	4.1.0		Library for over 40 mega widgets
Development Suite, GUI, Tk	TCL/Tk: TkTree	IDG	HP	<TBD>	4.1		Widget for displaying dynamic trees
Development Suite, GUI, Tk	TCL/Tk: TkTree	IDG	SGI	<TBD>	4.1		Widget for displaying dynamic trees
Development Suite, GUI, Tk	TCL/Tk: TkTree	IDG	SUN	<TBD>	4.1		Widget for displaying dynamic trees
Disk/Volume Manager	Veritas	SED-RW	SUN	SUN Microsystems Inc	TBD		
Document Generation	Microsoft Office Professional	IDG	SUN	Microsoft Corp.	7.0		
Document Generation	WABI	IDG	SUN	Unknown	2.2	/opt/SUNWwabi/bin	
Editing & Viewing	EMACS	IDG	HP	Unknown	19.13	/tools/bin/emacs	Freeware checked through ClearCase

* Commodity Codes: F = freeware; S = shareware

Figure 9.9.8.1-19. COTS Software Version Baseline Report (no control item ids)


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(plpatbl)
12:27 ECS Development Facility PATCH BASELINE REPORT DATE: 07/28/99 TIME:
PAGE: 1 Control Item ID: b00065000 ECS-wide Subsystem Baseline, Drop 5A Date of Configuration:
12/30/99

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PATCH NAME	CAT	RESP ORG	VARIANT	MFR/DEV NAME	VERSION	DESCRIPTION	CONTROL ITEM ID	COMMENT
ClearCase Patches								
3.1.1-20		IDG	SGI	Pure Software Inc	6.2	Clearcase Patch 3.1.1-20 for Irix 6.2 (64 bit)	b00048858	
3.1.1-20		IDG	SGI	Pure Software Inc	5.5.1	Clearcase Patch 3.1.1-20 for Solaris 5.5.1	b00048896	
3.1.1-21		IDG	SGI	Pure Software Inc	5.5.1	Clearcase Patch 3.1.1-21 for Solaris 5.5.1	b00048897	
3.1.1-30		IDG	SGI	Pure Software Inc	6.2	Clearcase Patch 3.1.1-30 for Irix 6.2 (64 bit)	b00048860	
3.1.1-32		IDG	SGI	Pure Software Inc	5.5.1	Clearcase Patch 3.1.1-32 for Solaris 5.5.1	b00048898	
3.1.1-37		IDG	SGI	Pure Software Inc	6.2	Clearcase Patch 3.1.1-37 for Irix 6.2 (64 bit)	b00048861	
3.1.1-37		IDG	SGI	Pure Software Inc	6.2	Clearcase Patch 3.1.1-37 for Irix 6.2 (64 bit)	b00048862	
3.1.1-38		IDG	SGI	Pure Software Inc	5.5.1	Clearcase Patch 3.1.1-38 for Solaris 5.5.1	b00048899	
3.1.1-39		IDG	SGI	Pure Software Inc	5.5.1	Clearcase Patch 3.1.1-39 for Solaris 5.5.1	b00048990	
3.1.1-40		IDG	SGI	Pure Software Inc	6.2	Clearcase Patch 3.1.1-40 for Irix 6.2 (64 bit)	b00048863	
3.1.1-40		IDG	SGI	Pure Software Inc	5.5.1	Clearcase Patch 3.1.1-40 for Solaris 5.5.1	b00048991	
3.1.1-41		IDG	SGI	Pure Software Inc	6.2	Clearcase Patch 3.1.1-41 for Irix 6.2 (64 bit)	b00048864	
HP DCE PATCH								
PHSS_10565		C		Hewlett Packard Corp	1.5	HP DCE/9000 1.5 cumulative patch	b00051111	
PHSS_10566		C		Hewlett Packard Corp	1.5	Domestic HP DCE/9000 1.5 cumulative patch	b00051112	
HP OS BASE PATCHES								
PHCO_10124		C		Hewlett Packard Corp		date(1)	b00050584	
PHCO_10125		C		Hewlett Packard Corp		rlog(1) co(1)	b00050586	
PHCO_10175		C		Hewlett Packard Corp		libc year2000 white paper	b00050588	
PHCO_10272		C		Hewlett Packard Corp		Cumulative fixes for vipw.	b00050590	
PHCO_10295		C		Hewlett Packard Corp		Allows mounting a disabled vxfs snapshot FS	b00050592	
PHCO_10576		C		Hewlett Packard Corp		cumulative sar(1) patch.	b00050594	
PHCO_10578		C		Hewlett Packard Corp		extends hfs fix for very large file systems	b00050596	
PHCO_10615		C		Hewlett Packard Corp		cumulative fix for SAM convert/unconvert	b00050598	
PHCO_10663		C		Hewlett Packard Corp		HP-UX cut (1) cumulative patch.	b00050600	
PHCO_10752		C		Hewlett Packard Corp		Installation docs for B180L, C200 systems	b00050602	
PHCO_10848		C		Hewlett Packard Corp		patch to add new /usr/sbin/mc command	b00050604	
PHCO_10868		C		Hewlett Packard Corp		cumulative sed(1) patch	b00050606	
PHCO_10881		C		Hewlett Packard Corp		Cumulative iconv(1) methods library patch	b00050608	
PHCO_10947		C		Hewlett Packard Corp		cumulative libbcurses patch	b00050610	
PHCO_11214		C		Hewlett Packard Corp		pw_id map corruption and getasop loop	b00050612	
PHCO_11342		C		Hewlett Packard Corp		cumulative Xcourse library patch	b00050614	
PHCO_11436		C		Hewlett Packard Corp		localedef(1) patch	b00050616	
PHCO_11437		C		Hewlett Packard Corp		ed(1) patch	b00050618	
PHCO_11647		C		Hewlett Packard Corp		HP-UX Upgrade Transition links patch	b00050620	
PHCO_11760		C		Hewlett Packard Corp		Cumulative make(1) patch	b00050624	
PHCO_11977		C		Hewlett Packard Corp		pax(1) cumulative patch	b00050626	
PHCO_12097		C		Hewlett Packard Corp		cumulative newgrp(1) patch	b00050628	
PHCO_12140		C		Hewlett Packard Corp		patch cleanup utility	b00050630	
PHCO_12184		C		Hewlett Packard Corp		useradd(1M) Cumulative patch	b00050632	
PHCO_12236		C		Hewlett Packard Corp		cumulative SAM trusted user patch.	b00050634	
PHCO_12332		C		Hewlett Packard Corp		Cumulative mediainit patch	b00050636	
PHCO_12355		C		Hewlett Packard Corp		acctcms(1m) patch.	b00050638	
PHCO_12405		C		Hewlett Packard Corp		HPFSP 2nd patch	b00050640	
PHCO_12435		C		Hewlett Packard Corp		fsck_hfs(1M) cumulative patch	b00050642	
PHCO_12512		C		Hewlett Packard Corp		Fixes incorrect output of ioscan.	b00050644	
PHCO_12558		C		Hewlett Packard Corp		asa(1) patch.	b00050646	
PHCO_12686		C		Hewlett Packard Corp		uucp(1) Cumulative patch	b00050648	
PHCO_12822		C		Hewlett Packard Corp		Fixes handling of >2GB dump areas.	b00050650	
PHCO_12833		C		Hewlett Packard Corp		Cumulative SAM Patch.	b00050652	
PHCO_12834		C		Hewlett Packard Corp		trtab(4) cumulative patch	b00050654	
PHCO_12923		C		Hewlett Packard Corp		fsck_vxfs(1m) cumulative patch	b00050656	
PHCO_13079		C		Hewlett Packard Corp		cumulative PFS patch	b00050660	depends on PHKL_14568, PHKL_12339
PHCO_13084		C		Hewlett Packard Corp		awk(1) cumulative patch	b00050662	
PHCO_13198		C		Hewlett Packard Corp		dd(1) patch for block/unblock conversion	b00050664	
PHCO_13450		C		Hewlett Packard Corp		sysdef(1M) patch	b00050666	
						.		
						.		
						.		
						.		

Figure 9.9.8.1-20. Patch Baseline Report

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(sitehost)
15:25
Goddard Space Flight Center
1
Control Item ID: b00010010
09/04/98
nnn-TDA-001-nn

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SITE-HOST MAP REPORT

DATE: 09/04/98 TIME: PAGE:

ECS Operational Subsystem Baseline, Ver.2.0, Drop 4P1 Date of configuration:

SUBSYSTEM	SRC CI	HOST FUNCTION	EDC	GSFC	LaRC	NSIDC	SMC
AST Subsystem	ASTHW	ASTER DEM Workstation	e0ass03				
AST Subsystem	ASTHW	ASTER LUT Database Server 01	e0ass01				
AST Subsystem	ASTHW	ASTER LUT Database Server 02	e0ass02				
Communications Subsystem	DCHCI	Bulletin Board Server					m0css02
Communications Subsystem	DCHCI	CSS Server	e0css02	g0css02	10css02	n0css02	m0css03
Communications Subsystem	DCHCI	FTP Server 01					m0css05
Communications Subsystem	DCHCI	FTP Server 02					m0css04
DMS Subsystem	AITHW	AIT Workstation/DBMS Server				n0ais01	
DMS Subsystem	AQAHW	QA Workstation 02				n0spg01	
DMS Subsystem	AQAHW	QA Workstation 03				n0spg02	
DMS Subsystem	INTHW	Interface Server (P)	e0ins02	g0ins02	10ins02	n0ins02	
DMS Subsystem	INTHW	Interface Server (S)	e0ins01	g0ins01	10ins01	n0ins01	
Data Mgmt Subsystem	DMGHW	DBA Operations Workstation	e0dmh02	g0dmh01	10dmh02	n0dmh02	
Data Mgmt Subsystem	DMGHW	Data Spec Workstation 01	e0dms03	g0dms03	10dms01	n0dms03	
Data Mgmt Subsystem	DMGHW	Data Spec Workstation 02	e0dms04	g0dms04	10dms04	n0dms04	
Data Mgmt Subsystem	DMGHW	Data Spec Workstation 03		g0dms05	10dms05		
Data Mgmt Subsystem	DMGHW	Sybase Backup Server	e0dmh01	g0dmh02	10dmh03	n0dmh01	
Data Process Subsystem	AITHW	AIT Workstation	e0ais02	g0ais05	10ais09		
Data Process Subsystem	AITHW	AIT Workstation/DBMS Server		g0ais01	10ais01		
Data Process Subsystem	AITHW	SSI&T AIT Server	esais01	gsais01			
Data Process Subsystem	SPRHW	Queuing Server	e0sps04	g0sps06	10sps03	n0sps08	
Data Process Subsystem	SPRHW	Science Processor 01	e0spg01	g0spg01	10spg01	n0spg03	
Data Process Subsystem	SPRHW	Science Processor 02			10spg05	n0spg09	
Data Process Subsystem	SPRHW	Science Processor 03	e0spg05	g0spg07	10spg06		
Data Server Subsystem	ACMHW	APC Server (P)	e0acg01	g0acg01	10acg02	n0acg01	
Data Server Subsystem	ACMHW	APC Server (S)	e0acg02	g0acg05	10acg05	n0acg02	
Data Server Subsystem	ACMHW	EMASS Manager 01		g0drp05			
Data Server Subsystem	ACMHW	Operations WS 01	e0acs03	g0acs02	10acs01	n0acs03	
Data Server Subsystem	ACMHW	Operations WS 02	e0acs04	g0acs06	10acs06	n0acs06	
Data Server Subsystem	ACMHW	SDSRV Server (P)	e0acs05	g0acs03	10acs03	n0acs04	
Data Server Subsystem	ACMHW	SDSRV Server (S)	e0acs06	g0acs04	10acs04	n0acs05	
Data Server Subsystem	AITHW	AIT Workstation/DBMS Server	e0ais03				
Data Server Subsystem	AQAHW	Disk/RAID Driver	e0aqq01	g0aqq01	10aqq02		
Data Server Subsystem	AQAHW	QA Workstation 01	e0aqq02	g0aqq02	10aqq01		
Data Server Subsystem	DIPHW	Distribution Server (P)	e0dis02	g0dis02	10dis02	n0dis02	
Data Server Subsystem	DIPHW	Distribution Server (S)	e0dis01	g0dis01	10dis01	n0dis01	
Data Server Subsystem	DIPHW	Scanner Host PC	e0dip05	g0dip03	10dip03	n0dip04	
Data Server Subsystem	DRPHW	ACSLs Workstation 01	e0drs03	g0drs03	10drs02	n0drs03	

Figure 9.9.8.1-21. Site-Host - Map Report

(basedoc1)
 10:23
 System Monitoring and Coordination Center
 PAGE: 1
 Control Item ID: b00010020
 12/31/98
 Doc #: 910-TDA-ann, Rev n

BASELINED DOCUMENTS (TITLE ORDER) REPORT
 ECS Product Baseline, Ver.2.0, Drop 4P1

DATE: 04/13/99 TIME:

Date of Configuration:

TITLE	DOCUMENT NUMBER	CONTROL ITEM ID	ISSUE	MFR/DEV	PUB DATE	REPOSITORY	FORMAT	COMMENT
AIT Server Disk Partitions	922-TDE-021-00	b00022030		ECS	03/03/98	ECS Baseline Home Page	.ppt	
AIT Server Disk Partitions	922-TDL-021-00	b00022040		ECS	05/05/98	ECS Baseline Home Page	.ppt	
APC Server Disk Partitions	922-TDE-001-00	b00022060		ECS	12/04/97	ECS Baseline Home Page	.ppt	
APC Server Disk Partitions	922-TDG-001-00	b00019720		ECS	09/05/97	ECS Baseline Home Page	.ppt	
APC Server Disk Partitions	922-TDL-001-00	b00022070		ECS	12/09/97	ECS Baseline Home Page	.ppt	
AQA Host Disk Partitions	922-TDG-003-00	b00019730		ECS	03/04/97	ECS Baseline Home Page	.ppt	
AQA Host Disk Partitions	922-TDL-003-00	b00022090		ECS	06/11/97	ECS Baseline Home Page	.ppt	
Access Control Lists	910-TDA-006-00	b00019460		ECS	03/03/98	ECS Baseline Home Page	.doc	
Accounts	910-TDA-011-00	b00019490		ECS	06/26/98	ECS Baseline Home Page	.doc	
Build Plan (4P and 4P1)	N/A	b00019940		ECS	06/30/98	ECS Baseline Home Page	.doc	No doc number assigned by CM
COTS License Mapping	910-TDA-tbd	b00019510		ECS	**/**/**	TBD	TBD	Publication date TBD
CSS Server Disk Partitions	922-TDE-005-00	b00022170		ECS	02/18/97	ECS Baseline Home Page	.pdf	
CSS Server Disk Partitions	922-TDG-005-00	b00019740		ECS	04/03/97	ECS Baseline Home Page	.pdf	
CSS Server Disk Partitions	922-TDL-005-00	b00022180		ECS	04/03/97	ECS Baseline Home Page	.pdf	
Cable Management Plan	920-TDE-005-05	b00022120		ECS	01/23/98	ECS Baseline Home Page	.pdf	
Cable Management Plan	920-TDG-005-04	b00019590		ECS	04/20/98	ECS Baseline Home Page	.pdf	
Cable Management Plan	920-TDL-005-01	b00022130		ECS	02/17/98	ECS Baseline Home Page	.pdf	
Core Metadata Model	420-TP-015-02	b00019440		ECS	05/24/98	ECS Data Handling System	.doc	
DIP Server #2 Disk Partitions	922-TDE-019-01	b00022240		ECS	05/06/98	ECS Baseline Home Page	.ppt	
DIP Server #2 Disk Partitions	922-TDG-019-01	b00019860		ECS	12/03/97	ECS Baseline Home Page	.ppt	
DIP Server #2 Disk Partitions	922-TDL-019-00	b00022250		ECS	12/09/97	ECS Baseline Home Page	.ppt	
DIP Server Disk Partitions	922-TDE-006-02	b00022270		ECS	05/05/98	ECS Baseline Home Page	.ppt	
DIP Server Disk Partitions	922-TDG-006-01	b00019750		ECS	12/31/97	ECS Baseline Home Page	.ppt	
DIP Server Disk Partitions	922-TDL-006-00	b00022280		ECS	12/09/97	ECS Baseline Home Page	.ppt	
DRP Server Disk Partitions	922-TDE-007-02	b00022320		ECS	03/03/98	ECS Baseline Home Page	.ppt	
DRP Server Disk Partitions	922-TDG-007-00	b00019760		ECS	12/23/97	ECS Baseline Home Page	.ppt	
DRP Server Disk Partitions	922-TDL-007-00	b00022330		ECS	12/09/97	ECS Baseline Home Page	.ppt	
Database Design and Database Schema Specifications	311-CD-10x-0x	b00019410		ECS	06/11/98	ECS Data Handling System	.doc	
Databases Configuration Listing	920-TDG-010	b00019620		ECS	**/**/**	TBD	TBD	Publication date TBD
Delivered Archive Data	TBD	b00019950		ECS	**/**/**	TBD	TBD	Document not yet available
Descriptor File Template	916-TDA-001-01	b00019550		ECS	02/13/98	ECS Baseline Home Page	.doc	
Directory Structures	910-TDA-009-01	b00019480		ECS	06/12/98	ECS Baseline Home Page	.ppt	
Drop 4 P1 Domains and Baseline Data	910-TDA-015-00	b00019500		ECS	07/01/98	ECS Baseline Home Page	.xls	
Dual-Homed Host Static Routes	921-TDG-005-00	b00019700		ECS	10/22/97	ECS Baseline Home Page	.xls	
ECS Domain Name Server Data File Content	923-TDE-0xx	b00022360		ECS	04/24/98	ECS Baseline Home Page	.doc	
ECS Domain Name Server Data File Content	923-TDG-0xx	b00019870		ECS	04/24/98	ECS Baseline Home Page	.doc	
ECS Domain Name Server Data File Content	923-TDL-0xx	b00022370		ECS	04/24/98	ECS Baseline Home Page	.doc	
ECS Domain Name Service Structure	913-TDA-001-00	b00019530		ECS	04/24/98	ECS Baseline Home Page	.ppt	
ECS Internal ICDS	313-CD-006-04	b00019420		ECS	05/29/98	ECS Data Handling System	.doc	
ECS Overall System Acceptance Test Procedures	411-CD-002-01	b00019430		ECS	09/20/96	ECS Data Handling System	.doc	Latest version published on
Web								
ECS Overall System Acceptance Test Report	412-CD-10x-0x	b00019930		ECS	**/**/**	TBD	TBD	Document to be available at
RRR								
ESDT Definition	N/A	b00019960		ECS	**/**/**	ECS RTM Home Page	TBD	No doc number assigned by CM
ESDT To Volume Group Mapping	920-TDG-tbd	b00019650		ECS	**/**/**	TBD	TBD	Document not yet available
Engineering Records	910-TDA-tbd	b00019520		ECS	**/**/**	TBD	TBD	Document not yet available
Floor Plan	920-TDE-004-01	b00022460		ECS	01/23/98	ECS Baseline Home Page	.pdf	
Floor Plan	920-TDG-004-05	b00019580		ECS	06/06/98	ECS Baseline Home Page	.pdf	
Floor Plan	920-TDL-004-01	b00022470		ECS	11/24/97	ECS Baseline Home Page	.pdf	
Hardware Network Diagram	921-TDE-002-05	b00022490		ECS	01/30/98	ECS Baseline Home Page	.pdf	
Hardware Network Diagram	921-TDG-002-04	b00019670		ECS	01/30/98	ECS Baseline Home Page	.pdf	
Hardware Network Diagram	921-TDL-002-03	b00022500		ECS	01/30/98	ECS Baseline Home Page	.pdf	
Host IP Assignments	921-TDG-003-03	b00022530		ECS	10/22/97	ECS Baseline Home Page	.pdf	
Host IP Assignments	921-TDG-003-04	b00019690		ECS	10/22/97	ECS Baseline Home Page	.pdf	
Host IP Assignments	921-TDG-003-05	b00022520		ECS	10/22/97	ECS Baseline Home Page	.pdf	
I/O Ports	910-TDA-002-02	b00019450		ECS	05/08/98	ECS Baseline Home Page	.doc	
ICL Server Disk Partitions	922-TDE-008-01	b00022560		ECS	07/23/98	ECS Baseline Home Page	.ppt	
ICL Server Disk Partitions	922-TDG-008-01	b00019770		ECS	07/23/98	ECS Baseline Home Page	.ppt	
ICL Server Disk Partitions	922-TDL-008-01	b00022570		ECS	07/23/98	ECS Baseline Home Page	.ppt	
Ingest Host Static Routes	921-TDE-006-01	b00022590		ECS	10/22/97	ECS Baseline Home Page	.xls	
Ingest Host Static Routes	921-TDG-006-00	b00019710		ECS	10/22/97	ECS Baseline Home Page	.xls	
Ingest Host Static Routes	921-TDL-006-00	b00022600		ECS	10/22/97	ECS Baseline Home Page	.xls	
Interface Server Disk Partitions	922-TDE-009-01	b00022620		ECS	03/03/98	ECS Baseline Home Page	.ppt	
Interface Server Disk Partitions	922-TDG-009-00	b00019780		ECS	12/23/97	ECS Baseline Home Page	.ppt	
Interface Server Disk Partitions	922-TDL-009-00	b00022630		ECS	12/09/97	ECS Baseline Home Page	.ppt	
MSS File-CM Server Disk Partitions	922-TDE-011-01	b00022680		ECS	03/03/98	ECS Baseline Home Page	.pdf	

Figure 9.9.8.1-22. Baselined Documents (Title Order) Report

(basedoc2)
10:23

DATE: 04/13/99 TIME:

System Monitoring and Coordination Center

BASELINED DOCUMENTS (NUMBER ORDER) REPORT

PAGE: 1

Control Item ID: b00010020
12/31/98

ECS Product Baseline, Ver.2.0, Drop 4P1

Date of Configuration:

Doc #: 910-TDA-nnn, Rev n

DOCUMENT NUMBER	TITLE	CONTROL ITEM ID	ISSUE	MFR/DEV	PUB DATE	REPOSITORY	FORMAT	COMMENT
220-WP-003-01	V2.0 Baseline Deployment Plan	b00019395		ECS	03/15/98	ECS Data Handling System	.doc	
305-CD-100-02	Segment/Design Specifications	b00019400		ECS	05/29/98	ECS Data Handling System	.doc	Final version: 11/09/98
311-CD-10x-0x	Database Design and Database Schema Specifications	b00019410		ECS	06/11/98	ECS Data Handling System	.doc	
313-CD-006-04	ECS Internal ICDs	b00019420		ECS	05/29/98	ECS Data Handling System	.doc	
411-CD-002-01	ECS Overall System Acceptance Test Procedures	b00019430		ECS	09/20/96	ECS Data Handling System	.doc	Latest version published on Web
412-CD-10x-0x	ECS Overall System Acceptance Test Report	b00019930		ECS	**/**/**	TBD	TBD	Document to be available at RRR
420-TP-015-02	Core Metadata Model	b00019440		ECS	05/24/98	ECS Data Handling system	.doc	
910-TDA-002-02	I/O Ports	b00019450		ECS	05/08/98	ECS Baseline Home Page	.doc	
910-TDA-006-00	Access Control Lists	b00019460		ECS	03/03/98	ECS Baseline Home Page	.doc	
910-TDA-007-01	Program Register	b00019470		ECS	05/14/98	ECS Baseline Home Page	.doc	
910-TDA-009-01	Directory Structures	b00019480		ECS	06/12/98	ECS Baseline Home Page	.ppt	
910-TDA-011-00	Accounts	b00019490		ECS	06/26/98	ECS Baseline Home Page	.doc	
910-TDA-015-00	Drop 4 P1 Domains and Baseline Data	b00019500		ECS	07/01/98	ECS Baseline Home Page	.xls	
910-TDA-tbd	COTS License Mapping	b00019510		ECS	**/**/**	TBD	TBD	Publication date TBD
910-TDA-tbd	Engineering Records	b00019520		ECS	**/**/**	TBD	TBD	Document not yet available
913-TDA-001-00	ECS Domain Name Service Structure	b00019530		ECS	04/24/98	ECS Baseline Home Page	.ppt	
915-TDA-001-00	System Startup/Shutdown procedures Common	b00019540		ECS	**/**/**	TBD	TBD	Document not yet available
916-TDA-001-01	Descriptor File Template	b00019550		ECS	02/13/98	ECS Baseline Home Page	.doc	
920-TDE-003-00	System Infrastructure	b00023020		ECS	05/16/97	ECS Baseline Home Page	.doc	
920-TDE-004-01	Floor Plan	b00022460		ECS	01/23/98	ECS Baseline Home Page	.pdf	
920-TDE-005-05	Cable Management Plan	b00022120		ECS	01/23/98	ECS Baseline Home Page	.pdf	
920-TDE-007-00	Vendor Documentation	b00023190		ECS	11/15/97	ECS Baseline Home Page	.xls	

Figure 9.9.8.1-23. Baselined Documents (Number Order) Report

9.9.8.2 Report Customization

All of the pre-defined reports discussed in Section 9.9.8.1 are generated according to specifications that are “compiled” using XRP-II’s Datarite report writer. Authorized operators can modify these specifications or develop their own. See Section 8 of the Datalook/Datarite Reference Manual for details.

10. Metadata Administration

Every science data product generated and archived by the ECS must be described to the system by metadata which are put into an inventory and then used to retrieve and distribute the data to users of the system. The ECS Earth Science Data Model, described in documents 420-TP-020-001 and 420-TP-016, organizes the metadata into groups of related attributes and services to be performed on the data products. These "core" attributes are necessary to identify, interpret and perform services on granules and collections. The Data Model also provides for "product-specific" attributes, i.e. attributes which are unique to a specific data product.

The smallest aggregation of data that is independently described and inventoried in ECS is referred to as a data granule. Granules are organized into logical groupings called collections in which the granule metadata varies principally by time or location, called single-type collections. In Release 2 only single-type collections are supported (more complex organizations will be supported in later ECS releases).

Every collection is described by an Earth Science Data Type (ESDT) and is made known to the system by an ESDT descriptor file and associated software code which is built into the Data Server's dynamic link library (DLL) to perform the services.

Metadata administration includes creating and updating ESDTs within ECS. Collections may be modified and updated over time. In addition, quality assurance will be performed after ESDTs have been installed and granules have been generated and stored in the archives. Collection-level metadata can only be updated by installing a revised ESDT. In Release 2, the only granule-level metadata which can be updated manually (i.e. not as a result of an operation such as Subsetting which modifies the science data content of a granule) are the Quality Assurance flags and explanations. Procedures for updating these flags are provided in Section 15.

10.1 ESDT Descriptor Files

The primary task in establishing a collection is providing the core and product-specific metadata attribute values. This is done by creating an Earth Science Data Type (ESDT) descriptor file. The descriptor file is also used to specify the data services that are available for granules that belong to the collection. These services are implemented as methods of a Dynamic Link Library (DLL) containing C++ code to accomplish each service. The descriptor file and the DLL are the means by which a collection is made known to the Science Data Server (SDSRV).

The ESDT descriptor is composed of sections, all in ODL, containing the following information:

- Collection level metadata attributes with values contained in the descriptor.
- Granule level metadata attributes whose values are supplied primarily by the Product Generation Executives (PGEs) during runtime.
- Valid values and permitted ranges for all product-specific attributes.

- List of services for all the granules in the collection and events which trigger responses throughout the system.

The ESDT descriptor file is created by Metadata Works (MDWorks in Figure 10.2-1), discussed in Section 10.3.3.

The services which apply to a collection are specified in the ESDT descriptor file. Metadata Works automatically inserts standard ECS-supplied services such as insert and search into the descriptor file. Product-specific services, such as Subsetting or a product-specific acquire, require executable code to enact those services. This code is contained in the DLL. The DLL is written and tested by either the ECS developers or sustaining engineering personnel at the DAAC.

After the ESDT (both descriptor file and DLL) has been generated it must be installed on the Science Data Server before the first data granule can be inserted. During this installation process, information from the ESDT Descriptor File is propagated to the Data Management and Interoperability subsystems, and to the Subscription Server, which must all be operating during the ESDT installation process. The detailed procedures for ESDT installation into ECS are described in Section 11.3.

10.1.1 Steps in Generating a Descriptor File

ESDTs for Distributable Product

These are the typical steps used in generating a descriptor file:

.Identify desired collection-level metadata attributes

- For permanent and interim files use only the minimum attributes.
- For distributable products identify all applicable attributes. This will involve reading appropriate documentation and interacting with the data provider.

.Identify granule-level attributes

- If a sample metadata configuration file is available from the data provider, use this.

.Check valids for core attributes (write CCR if new valids are required).

.Check PSAs (register PSAs if new).

.Gather metadata into a spreadsheet, or use Metadata Works to enter metadata directly.

.Use custom built scripts to generate the descriptor file from the spreadsheet, if used.

.Verify the descriptor file as outlined below.

.Check descriptor files into ClearCase.

.Notify the DLL Team Lead of the newly prepared descriptor files.

10.1.2 Verifying Descriptor Files

- Run the PERL script "update.pl", following the instructions in the script prologue. (This script makes sure that the inventory metadata attributes are all listed as event qualifiers in the EVENT group.)
- Run the PERL script "esdtQC.pl", following the instructions in the script prologue. Make any necessary corrections in response to errors issued, and rerun. Repeat until there are no errors. (This script checks for more than 30 common descriptor file errors.)
- Run the PERL script "required.pl", following the instructions in the script prologue. Add any missing attributes as indicated.
- Run the "testodl.csh" utility to ensure that there are no errors in the ODL structure for the descriptor file. Make any necessary corrections in response to errors issued, and rerun. Repeat until there are no errors.

10.2 Preparation of Earth Science Data Types

An ESDT goes through pre-operational life cycle steps starting with an analysis of the collection's need and continuing through development and operational installation. This process involves actions by the Data Provider or User in addition to ECS. These procedures are detailed in Project Instruction SO-1-002, "Earth Science Data Type Generation Procedures". The overall workflow is shown in Figure 10.2-1.

DEFINITIONS

Archive - A File Type indicating granules will be inserted to Data Server for long term storage and acquisition for distribution.

Full - A level of metadata coverage intended for data products which are produced within ECS.

Collection - A related group of data granules.

Granule - The smallest data element which is identified in the inventory tables.

Interim - A File Type indicating granules are temporarily stored in support of product generation.

Intermediate - A level of metadata coverage intended for contemporaneous data products which are not produced within ECS.

Limited - A level of metadata coverage intended for heritage data products brought into ECS for distribution

Minimal - A level of metadata coverage sufficient to uniquely identify a collection or granule.

Permanent - A File Type indicating static or semi-static granules which are used only as inputs in product generation.

Product Specific Attributes - Attributes that are defined by the data provider in support of searching for specific granules

Valid - An allowable metadata value.

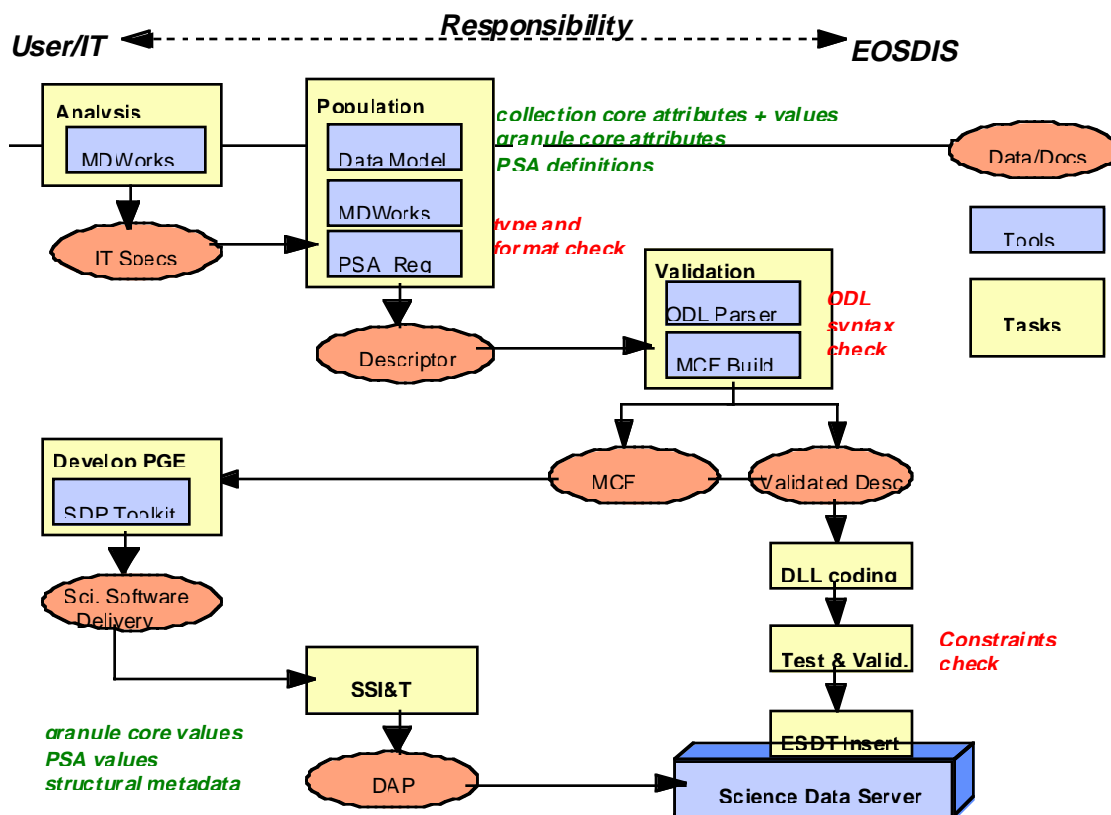


Figure 10.2-1. The ESDT Generation Process

PROCESS:

1. Need Analysis

- The baseline list of science ESDTs and their services is controlled by the ECS CCB. This baseline was established through an analysis of the ECS Functional and Performance Requirements Specification, the Technical Baseline established from inputs from the Ad Hoc Working Group on Production, and meetings with the individual data providers to define the basic requirements of each ESDT.

These basic requirements are:

- Data Provider File Designation,
- File Type (Permanent, Interim, Archive)
- Level of Metadata Coverage (Minimal, Limited, Intermediate, Full)

- For new ESDTs not currently in the development baseline, the result of the Need Analysis forms the basis for approving the inclusion of the ESDT into ECS. This is accomplished through the CCR process, governed by PIs "Configuration Change Request Preparation" [CM-1-003] and "Change Control Board Process" [CM-1-004].

2. ESDT Specification

- This step results in a set of specifications extending the results of the needed analysis and providing the information needed to implement an ESDT. This step is executed only if the ESDT has been included in the baseline. The roles and responsibilities for developing the specification are as above.

The specifications must include:

- ShortName and VersionID of the ESDT
- A list of the metadata attributes needed, valids, and any constraints on attributes. This list is to be drawn from the B.x Descriptor File Template. This template, under CCB control, is based on the attributes defined in "Release-B SDPS Database Design and Database Schema Specifications" [311-CD-008-001] (i.e., DID 311), as modified for B.0 (for example) by "B.0 Earth Science Data Model " [420-TP-020-001].
- A list and specification of the services needed (e.g., specification of the INSERT, SEARCH, ACQUIRE and SUBSCRIPTION semantics).

3. ESDT Generation

- Once the ESDT Specification has been developed and the applicable attributes identified, the necessary metadata has to be gathered, the metadata values checked against the valid values and the product-specific attributes (PSA) need to be checked against the list of PSAs that are already defined (see Fig. 10.2-2).
- Once the collection-level metadata and granule-level attributes have been checked, then the descriptor file is generated, the Dynamic Link Library produced, and testing and validation of the ESDT performed. This process is further elaborated in the sections below.
- For a one-of-a-kind, distributable product with Full metadata coverage, this process can take up to six weeks to accomplish. For a related group of products with identical services, much of the Descriptor File and DLL of the first ESDT can be reused, and the cycle time for preparing subsequent ESDTs in the related group is much less.

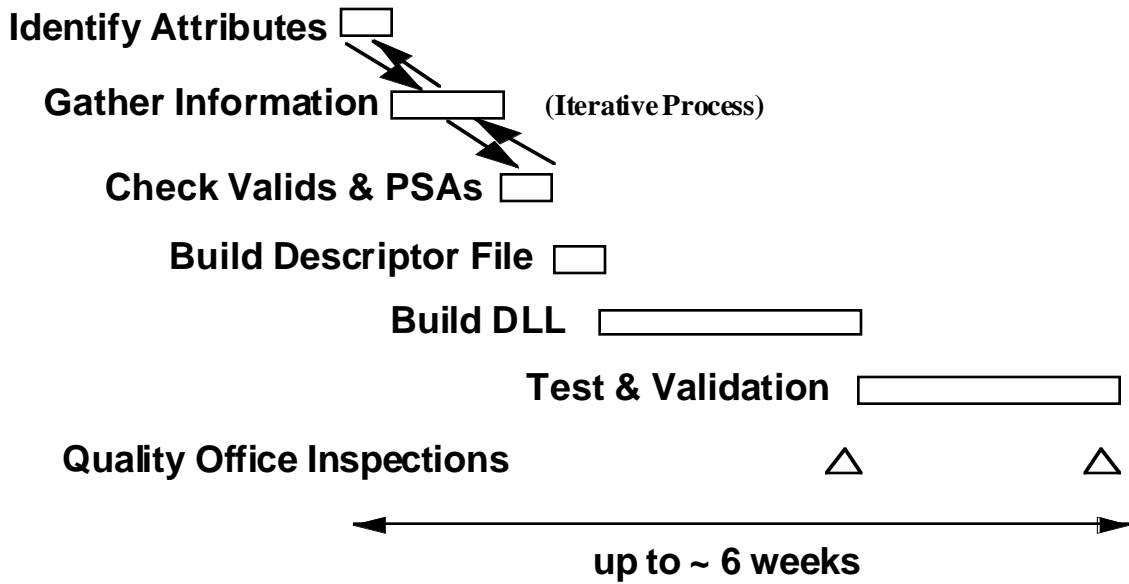


Figure 10.2-2. Steps in ESDT Development

10.3 Tools used in Generating a Descriptor File

Figure 10.3-1 shows the some of the tools that have been developed, and indicates supporting information flows between these tools. Brief descriptions of these tools are provided below.

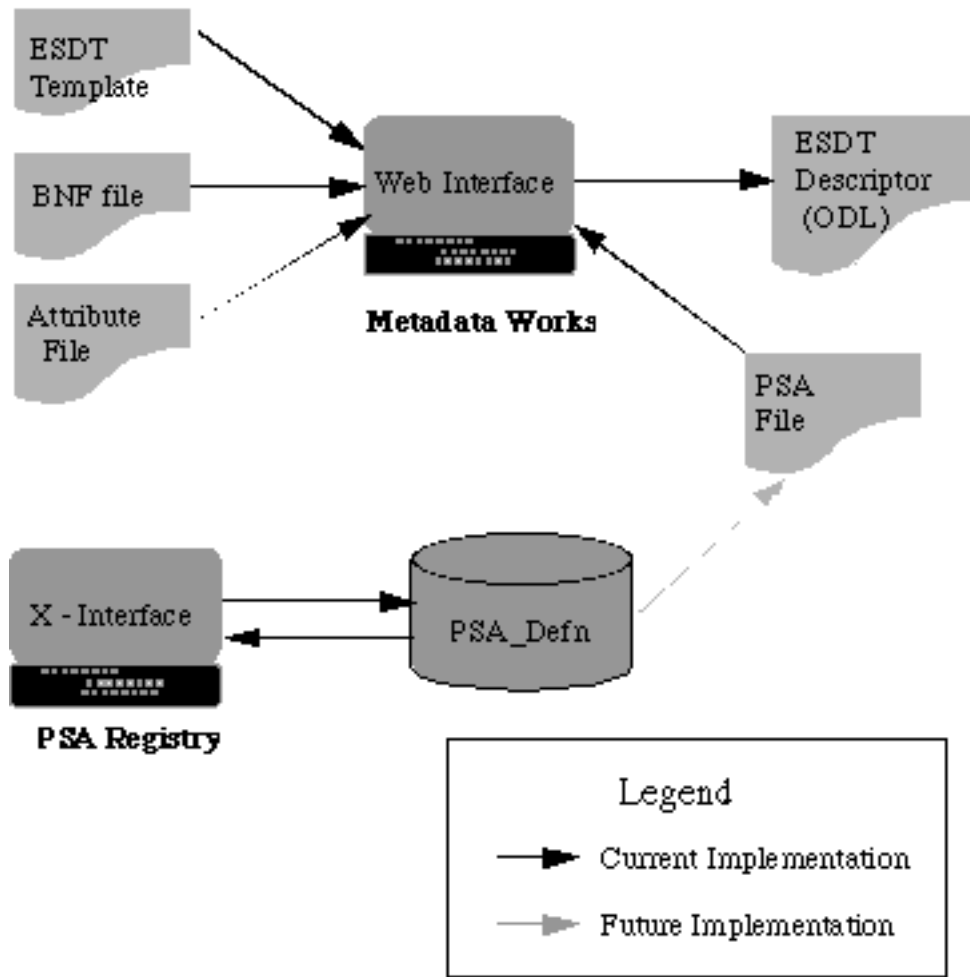


Figure 10.3-1. Tools and Supporting Information Flows

10.3.1 Data Dictionary and Validations Checking

Each proposed new valid must be reviewed by the Data Modeling group in order to validate that they fit within the model. When approved, within a couple days at most, the new valid will be available for use.

10.3.2 PSA Registry

Each Product Specific Attribute must be registered to ensure that the name is uniquely defined across all products and that no two names are applied to the same definition (aliases may be applied at the user's Client and in Data Management, but should not be applied within the inventory). An X-Windows based GUI has been developed to assist in the registration process.

10.3.3 Metadata Works

To support the entry of metadata for ESDTs with Full or Intermediate coverage, an HTML-based GUI has been developed. Metadata Works allows the person entering the metadata to start with a completely empty form, or to define a new descriptor file employing defaults of already defined groups or entire previously defined descriptor files. When the metadata entry is complete for a descriptor file, Metadata Works is then used to generate a complete Descriptor file employing the proper ODL syntax.

10.4 Metadata Population

10.4.1 Collection-Level Metadata

A majority of the attributes in the ECS Data Model apply to all the granules in the collection. These are known as collection-level attributes. There can be both core and product-specific collection-level attributes, defined once prior to establishing the collection.

Collection-level metadata is input via an HTML-forms GUI tool called Metadata Works, described further in Section 10.3.3. Based on the ECS Data Model it is designed for use by the data provider; e.g., an instrument team scientist or other person having extensive knowledge of the data. It can import as defaults the attribute values from a collection that has already been populated. A sequence of screens is presented to the user enabling specification of all required and optional attributes, with a list of permitted values presented where appropriate. Help screens give attribute definitions, data types and other relevant information to assist in the specification.

10.4.2 Granule-Level Metadata

The attributes in the ECS Data Model which can vary on a granule-by-granule basis are known as granule-level attributes. There can be both core and product-specific granule-level attributes.

Granule-level metadata are specified and populated using the Metadata Configuration File (MCF). The MCF is derived from information contained in the ESDT descriptor file and delivered by the Science Data Server for use by the Science Data Processing or Ingest Subsystems. The MCF specifies how the searchable metadata attributes **will** be populated in the SDSRV database. For data products generated by ECS, the science software or Product Generation Executive (PGE) interacts with the MCF using metadata tools contained in the Science Data Processing Toolkit. Through this process values are set for metadata attributes specified in the "source" MCF, such as the temporal or spatial coverage of each granule. These values are then inserted into a "target" MCF at PGE run time. The MCF is used in a similar manner for data entering ECS through the Ingest subsystem.

Procedures for entering data into ECS through the Ingest subsystem are described in Chapter 16. "Ingest". Procedures for running a PGE are described in Chapters 11.10 "Running a PGE in a Simulated SCF Environment at the DAAC" and 11.13 "PGE Planning Processing and Product Retrieval".

The Inventory Metadata section of Metadata Works is used to capture granule-level metadata specifications. An unofficial MCF may be generated as output from Metadata Works, for testing purposes. Final testing should always be done with the MCF provided by ECS which is guaranteed to be identical to the one delivered by SDSRV at run time.

The actual population of the granule-level attribute values into ECS inventory data bases takes place during the insert of a data granule into the SDSRV. Each data granule consists of one or more physical files. Accompanying each granule is a metadata record; i.e., an ASCII file containing the granule level attributes and their values in ODL. Only one metadata record is allowed per granule, i.e. no. sub-granule records are allowed, and no metadata records are shared between granules.

Procedures used to initiate the running of PGEs are described in Chapter 11.13 "PGE Planning and Processing".

10.4.3 Product-Specific Metadata

Product-specific metadata can be at both the granule-level and the collection-level. Product-specific metadata may (at the data providers election) be contained in the inventory tables in the database, in which case it will be searchable by ECS. There is also a provision to store product-specific metadata within granules that is available only when the granule has been ordered and delivered. This is termed archive metadata and is specified in a separate ODL group in the MCF.

In the granule metadata, the core attribute that is available to store product-specific metadata is called ParameterValue. The metadata describing this attribute is specified by the data provider through the AdditionalAttributes class at the collection-level. The units of measure, range, accuracy and resolution for this is specified in the PhysicalParameterDetails class, also at the collection-level.

Product-specific metadata at the collection level is specified with Metadata Works at the time the other collection level metadata attributes values are defined. At the granule-level, product-specific metadata is defined in the MCF. In both cases, a list of valid values and permitted ranges are specified in the ESDT data dictionary.

10.5 Testing and Validation

Testing and validation involves installation of the ESDT on a Data Server, and subsequent tests of the data services for the ESDT. These tests include insertion of actual or simulated data, search acquire, and other services that may apply and be available and supported under the extant version of ECS. (Section 11.3)

After testing, the ESDT Descriptor File and DLL are promoted to the development CM environment if pre-ECS release, or to the operational environment if after the ECS release is made operational.

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11. Production Rules for PGE's to Function in ECS

11.1 Production Rules

11.1.1 Purpose and Scope

This section describes the production rules supported by the Release B CDR design. It is intended to explain the implementation of these production rules in ECS and to document the information required for each rule. This section does not cover the exact design and implementation of these production rules in the PDPS system. That information may be found in the PDPS design documents, primarily in the Planning Subsystem document 305-CD-026-002, Release B SDPS Planning Subsystem Design Specification for the ECS Project.

While this section does address the syntax and operational procedures for specifying production rules, it does provide detailed information about what data is required for each rule and how that data will be used

11.1.2 Overview of Production Rules

11.1.2.1 Data Processing in ECS

Before discussing production rules, it is important to have a basic understanding of how the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) conducts its data processing. ECS provides facilities for running product generation executives (PGEs) to produce science data products. The support for this function primarily resides in three subsystems: the Data Processing Subsystem (DPS) which actually executes the PGEs, the Planning Subsystem (PLS) which plans the execution of PGEs to efficiently utilize the local computing resources and the Data Server Subsystem (DSS) which provides PGEs with input data and archives output data. The design and implementation of the DPS and the PLS are carried out by the ECS organization known as the Planning and Data Processing System (PDPS).

Data Processing Subsystem (DPS) - The DPS provides the environment under which PGEs are run. It works with the SDP toolkit to interface with the science software. The DPS coordinates the acquisition of input data (staging) and the archiving of output data (de-staging) with the DSS.

The DPS also ensures that there are adequate resources (disk space, RAM, etc.) available before a PGE begins execution. The DPS uses the AutoSys COTS product to implement the PLS production plan.

Planning Subsystem (PLS) - The PLS generally manages the ECS data processing activities and provides the main interface between the DPS and the rest of ECS. The PLS plans the execution of PGEs to provide efficient use of computing resources. The PLS receives. Production Requests (PRs) either from a software tool (Production Request Editor) or, for on-demand production requests (OPRs), from the DSS or DPS (see Error Handling). The PLS breaks up PRs

into data processing requests (DPRs), which are individual runs of a PGE. It maintains information about input data for specific DPRs and passes that information to the DPS. It queries the DSS for data which meets required criteria and provides the universal references (URs) of that data to the DPS for acquisition.

Data Server Subsystem (DSS) - The DSS provides input data to the DPS and archives output data from the DPS. It responds to queries from the PLS and provides the PLS notification of the arrival of input data for all subscriptions the PLS has placed with it. The DSS also submits On-Demand

Production Requests (OPRs) to the PLS.

These three subsystems form the core of the ECS data processing services. Since it has responsibility for managing these activities, most of the information about production rules will be maintained by the PLS.

11.1.2.2 General Definition of Production Rules

Simply stated, production rules are the instructions about how a particular PGE is to be run. These instructions specify a wide range of information such as the input and output data types, the frequency of execution, activation conditions and error handling instructions. This section focuses on the other types of production rules such as alternate inputs to be used or conditional PGE activations. These and other production rules are defined in the following sections.

Production rules in the ECS system will be tied to PGEs. This means that each PGE will use one or more production rules. The production rules will be initially entered by the Instrument Team with further modifications if necessary when a PGE undergoes Science Software Integration and Test (SSI&T) at the DAAC. Where applicable, default parameter values will be entered at that time. Many of these defaults can be overridden in the production environment when a Production Request is entered.

11.2 Production Rule Definitions

Introduction

This section presents a basic definition and examples of each of the production rules currently supported by the Release B CDR design. The production rules are divided into three categories:

Input Data Specification

Conditional Activation

Error Handling

Input Data Specification rules specify how the inputs for a particular run of a PGE are identified. Conditional Activation rules stipulate the conditions of when a particular PGE is to be run. Error Handling rules specify automatic actions to be taken when a PGE fails. Each sub-section is titled with the name of the production rule being discussed.

It is hoped that providing a common nomenclature will facilitate any future discussions between ITs and ECS about production rules. After each rule there is a list of the information required to implement that rule in the production environment (i.e. post-launch, at the DAACs). This information will initially be provided at SSI&T time. In the operational environment many of the values can be set when a Production Request is entered. Most production rule sections also include a simple diagram to help illustrate the concept being presented.

11.2.1 Input Data Specification

These production rules generally stipulate how inputs for a particular run of a PGE (a DPR) are identified/selected/created. Most PGEs have at least one input and one output. The most basic information about these inputs and outputs is the Earth Science Data Type (ESDT). It is assumed in the examples in this chapter that the ESDT is specified for all data sets which are used or produced by a PGE.

11.2.1.1 Basic Temporal

The most basic type of production rule specifies, for each input ESDT, the temporal range of that ESDT required by the PGE.

For example, the run of a PGE which produces a particular 2.5 minute MODIS Level 1B data granule requires as input the specific 2.5 minute Level 1A granule which is contemporaneous with the Level 1B granule to be produced.

Another example would be the production of a CERES Level 1A granule from the Level 0 data. CERES L1A granules cover 24 hours and require the PLS to identify and the DPS to stage all of the Level 0 data files that cover a particular 24 hour period. This sort of simple temporal specification is basic to the system and will be used by every PGE.

Inputs required to implement the Basic Temporal rule

For each PGE which uses this rule, the following data must be provided for each ESDT (input or output): Time period - Length of time of ESDT (e.g. 12 hours, 1 week or one year).

Boundary - Date/time to start counting periods

Both of the above parameters are specified at SSI&T time.

11.2.1.2 Example use of the Basic Temporal Rule

Suppose there is a PGE which creates a daily (24 hour) data set and those data sets should correspond with calendar days. In that case Time Period = 24 hours and Boundary = 1/1/98 00:00 (this could be any date). When a Production Request is entered, the Planning Subsystem will scan backwards from the start time of the PR until it finds the start of a period. It then produces DPRs for each period of time covered by the PR. Table 11.2.1.2-1 illustrates how this would work. Given the period and boundary defined above, two PRs are entered, the first for the time between 6/3/99 12:00 - 6/7/99 6:00 while the second specifies 6/7/99 18:00 - 6/16/99 12:00. When the first PR (#1) is entered, the Planning Subsystem determines that the start time of the PR is not the start time of a period. It then scans backwards, finding the start time of the period to be 6/3/99 00:00 and creates a DPR (1.1) to process that period. It then continues producing DPRs (1.2, 1.3, 1.4 and 1.5) until it reaches the end of the period which contains the end time of the PR. When the second PR (#2) is entered, the same process takes place. Note that since the end time of PR #1 and the start time of PR #2 fall in the same period, duplicate DPRs (1.5 and 2.1) are created. This sort of duplication is checked for by the Planning Subsystem and the second DPR is not run.

Table 11.2.1.2-1. Basic Temporal

Boundary (1/1/98 00:00)
= Period (24 Hrs)
PR #1 PR #2
DPR 1.1
DPR 1.2
DPR 1.3
DPR 1.4
DPR 1.5 = DPR 2.1
DPR 2.2
DPR 2.3
DPR 2.10
DPR 2.9
6/1/99 6/23/99

11.2.1.3 Alternate Inputs

This is a fairly simple rule, although there are several options which give it great flexibility and power. There are cases where, for one of its input data sets, a PGE can use any one of several inputs. For example, a particular PGE might require model wind data as an input and would be capable of accepting wind data from a DAO model, an NCEP model or, as a last resort, could

use climatology. Variants of this rule allow the alternate input to be optional or allow alternates to be grouped so that more than one of the alternates may be needed (i.e. use any M of N ESDTs in the group).

11.2.1.4 Inputs required to implement the Alternate Inputs rule

ESDT of Primary Alternate - This is the data set ID for the most desirable alternative.

Timer for Primary Alternate - Amount of time to wait before attempting to use second alternate.
Number Needed - Number of the alternate data sets (from this group of alternatives) required by the PGE. Usually 1, but can be more. If set to 0, this set of alternates is optional (i.e. the PGE can run without any of the alternates) ESDT of Second Alternate -

Data set ID for Second Alternate

Timer for second Alternate - Amount of time to wait before attempting to use third alternate.. (include any number of alternates, no practical limit).

ESDT of Last Alternate - Data set ID for Last Alternate.

Timer for Last Alternate - Note that this timer is used only if Number Needed = 0, which indicates that this set of alternates is optional. In that case, if this timer expires, the DPR will be executed even if none of the alternates is available. If however, Number Needed > 0, then this timer is not used; the DPR will be held indefinitely, waiting for one of the alternates to become available.

11.2.1.5 Example use of the Alternate Inputs Rule:

Let's assume that a PGE has two required input data sets and a third data set which can be any one of three alternates. Of the three alternates, the first two choices are almost equivalent, while the last choice is less desirable. In this case we designate the Primary Alternate (first choice) and set a timer for 1 hour. The second choice is designated with a timer set for 4 hours. This situation is shown in Table 11.2.4-1. What will happen is that, after the two required inputs are available, an attempt is made to acquire the first choice. If that choice is unavailable, the Planning Subsystem holds the DPR and starts the first timer (1 hour). If the first choice becomes available in that hour, the DPR is started immediately. If the first timer expires and the first alternate is still unavailable, an attempt is made to use the second choice. If the second choice is unavailable, the second timer (4 hours) is started. If the first or second alternates become available at any time during that 4 hours, the DPR is started immediately. However, if the second timer expires (a total of 5 hours after the two required inputs are available), an attempt is made to use the third choice. Unless this set of alternates is optional, most PGEs are expected to have a last alternate which is always available (e.g. climatology). If not, the DPR is held indefinitely waiting for one of the alternates to become available.

Table 11.2.1.5-1. Alternate Inputs

Required Dataset 1
Primary Alternate
Second Alternate
DPR
< or > First Choice –Timer set to 1 hour.
Wait 1 hour after required data sets are available before trying to use second alternate.
Second Choice –Timer set to 4 hours.
Wait 4 hours after this choice was first tried before attempting to use third alternate.
Output Dataset
Third Alternate < or > Third (in this case, last) choice. Attempt to use if primary and secondary alternates are unavailable 5 hours after required datasets are available.
Required Dataset 2

11.2.1.6 Tiling

In this case a PGE is set up to run for a series of pre-defined, rectangular areas (tiles). The tile definitions need to be entered into the PDPS database so that the proper input data granules can be identified. The implementation of this rule calls for the PGE developers to create tile definition files which would have descriptions of each tile. The Planning subsystem would then use those definitions to query the Data Server for input data granules for each tile. Tiles are grouped together into clusters which are likely to share common input granules. This is done for efficiency of operations.

11.2.1.7 Inputs required to implement the Tiling rule:

The primary input for the tiling rule is a tile definition file. This file will contain one entry for every tile which will include: Tile ID - Unique identifier used to refer to the tile Lat./Lon. of tile corners. Four coupled pairs of coordinates which bound the tile. Cluster ID - ID of cluster in which tile falls.

Table 11.2.1.7-1. Tiling (1 of 2)

Tile 1 Input Data
Tile 2 Input Data
Tile 3 Input Data
Tiles 4-6
Tiles 7 and 8
DPR-1
DPR-2
DPR-3
Output granule for tile 1
Output granule for tile 2

Table 11.2.1.7-1. Tiling (2 of 2)

Output granule for tile 3
Tiles 4-8 are processed in the same manner as tiles 1-3.
8 Tiles clustered together since they are likely to have overlapping inputs
Original
Swath
Data

11.2.1.8 Example use of the Tiling Rule

A tile definition file is part of the package delivered with the PGE for SSI&T. In the production environment, a PR is entered to run the PGE on all the tiles. A DPR is generated for each tile. These DPRs are grouped by Cluster ID so that, since they will share some of their inputs, these DPRs will be run on the same machine which will minimize the staging and copying of those inputs amongst the various production machines. The PLS will use the tile definitions to query the DSS to identify all input data granules covering a tile. It is likely that many of these input granules will have data outside as well as inside each tile. The URs for these input granules and the specific tile definition are then passed to the DPS as part of each DPR. Each DPR will then run, the DPS will acquire the inputs from the DSS and the PGE will run and, using only the data in the tile, create an output data granule for its tile.

11.2.1.9 Data Server Proxy (Subsetting/Subsampling)

There are cases where a PGE would like to use Data Server services on its input data sets prior to running the PGE. In these cases the Planning and Data Processing subsystems simply act as proxies for the PGE by calling those Data Server services. The services provided here are totally dependent what services the DSS offers for each specific product. Instrument teams wishing to use specific services on specific products should coordinate with the Data Server Subsystem to ensure those services will be available.

11.2.1.10 Inputs required to implement the Data Server Proxy rule

Each PGE which uses this rule will be need to identify:

Input ESDT - ID of data set upon which Data Server services will be performed.

Service Requested - Data server service ID Interface Parameters - Parameters specific to the service being requested. For example, a spatial subset request would specify the geographic extent while a temporal subset request would specify the time period requested.

Table 11.2.1.9-1. Subsetting & Subsampling

Subset of Original Dataset
DPR Output Data Granule
DPR Output Data Granule Subsample of Original Dataset
Spatial Subsetting Subsampling

11.2.1.11 Example use of the Data Server Proxy Rule

Assume a PGE with an input data set which covers the entire globe and is gridded at a .1 o by .1 o resolution. During the post-launch, PGE shakedown phase, the science software developer might want to generate a 1 o by 1 o resolution product for a quick look at the output data. Rather than have the PGE do its own averaging/subsampling, Data Server subsampling services could be invoked so that the PGE only has to run on 1/100th the amount of the original data. In this case a second PGE profile would be created at SSI&T which would include the service request and track the different runtime characteristics (e.g. CPU time, disk storage for input/outputs, RAM usage, etc.)

11.2.1.12 Level 0 to Level 1A

This is a special case of the simple temporal range rule and is of interest only to certain Level 1A PGE developers. The issue is what rules PDPS uses to determine what Level 0 data files are required to produce a particular Level 1A granule. In many cases (such as CERES), this is handled by the Basic Temporal rule rather than the method described here. This rule is intended to handle orbit-based Level 1A granules. Level 0 'granules' received by EDOS will be not have any discernible relationship with the spacecraft orbit. The Level 0 'granules' have not even been fully defined for some instruments flying on other platforms. In these cases, the Planning Subsystem will access a crude orbit model (really just a lookup table) to determine the start/stop times of a given orbit. It will then use those start/stop times (after adding a small cushion to ensure complete coverage of an orbit) to query the data server for the Level 0 data covering the orbit. The response to that query is given to the Data Processing Subsystem which acquires the data. The PGE then uses SDP Toolkit calls to determine the exact extent of the orbit. A similar process will be used for instruments having orbit-based Level 1A granules but which will be flying on platforms other than AM-1. In the case of SeaWinds, flying on the ADEOS II platform, a temporal offset may have to be used if the orbit model is based on equator crossing rather than on pole crossing as the SeaWinds want for their Level 1A granules.

Table 11.2.1.12-1. Level 0 to Level 1A

Time
Level 0 Data
Orbit-based
Level 1A Granules
Using temporal definitions of orbits, the PLS identifies and the DPS stages the appropriate Level 0 Data for each orbit-based Level 1A granules

11.2.2 Conditional Activation:

Most PGEs have well defined times and conditions when they are to be executed. The most common activation condition is the availability of all input data sets. Similarly, the frequency of execution is usually well defined (e.g. run once for every granule or run monthly averages once a month). However, some PGEs might have additional/different constraints on when they get run. This section addresses those cases.

11.2.2.1 Intermittent Execution

A PGE can be set up to run on every Nth instance of input data. For example, a QA PGE that is run on a daily product may only need to be run every fifth day to provide a spot check. Note that this does not refer to the common case of only running a weekly averaging PGEs once each week, which would be handled by the Basic Temporal rule and the time ranges specified for the input and output ESDTs. Rather this is a special case where a PGE can be run every day (or hour, week, etc.), but, for whatever reason, it is only desired to be run every Nth day.

11.2.2.2 Inputs required to implement the Intermittent Execution rule

This rule is implemented by using two parameters:

Number to Skip - Number of DPRs to be skipped (not executed)

Number to Keep - After skipping the specified number of DPRs, how many are to be kept. This number will usually be one, but could be any number. The use of these parameters will allow a pattern of execution to be established. This pattern is not maintained between PRs.

Table 11.2.2.2-1. Intermittent Execution (1 of 2)

PR #2
PR #1
DPR
1.1
DPR
1.2
DPR
1.3
DPR
1.4
DPR
2.1
DPR
2.2
DPR
2.3

Table 11.2.2.2-1. Intermittent Execution (2 of 2)

DPR
2.4
DPR
2.5
DPR
1.2
DPR
1.3
DPR
2.3
DPR
2.2
DPR
2.5
PRs #1 and #2 are entered at different times.
PR #1 generates 4 DPRs and PR #2 Generates 5.
Only 5 of the 9 are 'kept' and actually run.
Number Skipped = 1
Number Kept = 2
Created Run
Separate PRs,
pattern is restarted for PR#2

11.2.2.3 Example use of the Intermittent Execution Rule

Using the above example of a QA PGE to be run every fifth day, let's assume a Production Request is entered which covers the period from 6/1 - 6/30. As part of the PR values are entered for number skipped (4) and number kept (1). The PR would be expanded into 30 daily DPRs, of which, four out of every five would be discarded, leaving one DPR every fifth day.

11.2.2.4 Metadata-based Conditional Activation

It is possible to determine if a given DPR should be run, based on the metadata of one or more of its input data sets. For example, a PGE could be set up so that a QA flag must be set to an acceptable level/state within the metadata of an input data set or the PGE should not be run. This production rule will work for both core and product-specific metadata. Note that this is different than data-based conditional activation, which will not be supported in Release B. If that sort of conditional activation is desired, the IT will need to define a product-specific metadata field which will be filled by the PGE producing that data.

11.2.2.5 Inputs required to implement the Metadata-based Conditional Activation rule

This rule is implemented by using a series of statements for each ESDT to be checked. These statements take the basic form of:

Metadata field Operand Value. These statements would be 'AND'ed together so that if any of the checks fail, the DPR will not be run. These statements would be entered in at SSI&T time, however, the values could be changed when a Production Request is entered.

Table 11.2.2.5-1. Metadata-based Conditional Activation

Input 1
QAFlag=7
DayNight='DAY'
Clouds=20%
Input 2
QAFlag=4
Input 1
QAFlag=9
DayNight='DAY'
Clouds=70%
Input 2
QAFlag=8
Input 1
QAFlag=7
DayNight='DAY'
Clouds=30%
Input 2
QAFlag=7
DPR 1
DPR 2
DPR 3
Metadata Checks:
Input 1:
QAFlag > 5
DayNight = 'Day'
Cloud < 40%
Input 2:
QAFlag > 6
DPR 1 is NOT run since Input 2 failed the QAFlag check.
DPR 2 is NOT run since Input 1 failed the cloud cover check.
DPR 3 IS run since Inputs 1 and 2 met all metadata conditions

11.2.2.6 Example use of the Metadata-based Conditional Activation Rule

Assume there is a PGE which uses multiple ESDTs as inputs. Two of the inputs (Input 1 and Input 2) need to have their metadata checked prior to the PGE being executed. Input 1 needs to have a certain quality, less than a certain percentage of clouds and be daytime data while Input 2 just needs to be of a certain quality. Table 11.12.3.4-1, illustrates this situation and shows three DPRs created for different instances of Inputs 1 and 2 and the disposition of those DPRs based on the metadata of the inputs. As stated earlier, if it was decided that the cloud cover rule was too strict, the value used for comparison could be changed when Production Requests are entered. If, however, a new check were needed for some other metadata field, this change would have to be done through SSI&T.

11.2.2.7 Mode-based Conditional Activation

In this case, the mode a given instrument is in will determine which PGE is run. For example an instrument might go into a calibration mode which requires that a special calibration PGE is run. Actually, this is just a specialized case of the metadata-based conditional activation. The added functionality here is that at SSI&T time PGEs can be grouped into PGE collections. In such cases, the instrument mode would determine which PGE in the collection is run. This mechanism is used primarily to improve the accuracy of plans generated by the PLS.

11.2.3 Error Handling

Error handling is a little different from the other two categories of production rules. This is because it is mostly an operational procedure which occurs in response to an (hopefully) anomalous event. The key mechanism for implementing error handling will be PGE exit codes. Release A PDPS is currently working to define PGE exit codes and determine how best to associate actions with exit codes. (Establishing Science Software Exit Conditions for the Production Environment, 420-WP-006-001) is in preparation. The key enhancement to error handling by Release B is the reuse of the on-demand processing mechanism to automate the response to a specific error code. In this case, when a PGE undergoes SSI&T, On-Demand Production Requests (OPRs) are then associated with various PGE exit codes.

11.2.3.1 Inputs required to implement the Automated Error Handling

At SSI&T time, for every exit condition which will need another PGE to be run, the following information will need to be entered:

Exit Code - PGE exit code which triggers action
Message - Message to be displayed to operation console
OPR - On-Demand Production Request to be executed. The OPR will have the same timeframe as the original DPR so if the DPR were run on data from 6/20/99 12:00-13:00, then the OPR would be given the same timeframe before being passed to PLS.

11.2.3.2 Example use of Automated Error Handling

It is difficult for a short example to capture the full error handling options of the ECS production system. The following example simply gives a flavor for what is possible with regard to automatically submitting OPRs based on a PGEs exit code. While a certain PGE (PGE1) is undergoing SSI&T it is set up so that if PGE1 has an exit code of 6, it should be re-run in debug mode. If it has an exit code of 12 (can only happen from debug mode), then a second PGE (PGE2) should be run. At a later date, in the operational environment, a DPR for PGE1 is running and terminates with exit code 6. An OPR is generated for PGE1 which includes the runtime flag used to send it into debug mode. A message is displayed on the operator's console informing them of this event. The OPR is run and it finishes with an exit code of 12. Now another OPR is created, this one for PGE2. A different message is displayed on the operator's console.

11.3 Combinations of Production Rules

Introduction

One of the most powerful features of production rules is the ability to combine multiple rules. This gives the science software developers greater flexibility and control over the production of their data. This section is intended to illustrate how some of the production rules can be used together. It is not intended to be exhaustive, but rather to give a sampling of the more common combinations. Most combinations are quite easy to understand and the implications of these combinations are quite clear. However, while theoretically any and all of the production rules can be combined, some combinations will make little sense. For instance, combining tiling with intermittent execution will only produce DPRs for some tiles and it will not be easy for the science software developer to determine those tiles in advance. Conversely, intermittent execution works quite well with the basic temporal rule and behaves in an easily predictable manner. While the software can handle complex combinations, in practice these combinations might have results which are not especially intuitive. For example, while combining alternate inputs with metadata based activation, tiling and intermittent execution would seem quite reasonable to the Planning Subsystem software, it would be difficult for a human to determine the results in advance. However, if intermittent execution is removed from the above combination, the remaining combination might be a perfectly valid production recipe. The following sections provide a few examples of how production rules may be combined.

11.3.1 Basic Temporal

The Basic Temporal rule is fundamental to the production system. All Production Requests will have a temporal component. Consequently, all of the other production rules are being combined with the Basic Temporal rule.

11.3.2 Alternate Inputs and Metadata-Based Conditional Activation

It is possible to combine these two rules so that the metadata of the inputs determines which alternate is used. For example, suppose there is a PGE which, along with its required inputs, can use one of two alternates, but the primary alternate must have a certain level of QA set in its

metadata. If the primary data set becomes available, its metadata is checked and, if it fails the check, an attempt is made to use the second alternate.

11.3.3 Alternate Inputs and Data Server Proxy

This combination is quite straightforward. After the input data sets are determined via the Alternate Inputs rule, the Data Server Proxy service is invoked.

11.3.4 Alternate Inputs and Tiling

In this combination determining which data granules fall within a tile is a completely separate activity from determining which alternate is most should be used. In this case the tile definition could be used to acquire the data sets which had been chosen as part of the alternate input process.

11.3.5 Intermittent Execution

While it was mentioned above that all PGEs use the Basic Temporal rule, it is worth emphasizing that point in the case of Intermittent Execution. This rule is somewhat unique since it doesn't create DPRs, it removes them. By definition this rule needs to be used in combination with another rule.

11.3.6 Changes to rules

The following changes have occurred in the listing and organization of the rules documented by this section:

- The Release A Basic Temporal rule has been added.
- The current Alternate Inputs rule is the consolidation of Optional Inputs, Alternate Inputs - Hierarchical Preference and Alternate Inputs - No Preference. Subsetting and Subsampling have been combined and renamed Data Server Proxy. Alternate Inputs - Temporal/Spatial Tradeoff has been left out. This is because the PDPS team is still determining the best manner to implement this rule. There are several reasons for this including the lack of an IT provided algorithm, the nature of which could impact the design and implementation. Depending on what variables the algorithm uses, this rule might actually be a variant of the Data Server Proxy rule, or it might require the algorithm(s) to be integrated into PLS code.

11.4 Production Rules Technical Information Sources

- 1 ECS Baseline Information System :
- 2 PDPS Home Page: <http://dmsserver.gsfc.nasa.gov/ecsdev/relb/pdps/index.html>
<http://pete.hitc.com/baseline/> -choose drop4, you will find latest patch documentation and much more.
- 3 EOS Instrument Team Science Software (PGE's):

<http://ecsinfo.hitc.com/iteams/Science/science.html>. Production Rules White Paper and much more.

- 4 MODIS - Science Data Processing software Release 4 System Description, SDST-104 dated August 25, 1998.
- 5 Test Scenarios for selected Production Rules can be viewed by accessing the SCF at: [/home/dheroux/DPS/TESTBED/MISR/SSIT/V2/ODL/Scenarios](http://home/dheroux/DPS/TESTBED/MISR/SSIT/V2/ODL/Scenarios)

11.4.1 Production_Rules_Syntax

The Production Rules Syntax are presented as part of the Powerpoint Slides that accompany this document.

Production Rules identified thus far are listed as follows:

Basic Temporal, Advanced Temporal, Period Specification, Alternate Inputs, Optional Inputs, Metadata-based Activation, Metadata-Based Query -Static, Metadata-based Query - Dynamic, Orbit-Based Activation, Orbit Path, Runtime Parameter, Multi-File Granules, Multi-Granule ESDT's, Spatial Query, Minimum Number of Granules, Land Tiling, Tiling with Metadata-based Query, Optional DPRs, Ocean Data Day, Most Recent Granule, Alternates based on Minimum number of Granules, Zonal Tiling, Tile Clustering and Smart_Start_of_Year.

11.5 Production Requests

11.5.1 Science Software and Production Requests

Science software is one of the keys to production planning and processing:

- Performs the actual data processing to create desired products.
- Is developed at Science Computing Facilities (SCFs) external to ECS.
- Is embodied in Product Generation Executives (PGEs) when the software is integrated into the ECS production processing environment.
 - PGEs are science software code (e.g., executable programs or shell scripts) that contain the instructions for processing data to create the desired products.

The production request (PR) is another key to production planning and processing. The Production Planner defines ECS science data processing in terms of PRs.

- A PR is an order for data to be produced by the Data Processing Subsystem.
- A single PR may specify several jobs (using the same PGE) that are to be run over a period of time or a single job producing a single set of data.
- PRs may apply to the processing of new data (standard PRs or standing orders) or the reprocessing of existing data (reprocessing PRs).
- Each PR identifies a specific PGE for generating a particular type of product.

- Some PGEs are dependent on others; i.e., some PGEs require input data that are the output of other PGEs.
- The planning software will recognize and reject a PR when the PR specifies a PGE that requires data from another PGE that has not yet been specified in a PR.

The Planning Subsystem performs the following functions:

- Uses each PR to generate either one or a series of Data Processing Requests (DPRs).
 - Each DPR corresponds to one execution of a single PGE.
 - Each DPR contains the information that is needed by the SDP processing function, including PGE-related information.
- Checks the availability of the data required for the DPR, either from the data server (if the data have been previously ingested) or from internal predictions (if the data are expected to arrive in the future).
- Determines what data will be included in the DPR output so the system can make predictions concerning the availability of data for subsequent PGEs.

Figure 11.5.1-1 shows the relationships among the PGEs, PRs, and DPRs as they are accessed through the Production Request Editor GUI.

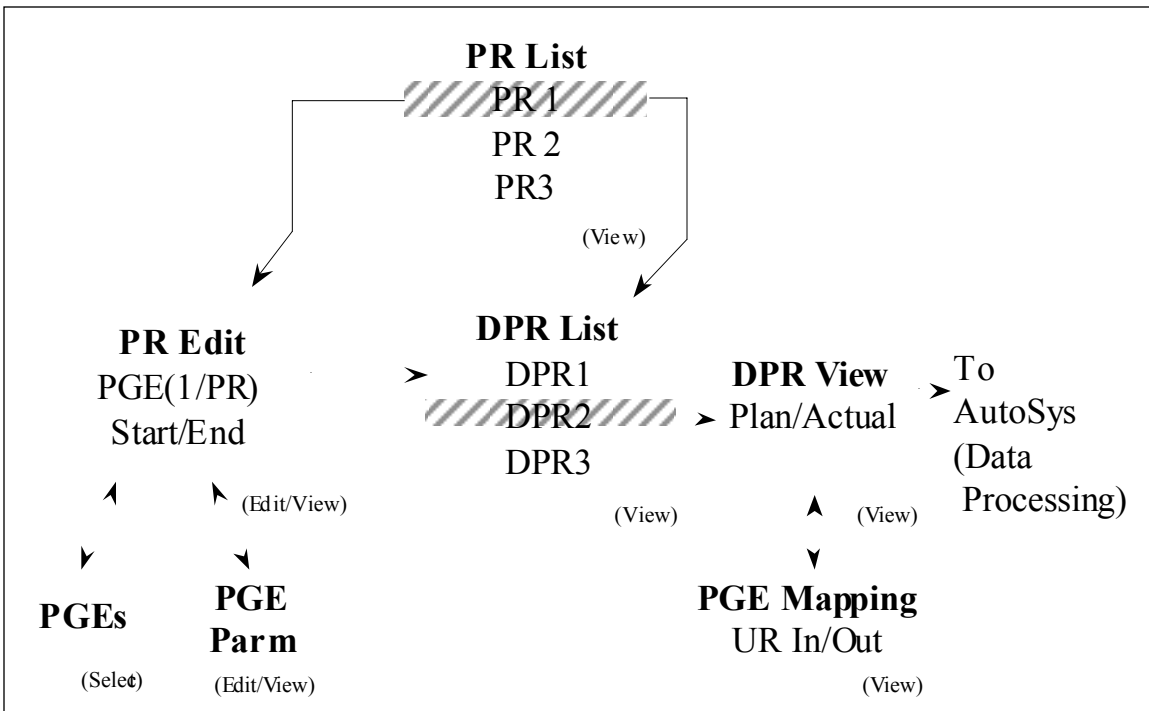


Figure 11.5.1-1. Production Request Editor Flow

11.5.2 Types of Processing

ECS either accommodates or will accommodate the following three general types of data processing:

- Routine Processing
- Reprocessing
- Ad-Hoc Reprocessing
- On-Demand Processing

11.5.2.1 Routine Processing

Routine Processing is pre-defined software production processing that is periodic and keyed to data arrival. For example, every day a Production Planner includes in the daily schedule a DPR for generating a particular Level 1A product from the most recent Level 0 data from the applicable satellite instrument.

11.5.2.2 Reprocessing

Reprocessing typically involves using a new, improved PGE to process data that had previously been processed with an older version of the PGE. In such cases reprocessing would be a large-scale operation, especially if several years worth of data were to be reprocessed. Consequently, the Production Planner is likely to schedule reprocessing in manageable quantities so the processing resources can accommodate routine and on-demand processing in addition to the reprocessing.

11.5.2.3 Ad-hoc Reprocessing

Ad-hoc Reprocessing could be necessary at any time. For example, if a product fails a quality assurance (QA) check, the same PGE could be run again on the same data set in the hope of creating an acceptable product. Similarly, if processing of a PGE fails for some reason, it might be possible to rerun the PGE and hopefully achieve a successful outcome.

11.5.2.4 On-Demand Processing

On-Demand Processing is ad-hoc processing initiated by either the Planning Subsystem or an end-user (as opposed to the Production Planner). For example, a researcher using data from the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) instrument on the Terra satellite may need a particular Level 2 product that has not yet been generated. The ASTER researcher would submit an on-demand request to have the product generated from a Level 1B product stored in the archive.

In the future such on-demand processing requests (OPRs) will be entered from a Client Subsystem tool, passed through the Distributed Information Manager (Data Management Subsystem) and the Data Server to the Planning Subsystem. Currently there is a work-around to the automated process which requires the requester to contact DAAC personnel to make the

request. So far ASTER researchers are the only identified external users of automated on-demand processing. Another future feature is automated cross-DAAC planning. It is a process that will be undertaken when products produced at one DAAC require inputs being produced at another DAAC. The predicted production time of remote input products will be used in creating local production plans. The primary mechanism for cross-DAAC planning will be the use of Predicted Data Availability Schedules (PDAS), created when a plan is created. A DAAC's PDAS will be made available to remote DAACs via the Data Server.

11.5.2.5 ASTER on Demand Capability

There is some information that needs to be provided to the operations personnel who will be doing the SSIT procedures that create the many PGE Profiles that the

ASTER on Demand capability depends on. When ODFRM passes ODMGR the parameters that a user has set for a particular Product they come in a parameter = value format in the GIParameterList. What ODMGR does is attempt to match these parameter/value pairs against Runtime Parameter/Value pairs in the PDPS database that have been entered at SSIT. If the parameter or values do not EXACTLY match what was put in the ODL for the Runtime parameter/value pairs, then ODMGR will not be able to select the correct PGE to create the product.

11.5.2.6 AST_06 Product Guidelines

There are certain parameters that are required for the AST_06 products. However, not all of the parameters have been identified yet. We needed to have 3 different PGEs, each of which produces a different AST_06 product (AST_06VD, AST_06SD, AST_06TD).

For the AST_06 products, the parameters should NOT be set (in the ODL) as selector parameters. The parameters for the AST_06 products are what are called "overwriteable" parameters, meaning that PDPS will overwrite the value in the database with whatever it gets from ODFRM. The parameters that can be set when requesting the AST_06 products are as follows:

- MatrixType
- SamplingFreq
- OutputMean
- OutputSigma
- BlueBand
- GreenBand
- RedBand
- FirstLine
- LastLine
- FirstSample
- LastSample\

11.5.2.7 Non-Standard L1B on Demand Requests

In support of Non-Standard L1B On Demand Requests, SSI&T personnel at EDC need

to add information to the ODL defining the AST_L1B ESDT to PDPS. The installation can set up the database originally but any re-registration of the AST_L1B ESDT (in the PDPS database) will cause the information populated in the database to be deleted.

NCR 25773 has been written against this problem, but unknown is the timeframe

for it being fixed. So the ODL file ESDT_AST_L1B#{ESDT version}.odl needs to have the following added for Non-Standard L1B requests:

```
OBJECT = METADATA_DEFINITION
CLASS = 1
  PARM_NAME = "InputPointer"
  CONTAINER_NAME = "InputGranule"
  TYPE = "STR"
END_OBJECT = METADATA_DEFINITION
```

```
OBJECT = METADATA_DEFINITION
CLASS = 2
  PARM_NAME = "ASTERMapProjection"
  CONTAINER_NAME = "AdditionalAttributes"
  TYPE = "STR"
END_OBJECT = METADATA_DEFINITION
```

```
OBJECT = METADATA_DEFINITION
CLASS = 3
  PARM_NAME = "Resampling"
  CONTAINER_NAME = "AdditionalAttributes"
  TYPE = "STR"
END_OBJECT = METADATA_DEFINITION
```

11.6 Production Rules used in Planning PGE Processing

11.6.1 Production Rules Defining the PGE

Production rules are the instructions about how a particular PGE is to be run. The instructions specify a wide range of information such as the input and output data types, the frequency of execution, activation conditions and error handling instructions.

A single PGE may use one or more sets of production rules, known as PGE profiles, since it may be desirable to run the same PGE with different input data sets, or activation conditions. The production rules are entered when a PGE undergoes Science Software Integration and Test

(SSI&T) at the DAAC. Where applicable, default parameter values are entered at that time. The initially selected runtime parameters, metadata check parameters, tile IDs, and many of the default parameters can be overridden in the production environment when a Production Request is entered.

Production rules define the PGE to the Planning and Data Processing Subsystems (PDPS). The following types of conditions can be specified for each PGE:

- The time period for which the PGE will run.
 - A PGE can run every hour, every day, or for every orbit of a satellite. The frequency of how often a PGE runs must be defined to PDPS so that it knows when to plan and execute the PGE. A definition of a satellite's orbit could be included if the PGE were to be executed for some number of satellite passes.
- PGE Inputs.
 - A PGE can have any number of inputs. The types of the inputs and how frequently they are available helps determine on what basis the PGE is scheduled.
 - Most inputs to a PGE are retrieved based on time; the specified inputs are retrieved from the Data Server Subsystem for the time which the PGE is defined to execute. Production Rules allow other conditions to be added to the mix, such as checks or queries against the metadata of the input granules, or the lists of inputs as alternates (for when a primary input is not available) or optionals (for inputs without which the PGE can still run successfully). If inputs are defined as alternate or optional, the number of inputs staged for the execution of the PGE may vary from one run to the next.
- PGE Outputs.
 - A PGE can have any number of outputs. The characteristics of the outputs can have effects on any downstream PGEs that use them as inputs. For example, it is possible for an output to be defined as optional, in which case it may or may not even be produced. (When an output is not generated, it cannot be used as input for a downstream PGE.)
- Runtime Parameter Values.
 - A PGE can have any number of runtime parameters, which are values that are placed in the process control file (PCF) under specified logical IDs before the PGE executes. The PGE treats them as constants and normally they are set either during SSI&T or when the Production Request is entered.
 - For some production rules (such as Orbital Processing) there is specific information that can be placed in a runtime parameter if so desired by the PGE.

- **_Geographic Tiles.**
 - A PGE can define a geographic location for which it will process data. Tiles are defined through production rules, and change the staging of inputs from time-based, to a combination of time- and geographically-based. Data are retrieved based on their location on the Earth with respect to the tile that it is currently being processed.

Some (but not all) production rules can work with other production rules.

11.6.1.1 Production rules are often used for the selection of dynamic inputs.

- **Dynamic inputs** can be either internal or external.
 - **Dynamic internal** inputs are produced by other PGEs (they are called dynamic internal inputs because they are produced at an ECS DAAC).
 - **Dynamic external** inputs are periodically ingested and stored in the Data Server Subsystem (they are termed dynamic external inputs because they are produced outside of the DAAC).
- **Static inputs** are granules that are inserted during the SSI&T process and are retrieved not on the basis of time but by Earth Science Data Type (ESDT) and science group.
 - The Metadata Query Production Rule is the only production rule that works for choosing static inputs.

PGE profiles allow a PGE to be defined to PDPS multiple times, each with a different set of inputs, outputs, or even scheduling information. Each PGE's definition is made up of its name, its version and its profile number. Different PGE name/version pairs define different PGEs to PDPS. The addition of the profile allows for multiple definitions of a PGE name/version pair. There can be up to 99 profiles for each PGE.

11.6.1.2 Syntax of Production Rules

Production rules are defined in the following two ways:

- Through science metadata that is entered in various types of files during the SSI&T process.
- By entering parameter values when a Production Request is created to schedule the PGE.

During SSI&T, production rules are defined in files written in Object Description Language (ODL) in a parameter equals value format. There are three general categories of ODL files:

- PGE Science Metadata ODL Files.
- ESDT Science Metadata ODL Files.

- Production Rule-Specific Science Metadata ODL Files
 - Orbit Definition ODL Files.
 - Path Map Definition ODL Files.
 - Tile Definition ODL Files.

When a Production Request is created to schedule a PGE, it is necessary to enter certain information that is essential to implementing the production rules that affect the particular PGE. The information may concern the date and time-range

11.6.1.3 PGE Science Metadata ODL Files

The PGE science metadata ODL file defines a PGE (or at least the current plan for its operation) to PDPS. It specifies everything from the PGE name and version, to the period for the PGE (how often it runs), all inputs and outputs, any runtime parameters and any exit messages or dependencies. A template version of the PGE science metadata ODL file is created by the **SSIT Create ODL Template** program from a PCF from the PGE.

11.6.1.4 ESDT Science Metadata ODL Files

The ESDT science metadata ODL file defines a PGE input or output to PDPS. Each input and output of a PGE must have a corresponding ESDT science metadata ODL file defined. It describes everything that PDPS needs to know about the subject input or output file, from its name and version, to its period (how often data is collected), to where it is used and archived. Note that many PGEs can use the same input or output type, and thus can share the same ESDT science metadata ODL file.

Unlike the PGE science metadata ODL file, there is no tool for automatically generating a template ESDT science metadata ODL file. A template version exists under the data directory called `ESDT_ODL.template`. The template must be copied to a file that follows the naming convention *ESDTShortName#ESDTVVersionID.odl*.

11.6.1.5 Production Rule-Specific Science Metadata ODL Files

The production rule-specific science metadata ODL files provide specific information to PDPS about production rules used by a PGE. They are needed only when the PGE is subject to one of the following conditions:

- Is executed on the basis of a satellite orbit.
- Needs to know the orbital path of a satellite.
- Requires data based on geographic tiling of the Earth.

Since not every PGE is based on orbits or tiles, not all PGEs require these files. The comments in the `PGE_ODL.template` describe when setting a specific parameter means that a production rule-specific science metadata ODL file needs to be created.

The production rule-specific science metadata ODL files are broken into three types, which are defined as follows:

- Orbit ODL File.
 - Defines the orbital period of the satellite from which the PGE’s input data is created.
 - Defines when a given orbit starts, how long it lasts, and the number of the orbit.
 - PDPS uses the information in the orbit ODL file to extrapolate future orbits and is able to plan PGEs that are required to run every so many orbits of the satellite.
- Pathmap ODL File.
 - Defines the mapping between the cyclic 0-233 orbits that the satellite makes with the actual path number that the PGE requires.
 - PDPS computes the path number from the orbit number (specified in the orbit ODL file) by incrementing it until it reaches the 233 maximum, then resetting it to zero.
 - Many instruments expect the path number to be a fixed swath on the Earth, so it is not just incremented for each satellite pass.
 - The pathmap ODL file creates a mapping from the sequential path numbers to the path numbers expected by the PGEs.
- Tile ODL File.
 - Defines the coordinates of the tiles used by some instruments to specify geographic locations on the Earth.
 - The tile definitions are used by PDPS to schedule the PGE (one execution per tile) and to acquire the necessary data (using the geographic coordinates to acquire data for the tile being processed only).

Unlike the PGE science metadata ODL file, there is no tool to automatically generate a template production rule-specific science metadata ODL file. Because the files themselves tend to be small, this is not usually a problem. A template version of each kind of production rule-specific science metadata ODL file (e.g., ORBIT_ODL.template, TILE_ODL.template) exists in the /usr/ecs/<MODE>/CUSTOM/data directory on the AIT Workstation. The templates must be copied, named properly, and edited in order to create the appropriate production rule-specific science metadata ODL file.

11.7 Release 5 Production Rules

The following statements provide some simplified descriptions of production rules that are scheduled to be made available in Release 5:

- **Basic Temporal** - Temporal (time) range of inputs matches the temporal range of outputs.
- **Advanced Temporal** - Temporal range of inputs is offset from the expected temporal range of inputs and outputs.
- **Alternate Input** - PGE is run with different inputs based on the availability of various alternate input data sets.
- **Optional Input** - PGE is run with specified optional inputs if available; otherwise, PGE is run without them.
- **Minimum/Maximum Number of Granules** - Minimum number of input granules needed for full data coverage and maximum number of input granules to search for may be specified. Minimum and maximum number of outputs expected from the PGE may be specified.
- **Optional DPRs** – The only DPRs executed are those for which the non-routine key input data actually become available (i.e., are either produced in data processing or can be acquired from the archive).
- **Intermittent Activation** - Every n^{th} DPR is activated; all other DPRs are skipped.
- **Metadata Checks** - DPR is run only if input data's metadata value(s) meet(s) certain criteria.
- **Metadata Query** - Input granule selection is based on metadata value.
- **Data Day** - Input data selection is based on Data Day.
- **Spatial Query** - Input granule selection is based on the spatial coverage of another input (i.e., the key input).
- **Tiling** - Input data is chosen on the basis of Instrument Team-defined tiles (geographic areas).
- **Closest Granule** – DPR is generated if a required input granule within a particular time range (rather than an exact time) is available; otherwise, no DPR is generated. (Supersedes the Most Recent Granule Production Rule)
- **Orbital Processing** - Selection of input times is based on orbit information.

11.7.1 Basic Temporal Production Rule

The Basic Temporal Production Rule defines the timeframe for the PGE along with its input and output data. PGEs subject to the Basic Temporal Production Rule generally have the following characteristics in common:

- Typically scheduled to run using input data that become available periodically (every hour, every day, etc.).
- Use input data for a particular period of time.
- Produce output for a specified length of time.

The data the PGE takes in (its input) and the data it produces (its output) have the same period (or some subset of the same period) as the PGE.

- Example One:
 - A MODIS PGE processes data for five-minute intervals, producing Level 1B granules.
 - The PGE requires as input the specific five-minute Level 1A granule that is contemporaneous with (covers the same five-minute time period as) the Level 1B granule to be produced.
 - Using the Basic Temporal Production Rule, a five-minute Level 1A granule is staged as input to the PGE and a five-minute Level 1B granule is expected as output, both matching the timeframe for which the PGE is run.
- Example Two:
 - A CERES PGE processes data for 24-hour intervals, producing 24-hour Level 1A granules as output.
 - As input the PGE takes Level 0 data that is ingested every two hours.
 - Using the Basic Temporal Production Rule, twelve two-hour Level 0 granules are staged as input to the PGE and a 24-hour Level 1A granule is expected as output, matching the timeframe for which the PGE is run.

The fundamental elements used to define the Basic Temporal Production Rule are “period: and “boundary.”

- **Period** is the length of time for which a PGE processes data or the length of time for which input and output data is collected.
 - A PGE that is subject to the Basic Temporal Production Rule only and that processes data in two-hour blocks, takes in data that relates to a particular two-hour interval and produces output data for that same two-hour period.
 - Data that has a period of 15 minutes was collected or produced for a 15-minute time period.
- **Boundary** is the starting point for the data or PGE. Depending on the characteristics of the data or PGE, the boundary may be the start of a minute or hour or day or week (etc.).
 - If a PGE's boundary is the start of the hour, it processes data that starts every hour and runs on data for the length of its period.
 - If data comes in every day, PDPS predicts that the data is going to be available at the start of the day and allows scheduling of PGEs that use the data as input accordingly.

Both the PGE itself and the input data have a boundary and period associated with them. That is how PDPS determines the frequency of processing for a Basic Temporal PGE and the time period for its inputs and outputs.

PDPS uses **period** and **boundary** in combination to plan the processing of each PGE, including determining its input requirements and anticipated output (which may be input to other PGEs). If a PGE has a period of one hour and a boundary of “start of day,” it is scheduled every hour, beginning at midnight. If an input has a period of 15 minutes and boundary of “start of hour,” PDPS predicts it every 15 minutes beginning on the hour.

Boundary offset is an addition to the Basic Temporal Production Rule that allows a PGE or data to start on an offset from a given boundary. For example, if a PGE would normally run every day but not start until two or three hours into the day (e.g., beginning at 3:00 a.m. instead of midnight), a boundary offset can be used to add three hours to the “start of day” boundary. This would mean the PGE would run on data that occurred three hours after the boundary.

Data with offset times refers to data where the start time is a few minutes off of the start time that PDPS expects. For example: if data is defined to PDPS as follows:

```
BOUNDARY = "START_OF_HOUR"
```

```
PERIOD = "HOURS=1"
```

but the data actually starts at 1:05 and ends at 2:05, the data is said to have **offset times**. There is a flag in the production rule syntax that tells PDPS to shift granule time specifications to match the granules in the archive.

The **end-of-month anomaly** is an addition to the Basic Temporal Production Rule that allows a PGE or data to cover a specific number of days within a month. The month is broken into thirds. The first third is composed of the first 10 days of the month. The second third consists of days 11 through 20. And the last third varies in length depending on the total number of days in the month (i.e., for November it would have 10 days; for December it would have 11 days). A specific **boundary** and **period** allow a PGE or its data to be scheduled into thirds of a month.

Figure 11.7.1-1 provides an illustration of the Basic Temporal Production Rule. The PGE has a boundary of “start of day” and a period of one hour, so it is scheduled for every hour through the day. If a Production Request were entered for two full days of processing, a DPR would be created for the PGE to run every hour; i.e., 48 DPRs total. If a Production Request were created for a four-hour period in the middle of a single day (for example, from 12:00 noon to 4:00 p.m.), then four DPRs would be created, one for 12:00-1:00, one for 1:00-2:00, one for 2:00-3:00, and one for 3:00-4:00.

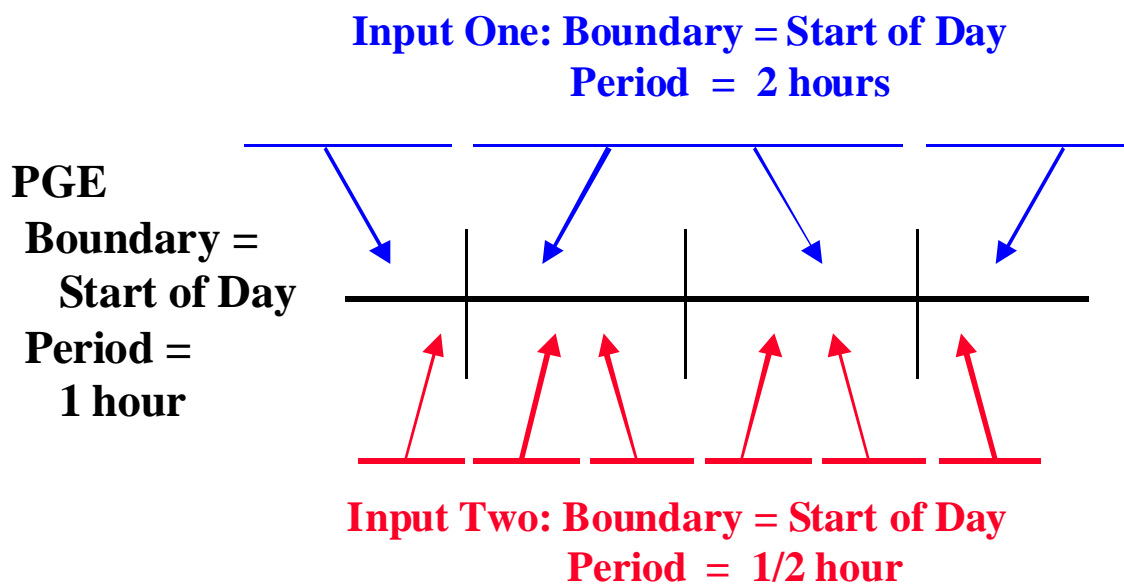


Figure 11.7.1-1. Example of the Basic Temporal Production Rule

In the example (Figure 11.7.1-1), Input One has a boundary of “start of day” and a period of two hours, so when PDPS plans for its availability, it expects a granule every two hours beginning at midnight. Consequently, each granule of Input One is associated with two DPRs for the PGE, because the PGE encompasses only one hour of the two-hour granule's period.

Input Two has a boundary of “start of day” and a period of $\frac{1}{2}$ hour, so when PDPS plans for its availability, it expects a granule every $\frac{1}{2}$ hour beginning at midnight. As a result two granules of Input Two are associated with each DPR for the PGE, because the PGE encompasses an hour of the $\frac{1}{2}$ -hour granule's Period. Thus, every DPR of the PGE will wait for two granules of Input Two to arrive before it can be processed.

11.7.1.1 PGE Science Metadata ODL File Parameters

The following parameters must be set properly in the applicable PGE science metadata ODL file in order to implement the Basic Temporal Production Rule:

- SCHEDULE_TYPE.
- PROCESSING_PERIOD.
- PROCESSING_BOUNDARY.

The SCHEDULE_TYPE parameter specifies the type of scheduling that will be done for the PGE. The following values are applicable to the Basic Temporal Production Rule:

- "Time"
 - The PGE is scheduled on the basis of the specified boundary/period and the availability of data for that boundary/period.
- "Snapshot"
 - The PGE is scheduled for a single date/time.
 - Note that PROCESSING_PERIOD and PROCESSING_BOUNDARY are **not** needed when "Snapshot" is specified.

Other values for SCHEDULE_TYPE apply to other production rules, such as the following values:

- "Data"
 - The PGE is scheduled on the basis of the availability of data produced by other PGEs.
- "Tile"
 - The PGE is scheduled based on the definition of geographic tiles.
- "Orbit"
 - PGE scheduling is based on the orbit of the spacecraft.

The PROCESSING_PERIOD parameter describes the length of time for which the PGE executes. Data will be acquired (barring any combination of Production Rules) for the specified period and output data will be planned for the given period. It is of the format "<Period Type>=<Length of Period>". Note that "length of period" can be specified as a positive integer only. The following values are acceptable "period type" entries for the Basic Temporal Production Rule:

- "YEARS"
 - PGE processes data applicable to a given year or years.
 - "YEARS" might be specified for a PGE that computes a yearly average.
 - For example, PROCESSING_PERIOD = "YEARS=1" relates to a PGE that processes one year's worth of data.
- "MONTHS"
 - PGE processes data applicable to a particular month or several months.
 - "MONTHS" is most likely to be used for some kind of averaging PGE.
 - For example, PROCESSING_PERIOD = "MONTHS=2" relates to a PGE that processes two months' worth of data at a time.
- "THIRDS"
 - PGE processes data applicable to some number of thirds of the month.

- For example, `PROCESSING_PERIOD = "THIRDS=1"` relates to a PGE that processes data applicable to 1/3 of the month.
- "WEEKS"
 - PGE processes data applicable to some number of weeks.
 - For example, `PROCESSING_PERIOD = "WEEKS=2"` relates to a PGE that processes two weeks' worth of data every time it runs.
- "DAYS"
 - PGE processes data applicable to some number of days.
 - For example, `PROCESSING_PERIOD = "DAYS=5"` relates to a PGE that processes five days' worth of data.
- "HOURS"
 - PGE processes data applicable to some number of hours.
 - For example, `PROCESSING_PERIOD = "HOURS=4"` relates to a PGE that processes four hours' worth of data when it is executed.
- "MINS"
 - PGE processes data applicable to some number of minutes.
 - For example, `PROCESSING_PERIOD = "MINS=5"` relates to a PGE that processes five minutes' worth of data.
- "SECS"
 - PGE processes data applicable to some number of seconds.
 - For example, `PROCESSING_PERIOD = "SECS=2"` relates to a PGE that runs on two seconds' worth of data.

There are other types of values for `PROCESSING_PERIOD` but they apply to other production rules (as described in the applicable sections of the lesson).

The `PROCESSING_BOUNDARY` parameter specifies the boundary (starting point in time) of the PGE. It tells when each instance of the PGE should start. Note that the `PROCESSING_BOUNDARY` and `PROCESSING_PERIOD` are used in conjunction to schedule the PGE.

The following `PROCESSING_BOUNDARY` values are used for implementing the Basic Temporal Production Rule:

- "START_OF_HOUR" – PGE processes data for each hourly interval.
- "START_OF_6HOUR" - PGE processes data for every 6-hour interval.
- "START_OF_DAY" - PGE processes data for every daily interval.
- "START_OF_WEEK" - PGE processes data for every weekly interval.

- "START_OF_ONE_THIRD_MONTH" - PGE processes data for every 1/3 of a month.
- "START_OF_MONTH" - PGE processes data for every monthly interval.
- "START_OF_YEAR" - PGE processes data for every yearly interval.
- "START_DATE=DD/MM/YYYY" - PGE processes data for the specified date only.

There are other values for PROCESSING_BOUNDARY that apply to other production rules (as described in the applicable sections of the lesson).

11.7.1.2 Handling Data with Offset Times

When the ALIGN_DPR_TIME_WITH_INPUT_TIME flag is set to "Y" (i.e., ALIGN_DPR_TIME_WITH_INPUT_TIME = "Y") PDPS shifts the expected times for input data to the actual times found in the archive. If the flag is NOT set, data with offset times can cause problems when generating Production Requests.

11.7.1.3 ESDT Science Metadata ODL File Parameters

The following parameters must be set properly in the applicable ESDT science metadata ODL file in order to implement the Basic Temporal Production Rule:

- DYNAMIC_FLAG.
- PERIOD.
- BOUNDARY.

The DYNAMIC_FLAG describes the type of data that is defined in the ESDT science metadata ODL file. It specifies to PDPS what kind of data the PGE requires as input or produces as output. It can have any of the following four possible values, all of which are valid for Basic Temporal data:

- "S"
 - Static Data.
 - Data do not change at regular intervals.
 - The same granule can be used as input for many runs of the PGE.
 - Calibration files are a good example of static data.
- "I"
 - Dynamic Internal.
 - Data are produced by a PGE running at the local DAAC.
 - All output products are either “dynamic internal” or “interim” kinds of data.

- "E"
 - Dynamic External.
 - Data are produced by an external source (not a PGE running at the local DAAC).
 - EDOS data is a primary example.
 - Dynamic external can be set for PGE inputs only.
- "T"
 - Interim/Intermediate.
 - Data are stored only temporarily by the Data Server Subsystem.

The PERIOD parameter specifies the length of time covered by the data. Data are expected to be either ingested or produced for the length of the PROCESSING_PERIOD described in PGE science metadata ODL files. However, the PERIOD of the data does **not** have to match the PROCESSING_PERIOD defined for the PGE. PDPS plans for data where the ESDT period is less or more than the processing period of the PGE that uses it. For example, if the PGE PROCESSING_PERIOD = "HOURS=1" and the input data PERIOD = "MINS=5", then PDPS plans to acquire twelve granules of the input data to cover the PROCESSING_PERIOD.

The following “period type” values are used for implementing the Basic Temporal Production Rule:

- "YEARS"
 - Data span a year or years.
 - “YEARS” might be selected for a yearly average output product.
 - For example, PERIOD = "YEARS=1" specifies data that cover a period of a year.
- "MONTHS"
 - Data span a month or several months.
 - “MONTHS” is most likely used for some kind of averaging output product.
 - For example, PERIOD = "MONTHS=2" specifies data that cover a period of two months.
- "THIRDS"
 - Data span some number of thirds of a month.
 - For example, PERIOD = "THIRDS=1" specifies data that cover a period of 1/3 month.

- "WEEKS"
 - Data span some number of weeks.
 - For example, PERIOD = "WEEKS=2" specifies data that cover a period of two weeks.
- "DAYS"
 - Data span some number of days.
 - For example, PERIOD = "DAYS=5" specifies data that cover a period of five days.
- "HOURS"
 - Data span some number of hours.
 - For example, PERIOD = "HOURS=4" specifies data that cover a period of four hours.
- "MINS"
 - Data span some number of minutes.
 - For example, PERIOD = "MINS=5" specifies data that cover a period of five minutes.
- "SECS"
 - Data span some number of seconds.
 - For example, PERIOD = "SECS=2" specifies data that cover a period of two seconds.
- "ORBITS"
 - Data span some number of orbits of the spacecraft.
 - For example, PERIOD = "ORBITS=1" specifies data that cover one orbit.
 - A PGE can be time-scheduled (using the Basic Temporal Production Rule) but use orbit-based data.

The BOUNDARY parameter is the starting point in time of the data granule. It tells when each data granule should start. Note that the BOUNDARY and PERIOD are used in conjunction to determine the starting and ending time for the granules.

The following values for BOUNDARY apply to the Basic Temporal Production Rule:

- "START_OF_HOUR"
 - Data granules start every hour.
- "START_OF_6HOUR"
 - Data granules start every six hours.

- "START_OF_DAY"
 - Data granules start every day.
- "START_OF_WEEK"
 - Data granules start every week.
- "START_OF_ONE_THIRD_MONTH"
 - Data granules start every 1/3 of a month.
- "START_OF_MONTH"
 - Data granules start every month.
- "START_OF_YEAR"
 - Data granules start every year.
- "START_OF_ORBIT"
 - Data granules start every orbit.

11.7.2 Advanced Temporal Production Rule

The Advanced Temporal Production Rule allows for input data to be acquired for a time period other than that of the PGE or its planned inputs/outputs. It provides an offset mechanism, specifying on an input basis that the data required for processing is some number of seconds earlier or later than the planned time period for the PGE.

- Example One:
 - A PGE requires data from its previous execution for interpolation purposes (e.g., one of its inputs is the output of the very same PGE the last time that it ran).
 - If the PGE processes data for each one-hour interval (producing an hourly product), the Advanced Temporal Production Rule is specified with an offset of minus 3600 seconds (one hour) for the input of the ESDT produced by previous runs.
- Example Two:
 - A PGE takes as input two-hour Level 0 data to produce an L1A product.
 - Because the edges of the Level 0 data can be difficult to process without preceding and succeeding data, the PGE requires three Level 0 granules, one from the time period before it runs, one for the time period it is currently processing and one for the next time period.
 - The PGE is defined as having three inputs, the first with an Advanced Temporal offset of minus 7200 seconds (two hours), the second with no Advanced Temporal offset and the third with an Advanced Temporal offset of plus 7200 seconds (two hours).

The Advanced Temporal Production Rule uses the times specified in the Basic Temporal Production Rule as a reference point for specifying offset(s) to request data from a “period” and/or “boundary” different from that of the DPR or its input. The offsets are specified as either negative or positive numbers to indicate whether the time period of the input data is before or after that of the DPR (a particular run of a PGE).

- **Begin Period Offset** is an amount of time (in seconds) that is specified with respect to the DPR start time. A negative beginning offset requests data that was collected before the DPR start time. A positive beginning offset requests data with a collection time after the start time of the DPR.
- **End Period Offset** is an amount of time (in seconds) that is specified with respect to the DPR end time. A negative ending offset requests data that ended collection before the DPR end time was reached. A positive ending offset requests data that ended collection after the end time of the DPR boundaries.

Note that the beginning and ending offsets are not absolute cut-offs for data. Overlapping granules (granules that start or end outside of the offsets) will be staged as inputs to the DPR.

Figure 11.7.2-1 provides an illustration of the Advanced Temporal Production Rule. The PGE shown in the example processes data for every one-hour interval. However, Input One comes in at two-hour intervals and Input Two is produced every 1/2 hour.

Both the Begin Period Offset and End Period Offset for Input One are -7200 seconds (minus two hours). Consequently, every DPR will stage the "previous" Input One. This could be used to get the "previous" or "next" granule of an input.

The Begin Period Offset for Input Two is zero, meaning that it will match the Start Time of the DPR. The End Period Offset is +1800 seconds (plus 1/2 hour). Therefore, all Input Two granules will be staged that fall within the time period of the DPR plus 1/2 hour. The effect is to acquire all Input Two granules within the time period of the DPR, plus the one from the next 1/2-hour time period, for a total of three granules. The additional granule acquired by means of the End Period Offset might be used for interpolation purposes at the end point.

The same types of parameter settings that apply to the Basic Temporal Production Rule apply to the Advanced Temporal Production Rule. In addition, there are some parameters in the PGE science metadata ODL file that apply specifically to the Advanced Temporal Production Rule. However, the values applicable to the Basic Temporal Production Rule must be set before the Advanced Temporal Production Rule syntax is added.

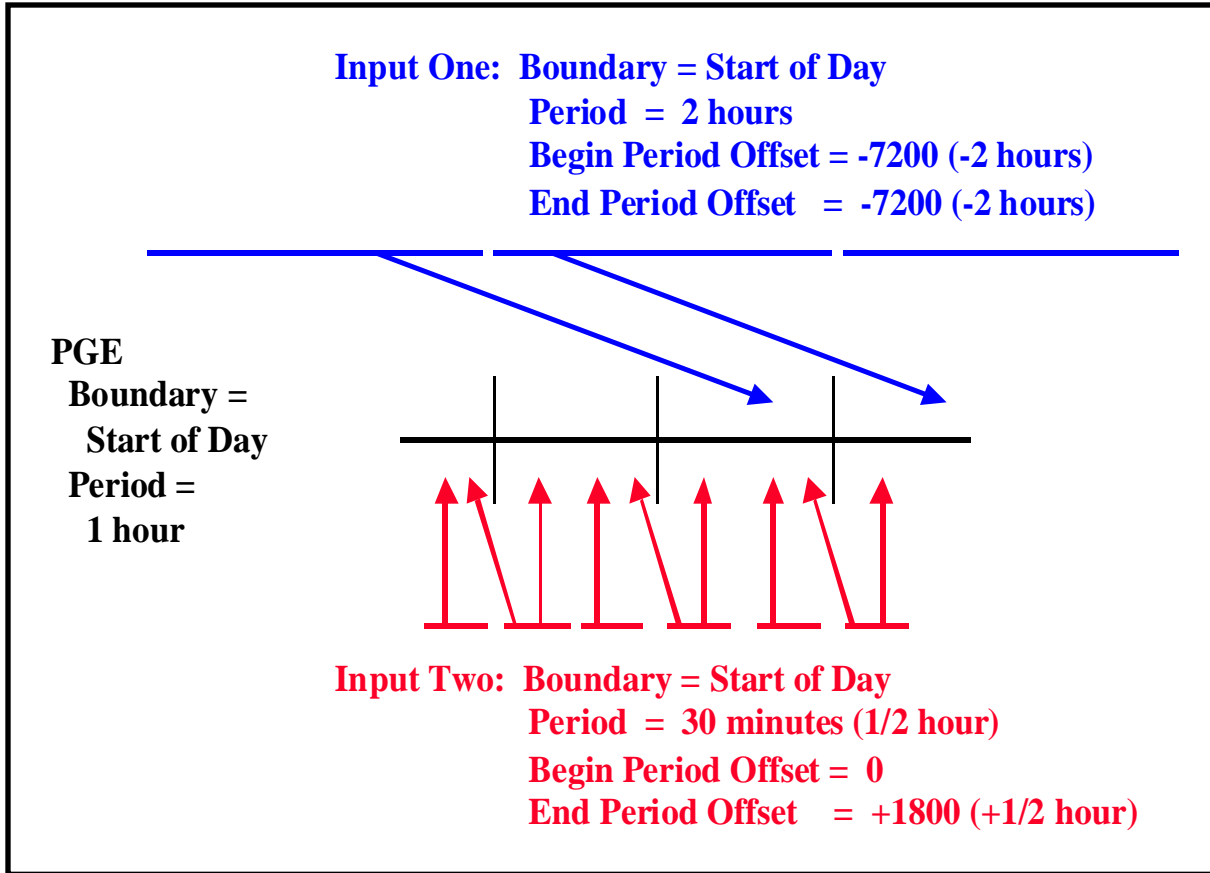


Figure 11.7.2-1. Example of the Advanced Temporal Production Rule

11.7.2.1 PGE Science Metadata ODL File Parameters

During the SSI&T process the PGE science metadata ODL file is generated from the PCF delivered with the science algorithm. A PCF_ENTRY object is generated for each file entry in the PCF. In order to implement the Advanced Temporal Production Rule the PCF_ENTRY object for each type of input file to which the rule applies uses the following syntax:

```

OBJECT = PCF_ENTRY
.
.
.
BEGIN_PERIOD_OFFSET =
END_PERIOD_OFFSET =
.
.
.
END_OBJECT = PCF_ENTRY

```

Accordingly, the following parameters must be set properly in order to implement the Advanced Temporal Production Rule:

- BEGIN_PERIOD_OFFSET.
- END_PERIOD_OFFSET.

BEGIN_PERIOD_OFFSET is the offset added to or subtracted from the Data Start Time of the DPR. The value assigned to BEGIN_PERIOD_OFFSET can be either a positive or negative value, specified in seconds. If the value is positive, it is added to the Data Collection Start Time (looking for the input forward in time). If the value is negative, it is subtracted from the Data Collection Start Time (looking backward in time). For example, BEGIN_PERIOD_OFFSET = -3600 requests data that was collected one hour (3600 seconds) before the DPR start time.

END_PERIOD_OFFSET is the offset added to or subtracted from the Data Collection End Time of the DPR. The value assigned to END_PERIOD_OFFSET can be either a positive or negative value, specified in seconds. If the value is positive, it is added to the Data Collection End Time (looking for the input forward in time). If the value is negative, it is subtracted from the Data Collection End Time (looking backward in time). For example, END_PERIOD_OFFSET = +2700 requests data that was collected 45 minutes (2700 seconds) after the DPR end time.

The BEGIN_PERIOD_OFFSET and END_PERIOD_OFFSET parameters can be specified for any input PCF_ENTRY in the PGE science metadata ODL file. If not specified, the parameters are set to zero (0) and the Advanced Temporal Production Rule does not apply to the PGE.

11.7.3 Alternate Input and Optional Input Production Rules

The Alternate Input and Optional Input Production Rules are very similar and use much the same processing in PDPS. Both rules allow a PGE to select various inputs based on timers and priority lists. The major difference is that Alternate Inputs requires that one of alternates on the list be used, whereas Optional Inputs allows successful execution of the PGE if no optional input on the list is available.

The Alternate Input Production Rule allows for a PGE to evaluate a list of inputs in priority order and be scheduled and executed with the best priority input that could be found. In essence, a PGE using Alternate Inputs is saying "I would like to run with Input A, but if it's not available, I am willing to run with Input B." A timer can be used to specify how long to wait for a given

alternate choice before proceeding with a choice of lesser priority. The PGE is not executed until one of the alternate choices has been found.

- Example:
 - A PGE requires model wind data as an input but is capable of accepting wind data from a Data Assimilation Office (DAO) model, a National Centers for Environmental Prediction (NCEP) model, or (as a last resort) climatology.
 - The PGE would use the Alternate Input Production Rule to list each input in priority order, giving a timer value for how long to wait before trying the next input.
 - If the DAO data are most desirable, DAO would be listed as first choice or "primary" data.
 - NCEP would be the second choice.
 - Climatology would be the last choice.
 - If a timer value is specified for DAO data, the PGE will wait for that timer to expire before running with either NCEP data or climatology.
 - If a timer had been placed on the NCEP input, the PGE would wait before running with the climatology data.

11.7.3.1 The Optional Input Production Rule

Allows for a PGE to list inputs that are desired but not required for it to execute. The inputs are ranked as previously stated and timers are set to wait before choosing a lower-priority type of input. However, if none of the inputs on the list becomes available, the PGE starts because the alternatives are classified as "optional." In essence the PGE is saying "I would like to run with Input A, but if its not available, I can run (and produce reasonable output) without it."

- Example:
 - It would be preferable to run a particular MODIS PGE with the output of a MISR PGE as input.
 - However, the MISR output may not be produced every day.
 - So the MODIS PGE lists the MISR input as optional with a two-hour timer.
 - On those occasions when no MISR output is produced, the MODIS PGE waits for two hours and then is executed without the MISR input.

Figure 11.7.3-1 provides an illustration of the Alternate Input Production Rule. The PGE in the illustration has two inputs that are "required" so they must available for the PGE to be run. It also has one input that is "alternate." The alternate input can be one of three choices, the first choice is the **primary**, then there are second and third choices.

After the pair of required inputs has become available, the alternate inputs are evaluated as follows:

- If the primary alternate is available, it is used as input and the PGE is scheduled for execution.
- There is a one-hour timer on the primary alternate. If the primary alternate is unavailable, the PGE waits until the primary alternate becomes available or the one-hour timer expires, whichever occurs first.
- If the second alternate is available after the timer for the primary alternate has expired, the second alternate is used as input and the PGE is scheduled for execution.

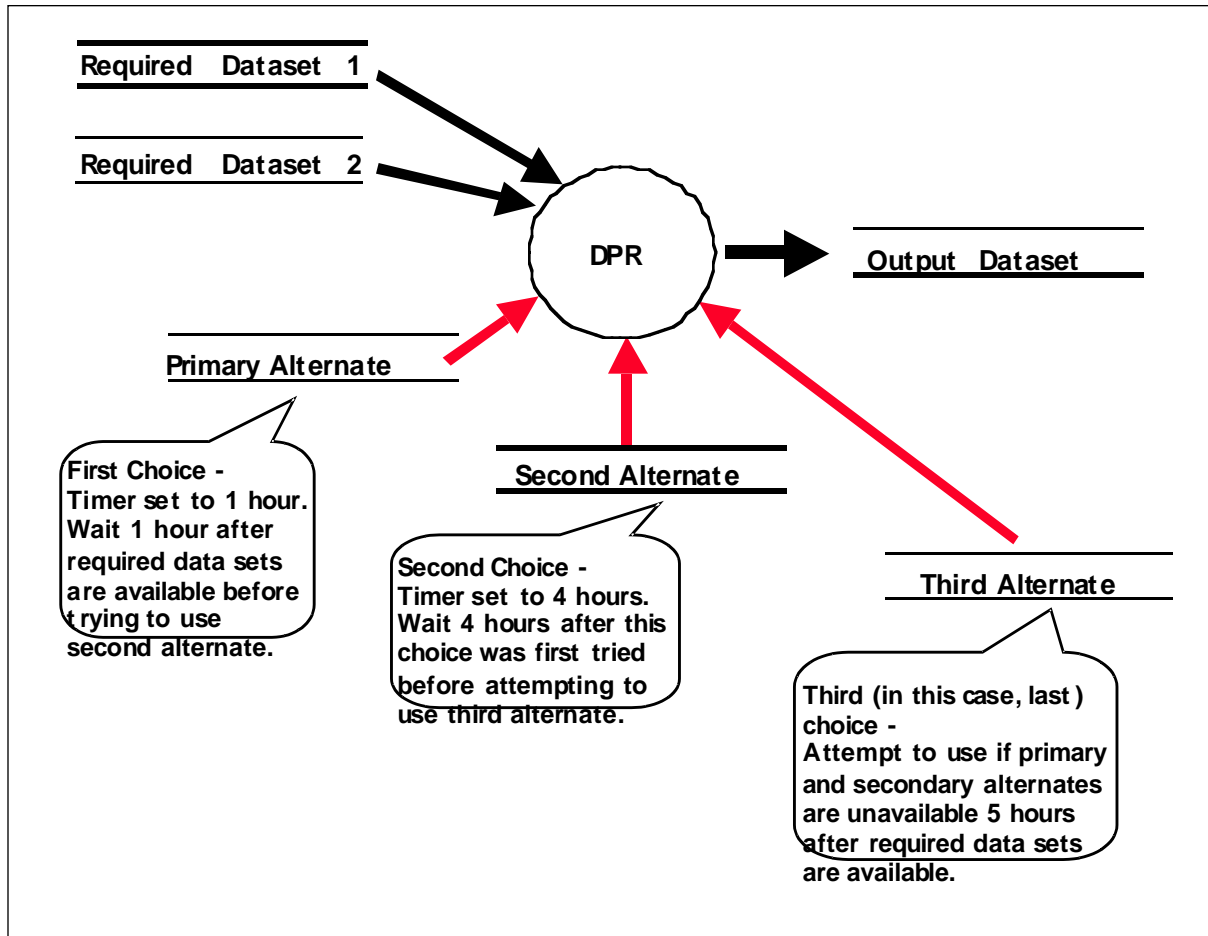


Figure 11.7.3-1. Example of the Alternate Input Production Rule

- There is a four-hour timer on the second alternate. If the second alternate is unavailable, the PGE waits until either the primary alternate or the secondary alternate becomes available or the four-hour timer expires, whichever occurs first.

- If the third alternate is available after the timer for the second alternate has expired, the third alternate is used and the PGE is scheduled for execution.
- There is no timer on the third alternate. If the third alternate is not available, the PGE waits until either the primary alternate, the secondary alternate, or the third alternate becomes available, whichever occurs first.
- The PGE will not start processing until one of the alternates becomes available.

If instead of an alternate the third input for the PGE had been defined as an optional input, the preceding scenario would have been the same, except that if neither the primary alternate, the second alternate nor the third option was available after the timers had expired, the PGE would not wait; it would be scheduled for execution without the third input. It would run with the two required inputs only.

The Alternate Input and Optional Input Production Rules are additions to settings/syntax put into the ODL files for other production rules. Inputs deemed “optional” or “alternate” can be searched for and acquired by other production rules (e.g., Basic Temporal or Metadata Checks/Query). The syntax for the rules used to search for the inputs have to be filled out in addition to the syntax required to make the input an alternate or optional input.

11.7.3.2 PGE Science Metadata ODL File Parameters

The following parameter must be set properly in the applicable PGE science metadata ODL file in order to implement the Alternate Input or Optional Input Production Rule:

- INPUT_TYPE.

In addition, one of the following two ODL objects is used within a PCF_ENTRY to define either the Alternate Input Production Rule or the Optional Input Production Rule:

- ALTERNATE_INPUT object.
- OPTIONAL_INPUT object.

INPUT_TYPE is a type of data defined by a PCF_ENTRY object (i.e., between OBJECT = PCF_ENTRY and END_OBJECT = PCF_ENTRY). It can have one of four possible values, only three of which are used to define an alternate or optional inputs:

- "Required"
 - A required input.
 - The data must be available or the PGE does not execute.
 - It is the "normal" value for the parameter (i.e., INPUT_TYPE = “Required”); consequently, the input is neither an alternate input nor an optional input.
- "Primary"
 - The primary alternate input.

- The data is the first choice in a list of alternates.
- "Alternate"
 - An alternate input (except the primary alternate) in a list of alternates.
 - The data is not the first choice in a list of alternates; it is a subsequent choice if the primary (or a higher-priority alternate) is not available.
- "Optional"
 - An optional input.
 - Availability of the data will be checked and if a timer has been specified, execution of the PGE will wait.
 - The PGE can be executed without the data if it is not available.

Although the Alternate Input and Optional Input Production Rules are similar, there are two different ODL objects used to define them within a PCF_ENTRY; i.e., the ALTERNATE_INPUT object and the OPTIONAL_INPUT object.

The ALTERNATE_INPUT object has the following syntax:

```

OBJECT = PCF_ENTRY
.
.
.
.
.
OBJECT = ALTERNATE_INPUT
.
.
.
END_OBJECT = ALTERNATE_INPUT
END_OBJECT = PCF_ENTRY

```

The ALTERNATE_INPUT ODL object surrounds an Alternate Input definition. An OBJECT/END_OBJECT pair separates the parameters defining the Alternate Input from the rest of the parameters defining the PCF_ENTRY. The following parameters define an ALTERNATE_INPUT object:

- CLASS.
- CATEGORY.
- ORDER.
- RUNTIME_PARM_ID.
- TIMER.
- WAITFOR.
- TEMPORAL [not implemented].

CLASS is a simple counter used to differentiate the different ALTERNATE_INPUT objects within the file. Since each ALTERNATE_INPUT object resides within a different PCF_ENTRY object, the CLASS for an ALTERNATE_INPUT object can always be 1.

CATEGORY is the name of the list of alternates to which the ALTERNATE_INPUT belongs. The PDPS uses CATEGORY to associate different alternates within a list. CATEGORY can be set to any string value of 20 characters or less (e.g., CATEGORY = "Snow Ice"). Alternates that are part of the same list should have matching CATEGORY values.

ORDER is the numerical place that the particular alternate holds in the list of alternates. The first choice or Primary Alternate (with the INPUT_TYPE = "Primary") should have ORDER = 1.

RUNTIME_PARM_ID specifies the Logical ID (in the PCF) for which the PGE will find the Logical ID of the alternate chosen. Since all alternates must be contained within different PCF_ENTRY objects, they all must have different Logical IDs (but all alternates within the same CATEGORY should have the same value of RUNTIME_PARM_ID). The RUNTIME_PARM_ID parameter specifies the Logical ID of a runtime parameter that the PGE may read to find out which alternate was chosen for the particular execution of the PGE.

The TIMER parameter specifies how long to wait for the particular alternate before checking for the next alternate in the list. The parameter value is expressed in the format "<Period Type>=<Length of Period>". Note that "Length of Period" can be specified as a positive integer only. The Alternate Input Production Rule accepts the following "Period Type" values:

- "WEEKS"
 - PDPS should wait for some number of weeks before searching for the next alternate in the list.
 - For example, TIMER = "WEEKS=2" would make PDPS wait two weeks before checking for the next alternate input.
- "DAYS"
 - PDPS should wait for some number of days before searching for the next alternate in the list.
 - For example, TIMER = "DAYS=5" would make PDPS wait five days before checking for the next alternate input.
- "HOURS"
 - PDPS should wait for some number of hours before searching for the next alternate in the list.
 - For example, TIMER = "HOURS=4" would make PDPS wait four hours before checking for the next alternate input.
- "MINS"
 - PDPS should wait for some number of minutes before searching for the next alternate in the list.

- For example, `TIMER = "MINS=5"` would make PDPS wait five minutes before checking for the next alternate input.
- "SECS"
 - PDPS should wait for some number of seconds before searching for the next alternate in the list.
 - For example, `TIMER = "SECS=2"` would make PDPS wait two seconds before checking for the next alternate input.

The `WAITFOR` parameter specifies whether or not the PGE can be run without the alternate input. Setting `WAITFOR = "N"` means that the PGE can run without the input if it cannot be found. In a list of alternate inputs, this would have meaning for the last choice only. If `WAITFOR = "Y"`, the PGE is not executed (even after the last alternate timer expires) until one of the alternates in the list can be found.

The `TEMPORAL` parameter is an unimplemented feature that would allow for searching for alternates from the same time period but a different date. It is currently stored in the PDPS database but is not used.

The `OPTIONAL_INPUT` object has the following syntax:

```

OBJECT = PCF_ENTRY□
.□
.□
.□
.□
.□
OBJECT = OPTIONAL_INPUT□
.□
.□
.□
END_OBJECT = OPTIONAL_INPUT□
END_OBJECT = PCF_ENTRY□

```

The `OPTIONAL_INPUT` ODL object surrounds an Optional Input definition. An `OBJECT/END_OBJECT` pair separates the parameters defining the Optional Input from the rest of the parameters defining the `PCF_ENTRY`. The following parameters define an `OPTIONAL_INPUT` object:

- `CLASS`.
- `CATEGORY`.
- `ORDER`.
- `RUNTIME_PARM_ID`.
- `TIMER`.
- `TEMPORAL` [not implemented].

The parameters that apply to the Optional Input Production Rule are defined in the same way that the corresponding parameters are defined for the Alternate Input Production Rule. However, note that the Optional Input Production Rule has no WAITFOR parameter. It is irrelevant; in fact, the very essence of the Optional Input Production Rule depends on not “waiting for” the last option but going ahead with the execution of the PGE without the unavailable optional input(s).

Table 11.7.3.2-1. Extract of PGE Metadata ODL File Template Showing Alternate Inputs (1 of 2)

```

>OBJECT = PCF_ENTRY
> CLASS = 16
> LOGICAL_ID = 1500
> PCF_FILE_TYPE = 1
> DATA_TYPE_NAME = "MOD10L2G"      [MODIS Level 2G Snow Cover]
> DATA_TYPE_VERSION = "1"          [ESDT versioning in release B.0]
> DATA_TYPE_REQUIREMENT = 1
> SCIENCE_GROUP = ""
> OBJECT = FILETYPE
> CLASS = 1
> FILETYPE_NAME = "Single File Granule"
> END_OBJECT = FILETYPE
> INPUT_TYPE = "Primary"
> NUMBER_NEEDED = 1
> OBJECT = ALTERNATE_INPUT
> CLASS = 1
> CATEGORY = "Snow Ice"              [User defined]
> ORDER = 1                          [This data type is sought first]
> RUNTIME_PARM_ID = 1509              [Run-time parameter holds LID of alternate]
> TIMER = "HOURS=6"
> WAITFOR = "N"                      [Force time-out on wait]
> TEMPORAL = "N"                    [Use most currently produced]
> END_OBJECT = ALTERNATE_INPUT
>END_OBJECT = PCF_ENTRY
>
>OBJECT = PCF_ENTRY
> CLASS = 17
> LOGICAL_ID = 1501
> PCF_FILE_TYPE = 1
> DATA_TYPE_NAME = "MOD10A1"        [MODIS Level 3 Daily Gridded Snow Cover data set]
> DATA_TYPE_VERSION = "1"
> DATA_TYPE_REQUIREMENT = 1
> SCIENCE_GROUP = ""
> OBJECT = FILETYPE
> CLASS = 2

```

**Table 11.7.3.2-1. Extract of PGE Metadata ODL File Template
Showing Alternate Inputs (2 of 2)**

```

> FILETYPE_NAME = "Single File Granule"
> END_OBJECT = FILETYPE
> INPUT_TYPE = "Alternate"
> OBJECT = ALTERNATE_INPUT
> CLASS = 2
> CATEGORY = "Snow Ice"           [User defined]
> ORDER = 2                       [This data type is sought last]
> RUNTIME_PARM_ID = 1509         [Run-time parameter holds LID of alternate]
> TIMER = "HOURS=6"             [Wait 6 additional hours]
> WAITFOR = "N"
> TEMPORAL = "N"
> END_OBJECT = ALTERNATE_INPUT
>END_OBJECT = PCF_ENTRY
>
>OBJECT = PCF_ENTRY
> CLASS = 18
> LOGICAL_ID = 1502
> PCF_FILE_TYPE = 1
> DATA_TYPE_NAME = "MIANTASC"   [MISR Terrestrial Atmosphere and Surface
Climatology]
> DATA_TYPE_VERSION = "1"
> DATA_TYPE_REQUIREMENT = 1
> SCIENCE_GROUP = ""
> OBJECT = FILETYPE
> CLASS = 3
> FILETYPE_NAME = "Single File Granule"
> END_OBJECT = FILETYPE
> INPUT_TYPE = "Alternate"
> OBJECT = ALTERNATE_INPUT
> CLASS = 3
> CATEGORY = "Snow Ice"           [User defined]
> ORDER = 3                       [This data type is sought last]
> RUNTIME_PARM_ID = 1509         [Run-time parameter holds LID of alternate]
> TIMER = ""                     [Don't wait for this one]
> WAITFOR = "Y"                 [Start anyway]
> TEMPORAL = "N"
> END_OBJECT = ALTERNATE_INPUT
>END_OBJECT = PCF_ENTRY

```

11.7.4 Minimum/Maximum Number of Granules Production Rule

The Minimum/Maximum Number of Granules Production Rule makes it possible to specify a range of possible granules for a given input or output for a PGE.

- Inputs.
 - Minimum number of granules the PGE needs for full data coverage.
 - Maximum number of granules for the time period.
- Outputs.
 - Minimum number of outputs that the PGE is expected to produce.
 - Maximum number of outputs that the PGE is expected to produce.

For example, a PGE processes data for every 90-minute interval, has a period of 90 minutes, and takes as input a granule with a period of two hours.

- In many instances one granule of the input will satisfy the PGE.
- In other instances, because of the way the two-hour and 90-minute periods overlap, the PGE needs two input granules to cover the time period.
- Therefore, ...
 - Minimum Number of Granules = 1.
 - Maximum Number of Granules = 2.

The Minimum/Maximum Number of Granules Production Rule is different from most production rules because it works for both input and output granules. It allows the PGE to request a range of inputs (i.e., 1-10 granules), so that it runs with as few as one granule but with as many as ten granules. If a PGE needs at least three granules of a particular input, the minimum number of granules is defined as three and the PGE is not executed until at least three granules are available.

Optional outputs are defined when the Minimum Number of Granules is set to zero. In such cases the PGE can produce none of the particular type of output and still be considered to have executed successfully. If a PGE has a non-zero value for a Minimum Number of Granules associated with an output, and fails to produce any granules of that output type, it is marked as failed.

Figure 11.7.4-1 provides an illustration of the Minimum/Maximum Number of Granules Production Rule. In the example the PGE processes data related to a one-hour period and takes in both Input 1 and Input 2. Since Input 1 has a PERIOD of 1/2 hour, every PGE run requires two Input 1 granules. Input 2 has a PERIOD of 15 minutes, so there are four Input 2 granules for every PGE run.

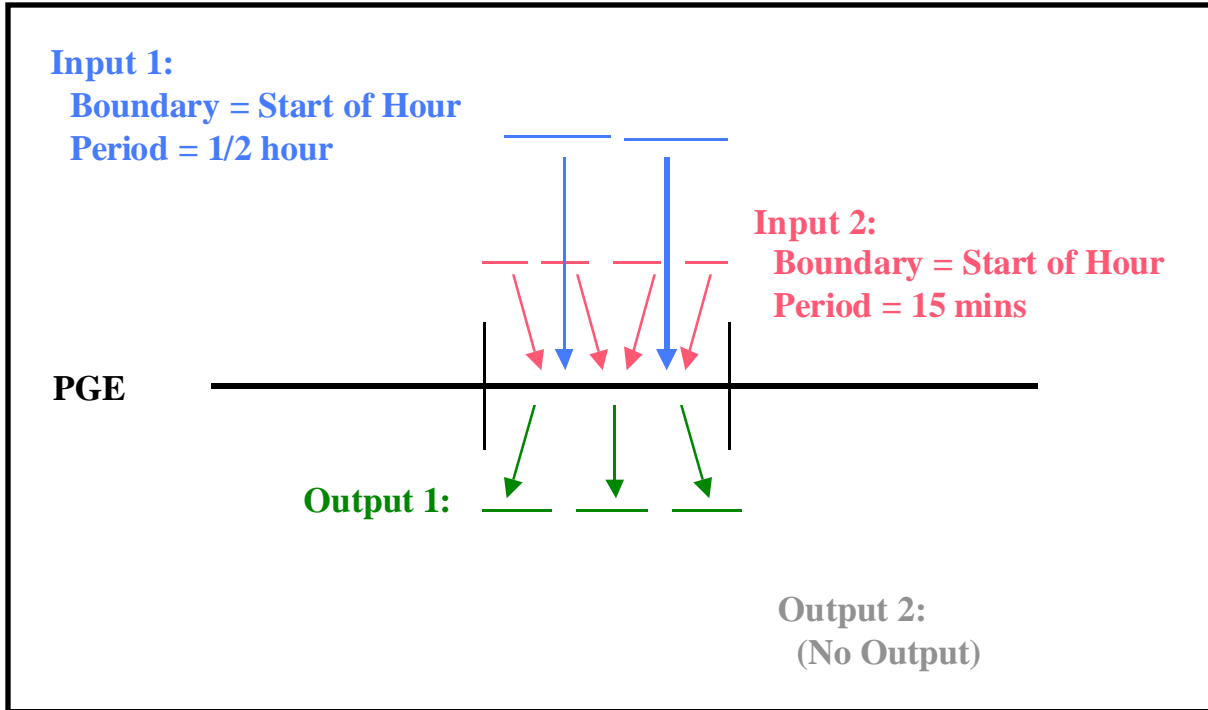


Figure 11.7.4-1. Example of the Minimum/Maximum Number of Granules Production Rule

The PGE produces three Output 1 granules for each run. In this case it does not produce any Output 2 granules.

Minimum and maximum values can affect each input and output as follows:

- Input 1:
 - If Minimum Granules is set to anything equal to or less than two for Input 1, the PGE is scheduled and executed.
 - If Minimum Granules is set to three, the PGE is not scheduled because there are not enough Input 1 granules to make the minimum.
 - If Maximum Granules is set to anything equal to or greater than two for Input 1, the PGE is scheduled and executed.
 - If Maximum Granules is set to one, the PGE is not scheduled because there are too many Input 1 granules (the number exceeds the maximum that the PGE can process).

- Input 2:
 - If the Minimum Granules is set to anything equal to or less than four for Input 2, the PGE is scheduled and executed.
 - If Minimum Granules is set to five, the PGE is not scheduled because there are not enough Input 2 granules to make the minimum.
 - If Maximum Granules is set to anything equal to or greater than four for Input 2, the PGE is scheduled and executed.
 - If Maximum Granules is set to three, the PGE is not scheduled because there are too many Input 2 granules (the number exceeds the maximum that the PGE can process).
- Output 1:
 - If Minimum Granules is set to anything equal to or less than three for Output 1, the PGE is scheduled and executes successfully.
 - If Minimum Granules is set to four, the PGE is marked as failed because it did not produce the expected number of output granules.
 - If Maximum Granules is set to anything equal to or greater than three for Output 1, the PGE is scheduled and executes successfully.
 - If Maximum Granules is set to two, the PGE is marked as failed because it produced too many output granules.
- Output 2:
 - If Minimum Granules is set to anything other than zero, the PGE is marked as failed because it did not produce the expected number of output granules.
 - If Maximum Granules is set to anything equal to or greater than zero for Output 2, the PGE is scheduled and executes successfully.

The Minimum/Maximum Granules Production Rules are additions to settings/syntax put into the ODL files for other production rules. All Production Rules have a Minimum and Maximum Granule setting for both inputs and outputs, even though both values may be set to one (1).

11.7.4.1 PGE Science Metadata ODL File Parameters

The PGE science metadata ODL file syntax for implementing the Minimum/Maximum Production Rule for **input** data includes the following types of entries:


```

OBJECT = PCF_ENTRY□
.□
PCF_FILE_TYPE =□
.□
.□
MIN_GRANULES_REQUIRED =□
MAX_GRANULES_REQUIRED =□
.□
.□
.□
END_OBJECT = PCF_ENTRY□

```

Accordingly, the following parameters must be set properly in order to implement the Minimum/Maximum Production Rule:

- PCF_FILE_TYPE.
- MIN_GRANULES_REQUIRED.
- MAX_GRANULES_REQUIRED.

The PCF_FILE_TYPE parameter is defined by integers in the range of 1 to 8 (inclusive). The integers are codes for the following types of files:

- 1 - product input files.
- 2 - product output files.
- 3 - support input files.
- 4 - support output files.
- 5 - user defined runtime parameters.
- 6 - interim/intermediate input files.
- 7 - interim/intermediate output files.
- 8 - temporary input/output.

For inputs (any PCF_ENTRY with a PCF_FILE_TYPE equal to 1, 3 or 6) the following pair of values must be set for each PCF_ENTRY:

- MIN_GRANULES_REQUIRED
 - Minimum number of granules required for the input.
 - A value of zero (MIN_GRANULES_REQUIRED = 0) would mean that the PGE could execute if no granules for that particular input could be found (in effect, the input is an **optional input**).
 - A value of three (for example) would mean that the PGE must have at least three granules of the input before the PGE can be executed.
- MAX_GRANULES_REQUIRED
 - Maximum number of granules for the input that the PGE is able to successfully process.

- A value of four (for example) would mean that the PGE would process at most four granules for the input.
- If MAX_GRANULES_REQUIRED = 4 and more than four granules are found for the given input, the PGE is not executed.

The PGE science metadata ODL file syntax for implementing the Minimum/Maximum Production Rule for **output** data includes the following types of entries:

```

OBJECT = PCF_ENTRY□
.□
PCF_FILE_TYPE =□
.□
.□
MIN_GRANULE_YIELD =□
MAX_GRANULE_YIELD =□
.□
.□
.□
END_OBJECT = PCF_ENTRY□

```

For outputs (any PCF_ENTRY with a PCF_FILE_TYPE equal to 2, 4 or 7) the following pair of values must be set for each PCF_ENTRY.

- MIN_GRANULE_YIELD
 - Minimum number of granules that the PGE produces for the output.
 - A value of zero (MIN_GRANULE_YIELD = 0) means that the PGE produces no granules for the output (the output is an **optional output**).
 - A value of three (for example) means that the PGE produces at least three granules of the output during a successful execution.
- MAX_GRANULE_YIELD
 - Maximum number of granules that the PGE produces for this output.
 - A value of four (for example) means that at most the PGE produces four granules for the output.
 - Note that sizing of disk space is based on this number, so making it too small could cause problems on the science processor disks.

11.7.5 Optional DPRs Production Rule

The Optional DPRs Production Rule (also called the Data-Scheduled Production Rule) makes the execution of a PGE subject to the availability of a **key input**. The system generates DPRs for every possible instance of the key input data but executes only the DPRs for which data are either produced in data processing or can be acquired from the archive.

The Optional DPRs Production Rule applies to PGEs that process certain kinds of **non-routine data**.

- **Routine Data**
 - Data that can be predicted, that come in at specific intervals and are always of a specified length.
 - Routine data makes it possible for the Basic Temporal Production Rule to schedule PGEs based on their input data.
- **Non-Routine Data**
 - Data that cannot be predicted because they come in at random periods and/or their length is variable.
 - Examples include an "optional" output of an upstream PGE, or data that are archived at random periods (e.g., some forms of ASTER data).

An Optional DPR has as its **key input** a non-routine data type. There are two sets of circumstances that lead to the scheduling of Optional DPRs:

- Every possible time that the input is produced in data processing (i.e., the key input is produced as an "optional" output by an upstream PGE).
- Whenever a new granule (of a particular data type) can be acquired from the archive (e.g., archived data that were inserted at unpredictable times).

An example of the first condition starts with a MODIS PGE that produces a certain product only when the input data were collected during the satellite's "Day" mode. A second MODIS PGE is scheduled to use the optional ("Day"-mode) product from the first MODIS PGE as its key input. The second MODIS PGE is scheduled to run after every instance of the first MODIS PGE; however, only the DPRs that can use the optional products resulting from runs of the first MODIS PGE are executed. The remaining DPRs cannot be executed because there is no input data for them.

The second condition is illustrated by ASTER routine processing, which makes use of the Optional DPRs Production Rule to schedule and execute ASTER PGEs for new data that have been archived. (Note that the DAAC ingests and archives ASTER production data from tapes supplied by the ASTER Ground Data System on a frequent but not entirely predictable basis.) When the Production Planner creates a Production Request for an ASTER PGE, it is necessary to specify the **insertion time** range (i.e., the time period when the desired data were archived) as opposed to the **collection time** (when the satellite instrument gathered the data). DPRs specifying the ASTER PGE are scheduled and executed for the data granules that were actually inserted in the archive during the time period specified in the Production Request.

An illustration of the Optional DPRs production rule is presented in Figure 11.7.5-1. In the figure there are two DPRs (i.e., DPR-1 and DPR-2) for the upstream PGE and two DPRs (i.e., OPT-1 and OPT-2) for the PGE subject to the Optional DPRs Production Rule. The "Optional DPRs" PGE takes as input the optional output of the upstream PGE. When it is executed, DPR-1

produces the optional output, so the dependent DPR (OPT-1) is executed. However, OPT-2 is not executed because DPR-2 (on which OPT-2 depends) does not produce the optional output.

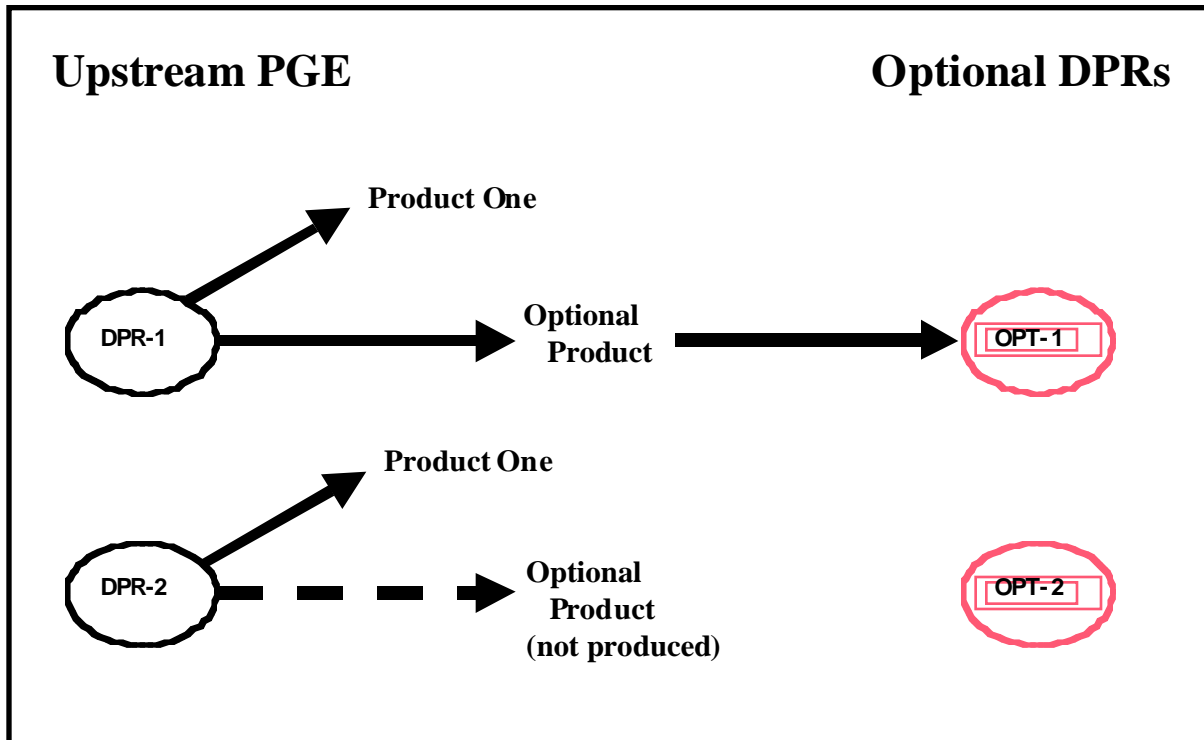


Figure 11.7.5-1. Example of the Optional DPRs Production Rule

The Optional DPRs Production Rule is set up during the SSI&T process. It uses many of the same parameter settings as the Basic Temporal Production Rule so the values specified in the Basic Temporal Production Rule (or other production rules) are set first, then the Optional DPRs Production Rule syntax is added.

11.7.5.1 PGE Science Metadata ODL File Parameters

The following two types of PGE science metadata ODL file entries must be made in order to set up the Optional DPRs Production Rule:

- SCHEDULE_TYPE.
- KEY_INPUT.

The SCHEDULE_TYPE parameter is set as follows:

- SCHEDULE_TYPE = “Data”
 - This demonstrates the appropriateness of the term “Data-Scheduled Production Rule.”

- Other schedule types include Time, Tile, Orbit, and Snapshot.

The key input is designated by including the following parameter in the PCF_ENTRY for whichever input is to be the key input:

- KEY_INPUT = “Y”
 - Assigning a value of “Y” to the KEY_INPUT parameter identifies the data as a key input and it is subsequently treated as such.
 - Either assigning a value of “N” to the KEY_INPUT parameter or leaving out the parameter entirely identifies the non-key input data.
 - Only one key input is allowed per PGE profile.

The Production Planner’s role in the implementation of the Optional DPRs Production Rule was described in the MODIS and ASTER examples previously described and varies with the kind of key input:

- Optional output of an upstream PGE (MODIS example).
 - Production Planner creates Production Requests for the PGE subject to the Optional DPRs Production Rule and specifies the same date/time range as for the upstream PGE.
 - Some of the DPRs generated as a result of the Production Request will never run due to lack of input data.
- Ingested on an irregular time schedule (ASTER example).
 - Production Planner specifies the data **insertion time** range when creating Production Requests.
 - All DPRs generated as a result of the Production Requests should be capable of running.

11.7.6 Intermittent Activation Production Rule

The conditions for executing most PGEs are well defined. The most common activation condition is the availability of all input data sets. Similarly, the frequency of execution is usually well defined (e.g., run once for every granule or run monthly averages once a month). However, some PGEs have additional or different constraints on when they are run.

A PGE can be set up to run on every n^{th} instance of input data. For example, a QA PGE that is run on a daily product may need to be run only every fifth day to provide a spot check. Note that this does **not** refer to the common case of running a weekly averaging PGE only once each week, which would be handled by the Basic Temporal Production Rule and the time ranges specified for the input and output ESDTs. Rather, this is a special case where a PGE **can** be run every day (or hour, week, etc.), but for some reason (such as a QA check) it is desired to run the PGE only every n^{th} day.

To implement the Intermittent Activation Production Rule the Production Planner supplies the following information (via the Production Request Editor) when creating a production request:

- **Number to Skip**
 - Number of DPRs to be skipped (not executed).
 - Entered in the **Skip** field on the Production Request Editor.
- **Number to Keep**
 - After skipping the specified number of DPRs, how many are to be kept?
 - Entered in the **Keep** field on the Production Request Editor.
 - The number to keep is usually one but could be any number.
- **Skip First**
 - Button on the Production Request Editor.
 - Selected to skip the first DPR.
 - Not selected if the first DPR is to be run.

The Planning Subsystem uses the preceding information to establish a pattern of execution. The pattern is effective for the single PR in which the “number to skip” and the “number to keep” are specified; it is not maintained between PRs.

The following example of the Intermittent Activation Production Rule is shown in Figure 11.7.6-1:

- The Production Planner prepares a production request for a 14-day period, generating 14 DPRs.
- The Production Planner made the following selections on the Production Request Editor:
 - Entered “4” in the **Number to Skip** field.
 - Entered “1” in the **Number to Keep** field.
 - Did **not** select the **Skip First** button.
- Consequently, the following results are obtained:
 - First DPR runs. Four DPRs (second through fifth) are skipped.

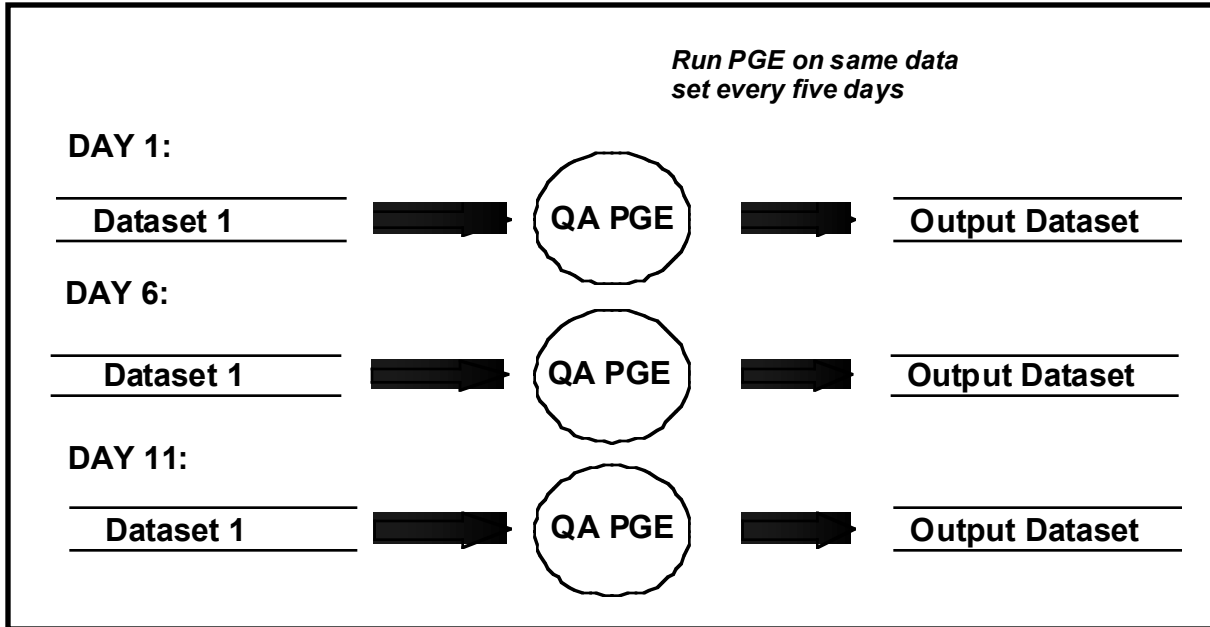


Figure 11.7.6-1. Example of the Intermittent Activation Production Rule

- Sixth DPR runs.
- Four DPRs (seventh through tenth) are skipped.
- Eleventh DPR runs.
- Remaining three DPRs (twelfth through fourteenth) are skipped.

11.7.7 Metadata Checks and Metadata Query Production Rules

The Metadata Checks and Metadata Query Production Rules are similar in definition and use. Both production rules allow the PGE to specify granule-level metadata values that define whether the PGE can accept one (or more) of its inputs. The rules differ only in the results of metadata search performed.

- Metadata Checks Production Rule.
 - When PLS requests the Science Data Server to search for the input(s), the Science Data Server "checks" the metadata of all granules that match the time frame with respect to the value(s) allowed by the PGE.
 - If any granule fails to match the specified value(s), the PGE is not executed.
- Metadata Query Production Rule.

- When PLS requests the Science Data Server to search for the input(s), the Science Data Server adds to the query the metadata value(s) desired by the PGE.
- Only the granules that match the time frame of the PGE plus the granule-level metadata value(s) specified by the PGE are staged for the PGE to use as input.
- If no granules are found matching the conditions and the input is not optional, the PGE is not executed.
- Example of Metadata Checks:
 - A MODIS PGE is run when the Percent Cloud Cover of its inputs is greater than 25 percent.
 - The Metadata Checks Production Rule is used to specify the granule-level metadata value of greater than 25.
 - When the PGE is scheduled and is ready to start, two granules match the timeframe of the Production Request for the input with the Metadata Check.
 - If both granules have a Percent Cloud Cover greater than 25 percent, execution of the PGE starts and both granules are staged.
 - If one of the granules has a Percent Cloud Cover of 15 percent, the PGE is not executed.
- Example of Metadata Query:
 - A MODIS PGE is run when as many granules as possible of one of its inputs have a QA Value = "Good".
 - The Metadata Query Production Rule is used to specify the granule-level metadata value = "Good".
 - When the PGE is scheduled and is ready to start, two granules match the time frame of the production request for the input with the Metadata Query.
 - If both granules have a QA Value = "Good", execution of the PGE starts and both granules are staged.
 - If one of the granules has a QA Value = "Bad", the PGE executes but with only one granule (the one with QA Value = "Good").

The Metadata Checks and Metadata Query Production Rules are used in conjunction with the times specified in the Basic Temporal Production Rule or other production rules. The Metadata Check or Query is added information that further refines what granules are sought by the PGE.

Multi-Granule ESDTs are a special case of the Metadata Query Production Rule. Multi-Granule ESDTs are used for PGE inputs or outputs when more than one granule of the same ESDT exists for the same temporal range (time period). The Multi-Granule ESDT mechanism employs a metadata parameter to differentiate between the "equal in time" granules. A metadata

parameter is selected that is unique across granules for the same time period and that is used by PDPS to keep track of which granule is which when the granules are produced. Later, if only one of a pair of granules for a particular time period is needed as input to the PGE, the Metadata Query is used to ensure that PDPS schedules the correct granule as input.

The **Data Day Production Rule** is actually an addition to the Metadata Query Production Rule involving runtime parameter values. There is a pair of settings (Start Data Day and End Data Day) that allow a PGE to perform a Metadata Query for the start of the Data Day and the end of the Data Day. A separate section of this lesson is devoted to the Data Day Production Rule.

Using runtime parameter values is a capability of the Metadata Query and Metadata Checks Production Rules. Rather than use a hard-coded value for the check or query, a value computed from one of the other production rules can be used.

Figure 11.7.7-1 illustrates the Metadata Checks and Metadata Query Production Rules. If no Metadata Check or Query were applicable, the PGE shown in the figure would use three granules of input (i.e., Granules A through C). However, let us assume that the metadata value to be checked/queried is %CloudCover. Each granule has a different value for %CloudCover.

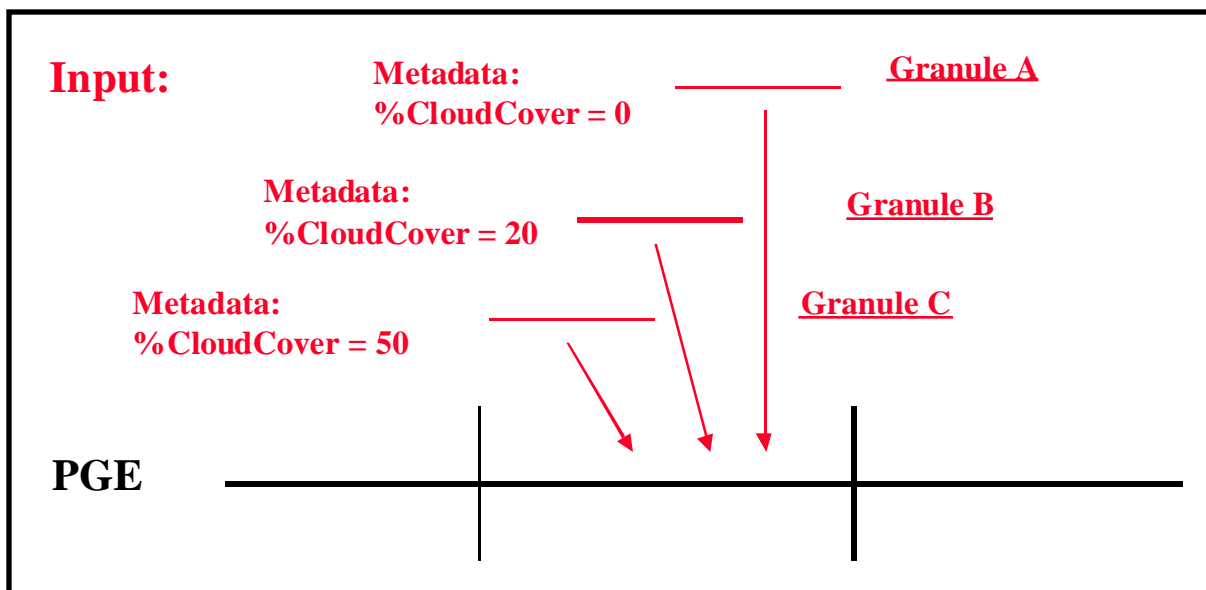


Figure 11.7.7-1. Example of the Metadata Checks and Query Production Rules

The following results demonstrate the differences between the Metadata Checks and Metadata Query Production Rules, especially with respect to the number of inputs that the PGE receives when different values are specified:

- Metadata Check of %CloudCover < 80:
 - In this case all three granules are acquired and the PGE is scheduled and executed.
- Metadata Query of %CloudCover < 80:
 - All three granules are acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover = 50:
 - The PGE is not scheduled because only one of the three granules (Granule C) meets the criterion.
- Metadata Query of %CloudCover = 50:
 - Granule C is found and if the PGE's Min/Max Granules parameters are set to allow one granule, that one granule is acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover < 50:
 - The PGE is not scheduled because only two of the three granules (Granule A and B) meet the criterion.
- Metadata Query of %CloudCover < 50:
 - Granules A and B are found and if the PGE's Min/Max Granules parameters are set to allow two granules, the granules are acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover <= 50:
 - The PGE is scheduled and executed because all three granules meet the criterion.
- Metadata Query of %CloudCover <= 50:
 - All three granules are found and acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover = 20:
 - The PGE is not scheduled because only one of the three granules (Granule B) meets the criterion.
- Metadata Query of %CloudCover = 20:
 - Granule B is found and if the PGE's Min/Max Granules parameters are set to allow one granule, the granule is acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover < 20:
 - The PGE is not scheduled because only one of the three granules (Granule A) meets the criterion.

- Metadata Query of %CloudCover < 20:
 - Granule C is found and if the PGE’s Min/Max Granules parameters are set to allow one granule, the granule is acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover = 10:
 - The PGE is not scheduled because none of the three granules meets the criterion.
- Metadata Query of %CloudCover = 10:
 - The PGE is not scheduled because no granules are returned from the query (unless Minimum Granules is set to 0).

Note that there can be more than one Metadata Check or Metadata Query on a given input. In the preceding example, a Metadata Check on %CloudCover can be combined with a Metadata Query on another parameter to further limit the input.

The Metadata Checks and Metadata Query Production Rules are additions to settings/syntax put into the ODL files for other production rules. The addition of a Metadata Check or a Metadata Query to an input means that other production rules used to evaluate that input will be applied in combination with the Metadata Check or Metadata Query.

11.7.7.1 PGE Science Metadata ODL File Parameters

Although the Metadata Checks and Metadata Query Production Rules are similar, there are two different ODL objects used to define them within a PCF_ENTRY in the PGE science metadata ODL file; i.e., the METADATA_CHECKS object and the METADATA_QUERY object.

The METADATA_CHECKS object has the following syntax:

```

OBJECT = PCF_ENTRY□
.□
.□
.□
.□
.□
OBJECT = METADATA_CHECKS□
.□
.□
.□
END_OBJECT = METADATA_CHECKS□
END_OBJECT = PCF_ENTRY□

```

The METADATA_QUERY object has the same syntax except “METADATA_QUERY” replaces “METADATA_CHECKS” in every instance.

Most of the following parameters must be set in the PGE science metadata ODL file within the METADATA_CHECKS or METADATA_QUERY ODL object (as applicable) in order to implement either the Metadata Checks or Metadata Query Production Rule:

- CLASS.
- PARM_NAME.
- OPERATOR.
- VALUE.
- DATABASE_QUERY.
- KEY_PARAMETER_NAME (optional).
- KEY_PARAMETER_VALUE (optional).

CLASS is a simple counter used to differentiate the different Metadata Checks or Metadata Query objects within the file. Since each Metadata Checks or Metadata Query object resides within a different PCF_ENTRY object, the CLASS for an METADATA_CHECKS or METADATA_QUERY object can always be 1 (e.g., CLASS = 1).

PARAM_NAME is the name of the metadata parameter on which the check or query is to be performed. The value specified for PARAM_NAME (e.g., PARAM_NAME = "%CloudCover") must be part of the granule-level metadata of the ESDT. In addition, it must match the parameter name specified in the ESDT science metadata ODL file.

OPERATOR is the operator (e.g., OPERATOR = "==") on which the check/query is to be performed. The following values are valid for OPERATOR:

- ">"
 - Value in metadata must be greater than.
- "<"
 - Value in metadata must be less than.
- ">="
- Value in metadata must be greater than or equal to.
- "<="
- Value in metadata must be less than or equal to.
- "=="
- Value in metadata must be equal to.
- "!="
- Value in metadata must be **not** equal to.

VALUE is the value (e.g., VALUE = 50) against which the metadata parameter (defined by PARAM_NAME) is compared (using the operator specified by the OPERATOR parameter). The value for the VALUE parameter should be the type of data (e.g., integer, string) as defined in the ESDT ODL metadata for the parameter.

DATABASE_QUERY indicates whether the value for the Metadata Check or Query should be retrieved from the PDPS database rather than through the use of the VALUE parameter. Specifying DATABASE_QUERY permits **runtime parameter values** to be used for Metadata Query or Metadata Checks. The following values are valid for the DATABASE_QUERY parameter:

- "NONE"
 - Use the value in the VALUE parameter; no value from the PDPS database is used.
- "PATH NUMBER"
 - Use the Path Number (0-233) of the orbit for which the PGE is scheduled.
- "ORBIT NUMBER"
 - Use the Orbit Number of the orbit for which the PGE is scheduled.
- "TILE ID"
 - Use the Tile ID of the current Data Processing Request.
- "START DATA DAY"
 - Use the Start Data Day for the current Data Processing Request.
- "END DATA DAY"
 - Use the End Data Day for the current Data Processing Request.

KEY_PARAMETER_NAME is an optional parameter that is used to specify the container within a multi-container metadata group (i.e., the MeasuredParameters metadata group in most ESDTs). The KEY_PARAMETER_NAME (e.g., KEY_PARAMETER_NAME = "ParameterName" for metadata checks or queries within the MeasuredParameters group) in conjunction with the KEY_PARAMETER_VALUE allows PDPS to determine which container within the multi-container group is to be the object of the check or query. KEY_PARAMETER_NAME is **not** used for product-specific attributes.

KEY_PARAMETER_VALUE is an optional parameter that is used to specify the **value** (e.g., KEY_PARAMETER_VALUE = "LandCoverage") for the container within a multi-container metadata group (i.e. the MeasuredParameters metadata group in most ESDTs). The KEY_PARAMETER_VALUE in both the PGE science metadata ODL file and ESDT science metadata ODL file must match.

Multi-Granule ESDTs are created by adding the following parameter to the PCF_ENTRY in the PGE science metadata ODL file:

- DISTINCT_VALUE.

The DISTINCT_VALUE must be set to the value of the metadata parameter that is used to differentiate granules within the Multi-Granule ESDT. In addition, the input or output defined by the PCF entry must have a corresponding DISTINCT_PARAMETER entry in the ESDT science metadata ODL file.

11.7.7.2 ESDT Science Metadata ODL File Parameters

The METADATA_DEFINITION ODL object surrounds the definition for Metadata Checks or Metadata Query information within the ESDT science metadata ODL file. An OBJECT/END_OBJECT pair is needed to separate the parameters defining the Metadata Definition from the rest of the parameters defining the ESDT with the following syntax:

```
OBJECT = METADATA_DEFINITION
      .
      .
      .
END_OBJECT = METADATA_DEFINITION
```

A METADATA_DEFINITION object can match multiple Metadata Checks or Metadata Query objects in various PGE science metadata ODL files. There is no difference between the two production rules with respect to the parameters that need to be set in the ESDT science metadata ODL file. Most of the following parameters must be set:

- CLASS.
- PARM_NAME.
- CONTAINER_NAME.
- TYPE.
- KEY_PARAMETER_NAME (optional).
- KEY_PARAMETER_VALUE (optional).

CLASS is a simple counter used to differentiate the different Metadata Definition objects within the file. Each Metadata Definition object within the file must have a **different** CLASS value.

PARM_NAME is the name of the Metadata parameter on which the check or query will be performed. The value specified for PARM_NAME must be part of the granule-level metadata of the ESDT. It must also match the parameter name specified in the PGE science metadata ODL file(s).

CONTAINER_NAME is the name of the Metadata Group within which the metadata parameter defined by PARM_NAME is contained. For product-specific attributes CONTAINER_NAME is set to the string "AdditionalAttributes" (i.e., CONTAINER_NAME = "AdditionalAttributes").

TYPE indicates the type of data within the metadata parameter. The following values are valid for TYPE:

- "INT"
 - Integer data.

- "FLOAT"
 - Floating point data.
- "STR"
 - String or character data.
 - Note that dates and times are considered string data.

KEY_PARAMETER_NAME is an optional parameter that is used to specify the container within a multi-container metadata group (i.e., the MeasuredParameters metadata group in most ESDTs). The KEY_PARAMETER_NAME allows PDPS to determine which container within the multi-container group is to be the object of the check or query.

KEY_PARAMETER_VALUE is an optional parameter that is used to specify the value for the container within a multi-container metadata group (i.e., the MeasuredParameters metadata group in most ESDTs). The KEY_PARAMETER_VALUE in both the ESDT science metadata ODL file and PGE science metadata ODL file must match.

The ESDT science metadata ODL file for an input specifying Multi-Granule ESDTs needs to have the following parameter added:

- DISTINCT_PARAMETER.

The DISTINCT_PARAMETER must be set to the name of the metadata parameter that is used to differentiate granules within the Multi-Granule ESDT. A corresponding METADATA_DEFINITION must be created to help PDPS find the specified metadata parameter when querying the Science Data Server.

11.7.8 Data Day Production Rule

The Data Day Production Rule is an addition to the Metadata Query Production Rule involving runtime parameter values. The Data Day Production Rule uses a query to the PDPS database for the time period for the DPR and a Metadata Query for data matching the Data Day. The Data Day is defined as a day within twelve hours of the current day. There is a pair of settings (Start Data Day and End Data Day) that provide parameters for the Metadata Query.

The Start Data Day and End Data Day values are calculated by subtracting twelve hours from the starting day for which the PGE is executing and adding twelve hours onto the ending day for which the PGE is running.

- Data Day for a PGE is running on data from 07/04 00:00:00 to 07/05 00:00:00 is defined as follows:
 - START_DATA_DAY = 07/03 12:00:00
 - END_DATA_DAY = 07/06 12:00:00.

11.7.9 Spatial Query Production Rule

The Spatial Query Production Rule allows a PGE to select input(s) based on the spatial coverage of another input (called the **key input**). The PDPS queries the Science Data Server for the spatial coverage of the key input, then uses it in acquiring any subsequent inputs that the PGE has requested that have the same spatial coverage.

- Example:
 - Level 0 input data for an ASTER DPR covers a small section of the Earth.
 - The PGE requires ancillary data that covers the same area to complete its processing.
 - The PGE uses the Spatial Query Production Rule to mark the geographic input as its key input.
 - The PGE specifies that the ancillary input is to be retrieved for the same spatial coverage as that of the key input.
 - When PDPS finds an input granule for the PGE, it performs a Spatial Query to acquire the ancillary input with the same spatial coverage as that of the key input.

Without specifying coordinates, PDPS can match inputs against the spatial constraint of the key input, and give to a PGE only those granules which overlap in area.

For Release 5B Spatial Pad will be added to the Spatial Query Production Rule. Spatial Pad is a means of padding the spatial constraints of the key input. The specified pad is added to all sides of the key input's spatial shape. All granules that intersect the expanded area are retrieved.

Figure 11.7.9-1 is an illustration of the Spatial Query Production Rule. The figure shows a PGE that has two input types, one of which is the key input. The other type of input has granules labeled with the names of various colors. One granule (i.e., “green”) of the key input is found. The spatial coordinates of the granule are retrieved and all inputs of the second ESDT are checked for overlap with the key input's coordinates.

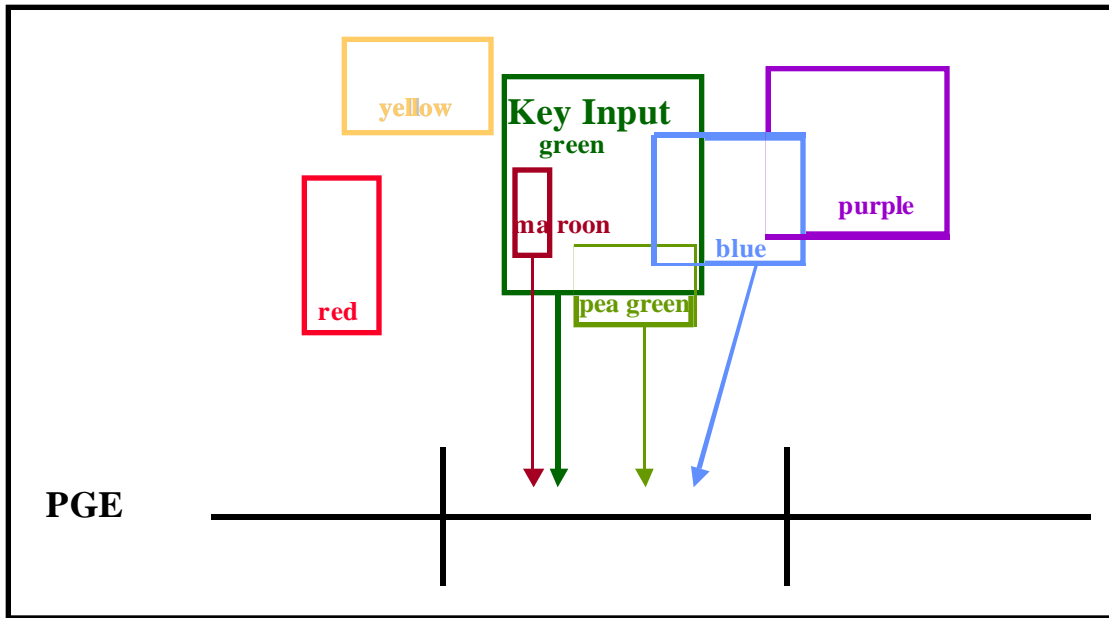


Figure 11.7.9-1. Example of the Spatial Query Production Rule

Assuming that all granules relate to the same time period, the granules are evaluated as follows:

- The “yellow” granule is not retrieved as an input because its spatial coordinates do not overlap with those of the key input.
- The “red” granule is not retrieved as an input because its spatial coordinates do not overlap with those of the key input.
- The “blue” granule is retrieved as an input because its spatial coordinates overlap with those of the key input. Part of its spatial constraint is within the constraint of the key input.
- The “maroon” granule is retrieved as an input because its spatial coordinates overlap with those of the key input. The spatial constraint of this granule is completely within the constraint of the key input.
- The “pea green” granule is retrieved as an input because its spatial coordinates overlap with those of the key input. Part of its spatial constraint overlaps with that of the key input.
- The “purple” granule is not retrieved as an input because its spatial coordinates do not overlap with those of the key input. It does not matter that it overlaps with another input that is accepted (i.e., the “blue” granule).

The Spatial Query Production rule is somewhat of an addition to other production rules. As such, it needs the same parameter settings as the Basic Temporal Production Rule. The values

specified in the Basic Temporal Production Rule (or other production rules) are set first, then the Spatial Query Production Rule syntax is added.

11.7.9.1 PGE Science Metadata ODL File Parameters

In order to implement the Spatial Query Production Rule the following two parameters must be defined in the applicable PCF_ENTRY (each input is defined by a separate PCF_ENTRY in the PGE science metadata ODL file):

- KEY_INPUT.
- QUERY_TYPE.

The entries are made in the following format:

```
OBJECT = PCF_ENTRY□  
  .□  
  .□  
  .□  
  QUERY_TYPE = "Spatial"□  
  KEY_INPUT = "Y"□  
  .□  
  .□  
  .□  
END_OBJECT = PCF_ENTRY□
```

QUERY_TYPE indicates what type of query is to be done to acquire the input defined by the PCF_ENTRY object. Valid values are as follows:

- "Temporal" - Input is acquired based on time.
 - The Basic Temporal and/or the Advanced Temporal Production Rules is/are used to get the input.
 - "Temporal" is the value that is assumed if the parameter is left out of the PCF_ENTRY object.
- "Spatial" - Input is acquired based on spatial coordinates (as well as time).
 - An input must be designated the key input to be used in determining the spatial constraints of the search.
 - "Spatial" is the value specified for each input that uses the Spatial Query Production Rule.
- "Tile" - Input is acquired by the spatial definition of a tile.
 - Refer to the Tiling Production Rule for additional information.
- "Already Created Tile" - Input is acquired based on the tile ID of an already created tile.
 - Refer to the Tiling Production Rule for additional information.

The KEY_INPUT is the input on which the spatial queries for other inputs will be based. When a KEY_INPUT parameter is assigned a value of “Y” the corresponding input is designated a key input and is treated as such. A value of “N” or leaving out the parameter entirely specifies a non-key input. Only one (1) key input is allowed per PGE Profile.

11.7.10 Tiling Production Rule

The Tiling Production Rule allows a PGE to run over a series of specific geographic locations called "tiles". The tiles are defined before the PGE is scheduled, specifying the longitude and latitude of four points that outline each tile. When the PGE is scheduled, it is scheduled for an entire day, and data is queried based on both a timeframe and the geographic location specified. Each run of the PGE for that day is for a specific tile, and only data that overlap or fit within the geographical coordinates of the tile are staged for the PGE.

- Example:
 - A MODIS PGE is designed to run on data for a specific geographic location every day.
 - The location is expressed as a polygon defined by latitude and longitude coordinates.
 - The MODIS PGE is scheduled every day, and data are retrieved that match the time period (the day for which the PGE is being executed) and some part of it falls within the geographic constraints of the tile.
 - The PGE runs and produces data that define information about the particular tile.

Period and **boundary** are used to specify the timing of input data and provide indications of how often the PGE should be executed. But at least some of the input data are retrieved on the basis of the coordinates defined for the tile on which the PGE is executing. In fact there are really two kinds of tiling:

- The PGE takes in data based on geographic shapes (tiles) and produces an output or outputs for the specified geographical coverage.
- The PGE takes in an already tiled product as input.
 - This form of tiling is more like a Metadata Query using a runtime parameter value to acquire the correct tiled data.

There are some possible future enhancements to the Tiling Production Rule but they have not been scheduled yet:

- **Zonal Tiling** supports tiles that cover a band around the Earth between two given latitudes.
- **Tile Clustering** involves grouping tiles that cover nearby geographic locations together so that data that span the tiles may be staged only once.
 - Intended to improve the performance of Tiling.

- Also provides for the ability to prioritize one group of tiles over others (so specific geographic outputs are produced before other geographic outputs).

Runtime parameters can be set to the ID of the tile being processed. Since PDPS schedules a Tiling PGE to run once per tile, it can pass the identifier of the tile to the PGE. The identifier can be placed under a specified runtime parameter in the PCF, or it can be used in a Metadata Query for a PGE that would use already tiled data as input.

Figure 11.7.10-1 provides an example of the Tiling Production Rule. The PGE runs once per defined tile. So for every tile in the Tile Scheme a Data Processing Request is created to run using data that match the geographic extent of the tile. The PDPS sends the coordinates of the tiles (e.g., Tiles 1 through 3 in Figure 11.7.10-1) to the Science Data Server when requesting data and acquires only the granules that fall fully or partially within the defined tile.

The PGE itself must be set up to handle the fact that the entire area of the tile may not be covered by available data. In addition, because PDPS does not keep track of tiles once they have been produced, the PGE must set the metadata of the output products so a downstream Tiling PGE can acquire the correct granules for a given tile. The PDPS matches up the granules needed for a downstream PGE via a query to the Data Server Subsystem.

11.7.10.1 Tiling Based on Already Tiled Data

As previously stated, the second form of Tiling concerns PGEs based on tiles that have already been created by other PGEs. Tiling based on already tiled data is really a combination of the Metadata Query Production Rule and the Tiling Production Rule. The latter is used in running the PGE(s) once per tile, just like any other Tiling PGE. The Metadata Query Production Rule is used in acquiring the previously tiled data by querying the Science Data Server for metadata that match the tile ID that is currently being executed. The query depends on the “runtime parameters” function of Tiling to provide the tile ID relevant to the PGE that is currently being executed.

The Tiling Production Rule is based (at least for the PGE science metadata ODL file) on the same fields used for the Basic Temporal Production Rule. A PGE that performs Tiling still needs a **boundary** and **period** and other such parameters. The difference is that values specified for some of the fields provide Tiling information. Furthermore, Tiling requires that a tile scheme be identified in the PGE science metadata ODL file. The tile scheme is defined in a tile science metadata ODL file.

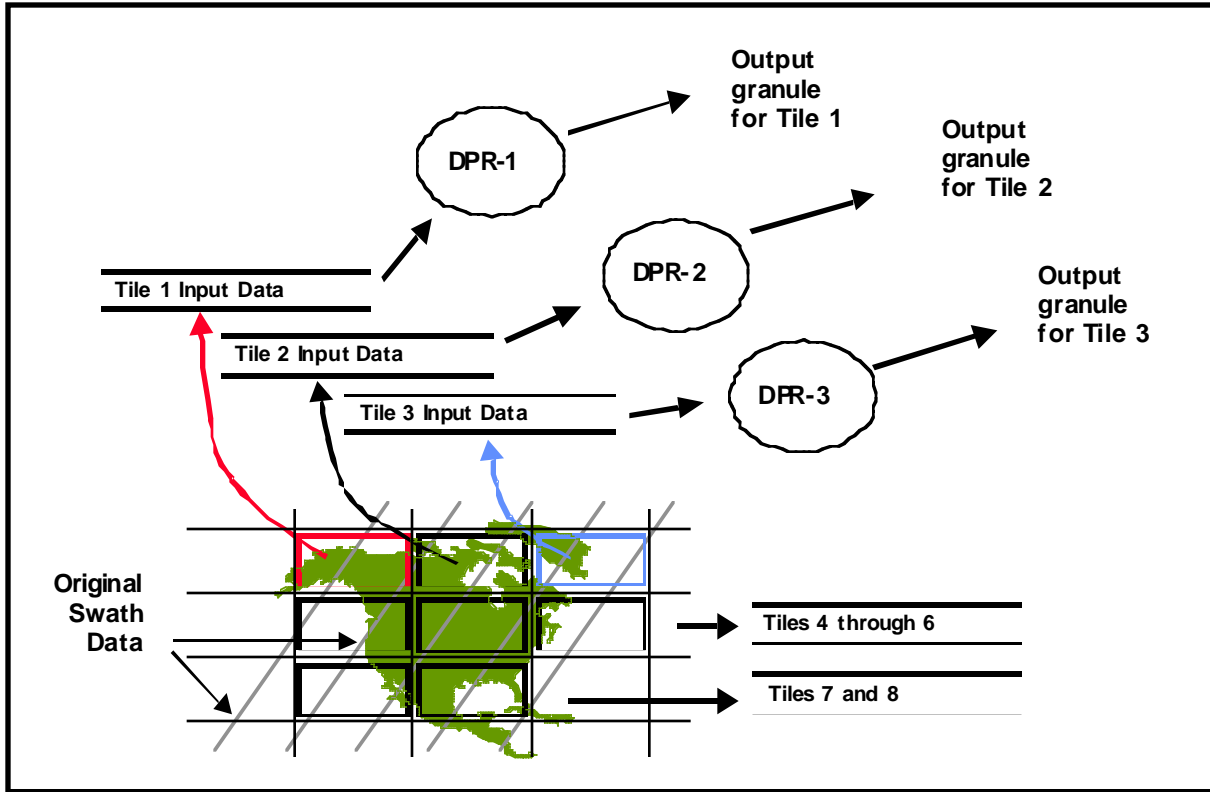


Figure 11.7.10-1. Example of the Tiling Production Rule

11.7.10.2 PGE Science Metadata ODL File Parameters

The following parameters must be set in the PGE science metadata ODL file in order to implement the Tiling Production Rule:

- SCHEDULE_TYPE.
- TILE_SCHEME_NAME.

In addition, the following parameter is used within a PCF_ENTRY when defining the Tiling Production Rule:

- QUERY_TYPE.

The SCHEDULE_TYPE parameter defines the type of scheduling that will be done for the PGE. Values for the Tiling Production Rule are:

- "Tiling"
 - Tile-Scheduled.
 - The PGE is scheduled based on the specified PROCESSING_PERIOD and PROCESSING_BOUNDARY, but a DPR is created for each defined tile.

The `TILE_SCHEME_NAME` parameter is the name of the Tile Scheme to be used by PDPS when scheduling and executing PGEs for each defined tile. There must be a tile ODL file that matches the specified scheme name.

The `QUERY_TYPE` parameter specifies the type of query to be performed on the input defined by the `PCF_ENTRY` Object. It uses the following syntax:

```
OBJECT = PCF_ENTRY
.
.
.
QUERY_TYPE =
.
END_OBJECT = PCF_ENTRY
```

For Tiling PGEs there are two possible values for `QUERY_TYPE`:

- "Tile"
 - The data for the input are acquired on the basis of the spatial constraints of the current tile.
 - Used for a PGE that takes in raw data and produces one or more tiles of data.
- "Already Created Tile"
 - The input is a tiled output of another Tiling PGE.
 - Used for a PGE that takes input from one or more other Tiling PGEs.
 - A Metadata Query must be added to this `PCF_ENTRY` in order for the correct tiled input to be acquired.

11.7.10.3 Tile Science Metadata ODL File Parameters

The following parameter must be set in the Tile science metadata ODL file in order to implement the Tiling Production Rule:

- `TILE_SCHEME_NAME`.

In addition, the following ODL objects are used within a `PCF_ENTRY` to define the Tiling Production Rule:

- `TILE` object.
- `TILE_COORDINATE` object.

The `TILE_SCHEME_NAME` parameter identifies the tile scheme for which the tile information is being specified. Values are limited by the following constraints:

- The string specified can be no more than 20 characters.
- The string specified should match the string specified for `TILE_SCHEME` in the PGE science metadata ODL file.

The TILE object is an ODL object that surrounds each tile definition. An OBJECT/END_OBJECT pair (as shown in the example that follows) is needed for each tile that is going to be expressly defined:

```
OBJECT = TILE
.
.
.
END_OBJECT = TILE
```

The following parameters are set in the TILE object in order to implement the Tiling Production Rule:

- CLASS.
- TILE_ID.
- TILE_DESCRIPTION.

CLASS is a simple counter used to differentiate the different TILE objects within the file. Each TILE object needs to have a different CLASS value.

TILE_ID is the tile identifier for the tile being defined. The TILE_ID must be an integer (e.g., TILE_ID = 12) and must be greater than zero but less than the maximum integer. If a Tile ID is defined in other tile schemes, it must have the same coordinates and description.

TILE_DESCRIPTION is a string of characters (255 characters maximum) that describes what the tile is for, such as its geographic location or area that it covers (e.g., TILE_DESCRIPTION = "Upper North America").

The TILE_COORDINATE object is an ODL object that defines a coordinate (latitude and longitude) for a tile. An OBJECT/END_OBJECT pair is needed for each coordinate that is defined. Each tile must have four TILE_COORDINATE objects defined. (Currently only four-sided polygons are allowed; however, a possible future enhancement would provide for polygons with more than four points.) Coordinate objects must follow a clockwise sequence so that if lines were drawn between the points in the order they are given the desired shape would be drawn.

Coordinate objects conform to the following format:

```
OBJECT = TILE
.
.
.
OBJECT = TILE_COORDINATE
  CLASS =
  LATITUDE =
  LONGITUDE =
END_OBJECT = TILE_COORDINATE
.
.
.
```

END_OBJECT = TILE

The following parameters are set in the TILE_COORDINATE object in order to implement the Tiling Production Rule:

- CLASS.
- LATITUDE.
- LONGITUDE.

The CLASS parameter (e.g., CLASS = 1) is an object counter that is used only to distinguish objects. The value assigned to CLASS must be an integer greater than zero and must be unique in the file for the particular type of object.

The LATITUDE parameter (e.g., LATITUDE = 12.15) describes the latitude component of the tile coordinate. There is one LATITUDE entry per TILE_COORDINATE object.

The LONGITUDE parameter (e.g., LONGITUDE = -43.22) describes the longitude component of the tile coordinate. There is one LONGITUDE entry per TILE_COORDINATE object.

11.7.11 Closest Granule Production Rule

The Closest Granule Production Rule allows a PGE to request the nearest input granule from the Data Processing Request time. The PDPS requests a search forward or backward for a specified period of time until it finds a granule that matches the request. However, there is a limit to the number of queries that are performed. The number of queries and the period length of the query are specified during SSI&T.

- Example:
 - A PGE processes data at daily intervals and could use a particular type of calibration granule that would allow it to determine the nearest parameters of the instrument.
 - Although most calibration coefficients are defined as static granules, in this case there is a dynamic granule that is received about once a month.
 - The closest such granule would be optimum, so the PGE uses the Closest Granule Production Rule to search forward or backward from the time of the DPR to find the nearest calibration granule.

The Closest Granule Production Rule supersedes the Most Recent Granule Production Rule. The latter allowed the search for inputs to go backward in time from the start of the DPR. The Closest Granule Production Rule allows the search for input granules to go either backward or forward in time, increasing the flexibility of the rule. The Closest Granule Production Rule has all of the ability of Most Recent Granule, plus the ability to search forward in time for input data.

The Closest Granule Production Rule uses two values to determine the period of the query. The two values are concerned with the direction of the query and the number of queries allowed.

- Offset.
 - Tells the PDPS software the query duration.
 - The sign (+ or -) indicates whether the query goes forward (positive) or backward (negative) in time.
- Retries.
 - Tells the PDPS software how many time periods (as defined by the offset) to search (either forward or backward) in time for matching granule.

The PDPS does a Basic Temporal query before using Closest Granule to find the input. If the desired input is not found within the time period of the DPR, PDPS performs a query against the Science Data Server for the period defined by the offset. Again, if no matching granule is found, PDPS repeats the query, going backward or forward in time by the value specified in the offset. If no acceptable granule has been found before the maximum number of queries is reached, PDPS fails to generate the DPR due to insufficient input data.

Figure 11.7.11-1 illustrates the Closest Granule Production Rule. In the example, the PGE has a boundary of “start of day” and a period of one hour, so it is scheduled to run for one hour’s worth of input data. The input has a period of one hour, and can come in at any hour of the day. Consequently, the PGE requests one granule of input.

The PGE has defined the Closest Granule Production rule with a –6-hour period of the query, meaning that it queries back in time in six-hour intervals. The number of retries is two. The PDPS performs a query for the input based on the time period of the DPR. Not finding any matching data, it uses the Closest Granule information to query for a six-hour period beginning six hours before the start time of the DPR. Again nothing is found, so a second Closest Granule query is performed, this one six hours before the last Closest Granule query. The second query results in the discovery of two matching granules. The PDPS selects the granule that is later in time and schedules the PGE to use it as input.

If the Closest Granule Production Rule were used in conjunction with the Minimum/Maximum Number of Granules Production Rule, it might be possible for both granules to be selected in the previously described Closest Granule query. If the example included setting the Maximum Number of Granules to two, both granules would be selected as input to the PGE.

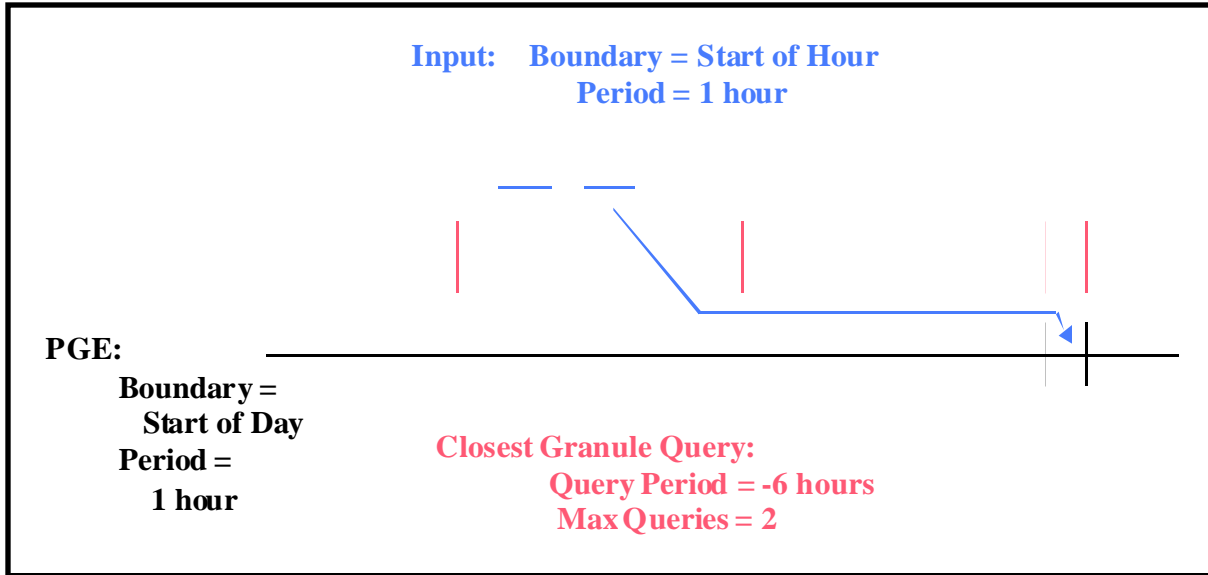


Figure 11.7.11-1. Example of Closest Granule Production Rule

The Closest Granule Production Rule needs the same parameter settings as the Basic Temporal Production Rule. The values needed for the Basic Temporal Production Rule must be set before the Closest Granule Production Rule syntax is added.

11.7.11.1 PGE Science Metadata ODL File Parameters

In addition to the parameter settings for the Basic Temporal Production Rule, the following parameters must be set within the appropriate PCF_ENTRY in the PGE science metadata ODL file in order to implement the Closest Granule Production Rule:

- CLOSEST_QUERY_OFFSET.
- CLOSEST_QUERY_RETRIES.

CLOSEST_QUERY_OFFSET is the offset added to or subtracted from the Data Start Time of the DPR and uses as the query for the requested input data type. The specified value has the format "<Period Type>=<Length of Period>" (e.g., CLOSEST_QUERY_OFFSET = "HOURS=6"). The following "Period Type" values are used in implementing the Closest Granule rule:

- "WEEKS"
 - Offset is some number of weeks.
 - For example, "WEEKS=2" would be a 14-day offset.

- "DAYS"
 - Offset is some number of days.
 - For example, "DAYS=5" would be a 120-hour offset.
- "HOURS"
 - Offset is some number of hours.
 - For example, "HOURS=4" would be a 240-minute offset.
- "MINS"
 - Offset is some number of minutes.
 - For example, "MINS=5" would be a 300-second offset.
- "SECS"
 - Offset is some number of seconds.

CLOSEST_QUERY_RETRIES is the maximum number of Closest Granule queries before the DPR fails due to insufficient input data. The specified value is an integer value that is limited only by the maximum size of an integer on the executing hardware.

Note that the longer the offset value or the greater the number of retries, the more time that each query requires due to search time at the Science Data Server and processing time of any granules returned. The combination of a large offset with a large number of retries, can (if no data granules are found) consume a lot of time while failing to generate a DPR.

11.7.12 Orbital Processing Production Rule

The Orbital Processing Production Rule is similar to the Basic Temporal Production Rule in that both define the time period for the inputs and outputs of the PGE. The difference is that the Orbital Processing Production Rule uses the orbit of the spacecraft to determine that time period. A PGE that processes data related to every orbit of a satellite uses data related to a time period that is computed from the orbit of that satellite.

- Example:
 - A PGE processes Level 0 data related to each orbit of the AM-1 satellite.
 - The AM-1 satellite has an orbital period of 98 minutes so the PGE is scheduled to process data for each 98-minute interval.
 - Since Level 0 data are received every two hours, the data staged for the PGE include every Level 0 granule that falls within the 98 minute PGE interval.
 - Only one granule of Level 0 data is relevant to some 98-minute orbits.
 - Two granules of Level 0 data are relevant to other 98-minute orbits.

The Orbital Processing Production Rule uses the “period” and “boundary” concept just like the Basic Temporal Production Rule. The difference is that for Orbital Processing, the orbit of the spacecraft is taken into account when a PGE or its data are marked as **orbit scheduled**.

When responding to a Production Request for orbit-scheduled processing, PDPS determines the orbit of the satellite via information provided during the SSI&T process. The information (stored in the PDPS database) gives the start time and length of a particular orbit or set of orbits. PDPS extrapolates (or interpolates in the case of an orbit between two orbital periods stored in the database) the start and end times of the PGE that is specified in the Production Request. Data are sought on the basis of the derived start and stop times and the appropriate data granule(s) is/are staged before the PGE is executed.

Orbital path is the path of the satellite over the Earth. It is a number from 0-233 that indicates the region of the Earth covered by a particular orbit. Note that because of the implementation of Orbital Path, there needs to be a mapping between the orbital path calculated by PDPS and the orbital path number expected by the PGEs.

Runtime parameters can be set to values associated with Orbital Processing. The following list of orbital parameters can be placed under runtime parameters:

- Orbit Number.
 - The number of the orbit (starting from zero) and continually increasing.
- Orbital Path Number.
 - The number of the path that maps to the orbit number.
 - The orbital path number is the 0-233 orbital path traversed by the satellite.
- Orbit Number within the Day.
 - The number of the orbit within the given day.
 - It includes any orbit that starts within the given day.
 - This is a **Release 5B** capability.
- Granule Number within the Orbit.
 - The number of the granule within a given orbit.
 - It includes any granule that starts within the given orbit.
 - This is a **Release 5B** capability.

Figure 11.7.12-1 provides an illustration of the Orbital Processing Production Rule. The PGE in the diagram takes a two-hour input, but is scheduled based on the orbit time and period of the satellite. PDPS uses the data collected at SSI&T to predict the time of the orbit and performs the query to the Science Data Server for the input based on that extrapolated or interpolated orbital time. Granules of input data are allocated to DPRs based on their ability to cover the time period relevant to the DPR.

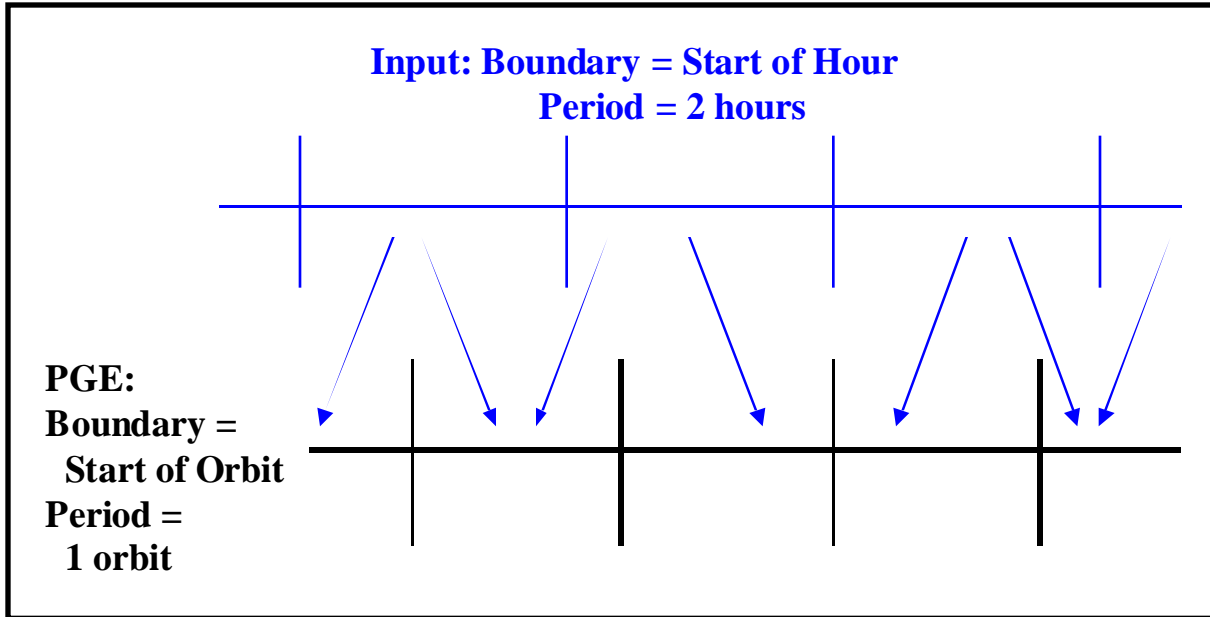


Figure 11.7.12-1. Example of the Orbital Processing Production Rule

In the example shown in Figure 11.7.12-1 the length of an orbit is less than the period of the two-hour input, so sometimes a single granule may cover the input time range of a PGE execution and at other times two granules are required. The production rule would work equally well if the data were of a shorter period (e.g., 1/2 hour) than the orbit of a satellite (e.g., 90 minutes). In such a case three granules would be staged for every execution of the PGE.

The Orbital Processing Production Rule is based (at least for the PGE science metadata ODL file) on the same fields used for the Basic Temporal Production Rule. However, the values specified for the parameters provide orbit information rather than time-period information.

11.7.12.1 PGE Science Metadata ODL File Parameters

The following parameters must be set in the PGE science metadata ODL file in order to implement the Orbital Processing Production Rule:

- PLATFORM.
- SCHEDULE_TYPE.
- PROCESSING_PERIOD.
- PROCESSING_BOUNDARY.

The PLATFORM parameter is the name of the platform (satellite) for which the PGE is processing data. Information concerning the orbits of a satellite are stored in the PDPS database. Values that can be assigned to the parameter are subject to the following constraints:

- The string specified can have no more than 25 characters.

- The string specified should match the string specified in the orbit science metadata ODL file. If no matching file is found, an error is reported during SSI&T.

The SCHEDULE_TYPE parameter describes the type of scheduling that is required for the PGE. "Orbit" is the value used for Orbital Processing. As a result, the PGE is scheduled based on the start time and period of the satellite's orbit. Note that PROCESSING_PERIOD and PROCESSING_BOUNDARY must be set correspondingly.

The PROCESSING_PERIOD is the time interval for the data that the PGE processes. Assuming no combination of production rules that would affect the period, data are acquired for the specified PROCESSING_PERIOD and output data are planned for the given period. The value assigned to PROCESSING_PERIOD is of the format "<Period Type>=<Length of Period>". The "Period Type" applicable to the Orbital Processing Production Rule is "ORBITS". For example, "ORBITS=1" would be applied to a PGE that processes data related to one orbit's worth of data.

The PROCESSING_BOUNDARY is the boundary (starting point in time) of the PGE. It specifies when each instance of the PGE should start. Note that the PROCESSING_BOUNDARY and PROCESSING_PERIOD are used in conjunction when scheduling the PGE. Consequently, "START_OF_ORBIT" is the acceptable PROCESSING_BOUNDARY for the Orbital Processing Production Rule. It indicates that the PGE processes data related to each satellite orbit. It must be used in conjunction with a PROCESSING_PERIOD that specifies a "Period Type" of "ORBITS".

11.7.12.2 Orbit Science Metadata ODL File Parameters

The following parameter must be set in the orbit science metadata ODL file in order to implement the Orbital Processing Production Rule:

- PLATFORM.

In addition, the following ODL object is used in defining orbits for the Orbital Processing Production Rule:

- ORBIT_MODEL object.

The value assigned to the PLATFORM parameter in the orbit science metadata ODL file must be exactly the same as that specified for the same parameter in the PGE science metadata ODL file.

The ORBIT_MODEL object is an ODL object that surrounds each orbit definition. An OBJECT/END_OBJECT pair (as shown in the example that follows) is needed for each orbit that is to be expressly defined: PDPS extrapolates or interpolates orbits that are not specifically defined within the file.

```
OBJECT = ORBIT_MODEL
  CLASS = 1
  ORBIT_NUMBER = 1000
  ORBIT_PATH_NUMBER = 68
  ORBIT_PERIOD = "MINS=98"
```

```
ORBIT_ START = "09/21/1999 14:50:00"  
END_OBJECT = ORBIT_MODEL
```

The following parameters are set in the ORBIT_MODEL object in order to implement the Orbital Processing Production Rule:

- CLASS.
- ORBIT_NUMBER.
- ORBIT_PATH_NUMBER.
- ORBIT_PERIOD.
- ORBIT_START.

CLASS is a simple counter used to differentiate the different ORBIT_MODEL objects within the file. Each ORBIT_MODEL object needs to have a different CLASS value.

ORBIT_NUMBER is simply the number of the orbit being specified. Each orbit of the satellite has a sequential number associated with it. This is the integer value of the orbit number for the orbit being defined in the ORBIT_MODEL object.

ORBIT_PATH_NUMBER is value of the path for the specified orbit. The orbital path is a number from 0-233 that repeats every 16 days. This is the integer value of the orbital path number for the orbit being defined in the ORBIT_MODEL object.

ORBIT_PERIOD is the length of time it takes for the satellite to complete one orbit. The value assigned to ORBIT_PERIOD has the format "<Period Type>=<Length of Period>" (e.g., "MINS=98"). Note that the "Length of Period" is specified as a positive integer only.

Period Type values for the orbit model science metadata OFL file are:

- "WEEKS"
 - Orbit spans some number of weeks.
 - For example, "WEEKS=2" would be an orbit that takes two weeks to complete.
- "DAYS"
 - Orbit spans some number of days.
 - For example, "DAYS=5" would be an orbit that takes five days to complete.
- "HOURS"
 - Orbit spans some number of hours.
 - For example, "HOURS=4" would be an orbit that takes four hours to complete.
- "MINS"
 - Orbit spans some number of minutes.
 - For example, "MINS=85" would be an orbit that takes eighty-five minutes to complete.
- "SECS"
 - Orbit spans some number of seconds.

- For example, "SECS=7200" would be an orbit that takes 7200 seconds (two hours) to complete.

ORBIT_START is the start date and time for the orbit defined by the particular ORBIT_MODEL object. Its format is either "MMM DD YYYY HH:MM:SS" or "MM/DD/YYYY HH:MM:SS".

11.7.13 Production Planning Considerations

During normal operations it is expected that the Production Planner will not have to add PRs to the PDPS database very frequently. The frequency of this activity is, to some extent, determined by the SCF responsible for the science software.

- The PR is a template request to generate a particular data product and results in a production run of the associated SCF-provided PGE.
 - PR specifies a range (temporal, orbit, or tile) over which the data products are to be produced or the PGEs are to be scheduled.
 - PR might request that the data product be produced for only a single day's data.
 - PR might request that data products be produced for every opportunity of input data for several months, resulting in several hundred jobs being planned and run as the input data become available.
 - Early in a mission the SCF may prefer to request processing for a short time period only (e.g., a week or less).
 - At that time the SCF is gaining an understanding of the on-orbit behavior of the instrument, the resulting data, and the interaction of the science processing software with real data.
 - SCF reviews the quality of the products and notifies the Production Planner of the need for any changes to the PR (e.g., discontinue the PR, change time ranges, or modify input parameters).
 - When the SCF has developed a good understanding of the instrument's behavior, the team may be comfortable requesting processing for months at a time.
 - DAAC operations may have operational reasons for wanting to issue processing requests for a more limited time period.

The Production Planner has to balance the various considerations when determining whether or not to create or update a PR.

Planning decisions are made on the basis of locally defined planning strategies for supporting the SCFs' data processing needs. The production planning tools are intended to be flexible enough in their design to support the particular planning and scheduling cycles of the operations organization at each DAAC.

Before planning production the Production Planner must coordinate with the Resource Planner to resolve all resource allocation issues. The Resource Planner notifies the Production Planner of the resources available for use in processing. Furthermore, the Production Planner may well have direct access to the Resource Plan.

The Production Planner prepares monthly and weekly production plans. In addition, the Production Planner develops a daily production schedule from the most current weekly plan. However, the first step in the planning process is creating production requests using the Production Request Editor.

12. Resource Planning

12.1 Resource Planning Process

The Resource Planning process is the mechanism by which reservations for non-routine ground events are defined and controlled. Such events may include testing, corrective maintenance, preventive maintenance or system upgrades, or any other event that requires DAAC production processing resources. Resource planning defines ground events, which are also used in production planning; thus, resource planning can take place whenever a production plan needs to be created. In general, this will occur on a biweekly basis for 30-day plans, on a weekly basis for ten-day plans, and on a daily basis. However, ground events can be entered at any time. The important point is that it is necessary to be aware of the anticipated processing load and upcoming maintenance events for about the next month.

Resource Planning includes two general types of activities; i.e., Resource Definition and Resource Scheduling. The site M&O Resource Planner uses the Resource Editor GUI within the Planning Subsystem to define ECS resources used in production processing. The Resource Planner and Resource Manager use the Resource Scheduler GUI to schedule non-routine events against ECS resources.

Subsequent sections related to Resource Planning address the following topics:

- a. Section 12.2 An overview of the process for defining resources and step-by-step procedures for using the Resource Editor.
- b. Section 12.3 An overview of the process for scheduling resources and step-by-step procedures for using the Resource Scheduler.
- c. Section 12.4 An overview of the process for tuning system parameters related to Resource Planning and a description of the process for changing configuration parameters.

12.2 Defining Resources

The Resource Planner uses the Resource Editor GUI to define ECS resources used in production processing in the following terms:

- a. "Disks."
- b. "Virtual computers" (sets of CPUs and associated memory and disks).
- c. "Strings" (sets of virtual computers).
- d. "Real computers" (hosts that are composed of one or more virtual computers).
- e. "AutoSys" ("strings" associated with the production processing software).
- f. Generic "hardware."

The following general process is used for defining production resources:

- a. Determine what production resources are available.
- b. Determine the distribution of resources among operating modes.

c. Define resources for each mode using the Resource Editor GUI.

Each procedure outlined has an **Activity Checklist** table that provides an overview of the task to be completed. The outline of the **Activity Checklist** is as follows:

Column one - **Order** shows the order in which tasks could be accomplished.

Column two - **Role** lists the Role/Manager/Operator responsible for performing the task.

Column three - **Task** provides a brief explanation of the task.

Column four - **Section** provides the Procedure (P) section number or Instruction (I) section number where details for performing the task can be found.

Column five - **Complete?** is used as a checklist to keep track of which task steps have been completed.

Table 12.2-1, below, provides an Activity Checklist for Defining Resources.

Table 12.2-1. Defining Resources - Activity Checklist

Order	Role	Task	Section	Complete?
1	Resource Planner	Launch the Resource Editor	(P) 12.2.1	
2	Resource Planner	Determine Actual Processing Resources	(P) 12.2.2	
3	Resource Planner	Add a Resource	(P) 12.2.3	
4	Resource Planner	Modify a Resource	(P) 12.2.4	
5	Resource Planner	Delete a Resource	(P) 12.2.5	
6	Resource Planner or DAAC Staff	Shut Down the Resource Editor	(P) 12.2.6	

12.2.1 Launch the Resource Editor

The Resource Editor is invoked from a UNIX command line prompt. Table 12.2-2 presents (in a condensed format) the steps required to launch the **Resource Editor** GUI. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the detailed procedures that follow.

1 At the UNIX command line prompt enter:

setenv DISPLAY <clientname>:0.0

a. Use either the X terminal/workstation IP address or the machine-name for the clientname.

- b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.
- 2** In the terminal window, at the command line prompt, start the log-in to the Planning/Management Workstation by entering:
- /tools/bin/ssh <hostname>**
- Examples of hostnames include **e0pls03, g0pls01, l0pls02, n0pls02**.
 - If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - If you have not previously set up a secure shell passphrase, go to Step 4.
- 3** If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
- <Passphrase>**
- Go to Step 5.
- 4** At the **<user@remotehost>'s password:** prompt enter:
- <Password>**
- 5** In the terminal window, at the command line, enter:
- cd /usr/ecs/<MODE>/CUSTOM/utilities**
- <MODE>** is current mode of operation.
 - TS1 - Science Software Integration and Test (SSI&T)
 - TS2 - New Version Checkout
 - OPS - Normal Operations
 - “utilities” is the directory containing the Planning Subsystem start-up scripts.
- 6** Set the application environment variables by entering:
- setenv ECS_HOME /usr/ecs/**
- Application home environment is entered.
 - When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to set it manually.
- 7** Start the Resource Planning background processes by entering:
- EcPIRpAllStart <MODE> <application_id>**
- The Resource Planning background processes are launched.
 - The **application_id** or **MSGSRV_ID** is a number from 1 to 5. It identifies the message service in use so messages can be directed to the proper message handler GUI. Consequently, it is a good idea to use the same **application_id** consistently during a resource planning session.
- 8** Start the **Resource Editor** GUI by entering:
- EcPIRpReStart <MODE> <application_id>**

- a. The **Resource Editor** GUI is launched.
- b. The **Resource Editor** GUI displays a list of defined resources and a series of buttons that enable the following operations:
 4. **New...** Add a resource definition. (Section 12.2.3)
 5. **Modify...** Edit or review the details of an existing resource definition. (Section 12.2.4)
 6. **Delete** Delete a resource definition. (Section 12.2.5)
 7. **Fetch Baseline** [not used]
 8. **Load Baseline** [not used]

Table 12.2-2. Launch the Resource Editor - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the ECS System using secure shell	enter text, press Enter
2	Enter cd /usr/ecs/<MODE>/CUSTOM/utilities	enter text, press Enter
3	Set the environment variables	enter text, press Enter
4	Enter EcPIRpAllStart <MODE> <application_id>	enter text, press Enter
5	Enter EcPIRpReStart <MODE> <application_id>	enter text, press Enter

12.2.2 Determine Actual Processing Resources

The Resource Editor allows the authorized operator to define resources in the following categories:

- a. **Disks:** Disk partitions that are associated with and provide temporary data storage for the input and output files used in processing.
- b. **Virtual Computers:** Virtual computers composed of CPUs, random-access memory (RAM), and associated-disk(s). The CPUs and RAM specified for a virtual computer are components of the real computer from which the virtual computer is derived.
- c. **Strings:** Sets of one or more virtual computers. Strings are associated with the processing software (AutoSys). A dual science processor configuration can be defined by specifying strings containing virtual computers derived from different real computers.
- d. **Real Computers:** Physical computing devices (hosts), each of which contains one or more CPUs. Each science processor host (“real” computer) is divided into one or more virtual computers by allocating CPUs and RAM from the real computer to the virtual computer(s).
- e. **AutoSys:** Identifies the string(s) of virtual computers used by the production processing software.
- f. **Hardware:** Any type of equipment that is not defined as a computer or disk may be defined as “hardware.”

The ECS Operational Readiness Plan for Release 2.0 (603-CD-003-001) specifies that initially disk partitions at the DAACs are to be split among the operating modes as follows:

- a. OPS – 60%.
- b. TS1 - 20%.

- c. TS2 - 20%.

However, it may be advantageous to reserve some nominal percentage of the disk (e.g., two to five percent) as a safety buffer. In any case, it is critical to ensure that the sum of the disk space assigned to the various modes is no more than the total disk space available.

Although the ECS Operational Readiness Plan does not specifically mention allocating resources other than disk partitions, CPUs and RAM need to be allocated among modes in the same manner. However, it is not necessary to be exact with the CPU count or RAM amount.

- a. There is no one-to-one mapping of CPU allocation with actual CPUs on the science processor.
- b. Actual CPU usage during processing is limited by the operating system (OS).
 - 1. If ten CPUs have been specified for a particular mode, only ten Data Processing Requests (DPRs) can be running the Execute job at a given time.
 - 2. What is really being defined is the maximum number of DPRs that will execute at a given time.
- c. It is important to monitor the load on each science processor.
 - 1. CPUs can be over-allocated or under-allocated as necessary to get the most out of the CPUs on each science processor.
 - 2. If monitoring indicates that the processor is underused when OPS mode is at full processing capacity, the number of CPUs allocated to OPS mode could probably be increased.
 - 3. If the science processor is at full capacity when OPS mode is at full processing capacity and it is suspected that the processor may be overworked, the number of CPUs allocated to OPS mode should be reduced.
- d. Random-access memory (RAM) is subject to the same considerations as CPUs.
 - 1. RAM can be over-allocated or under-allocated as necessary to get the most out of the memory on each science processor.
- e. The OS takes care of true CPU and RAM allocation.

Another consideration is the throttling of the processing load through the DpPrAutoSysMaxJobs variable. DpPrAutoSysMaxJobs applies to Job Management (EcDpPrJobMgmt) and is defined in the Configuration Registry.

- a. If DpPrAutoSysMaxJobs in OPS mode is set at 32 [allowing AutoSys to accommodate eight DPRs (consisting of four jobs each) simultaneously in OPS mode] and ten CPUs are defined for OPS, it would not be possible to utilize all ten CPUs.
- b. If the value of DpPrAutosysMaxJobs were increased to 64 (16 DPRs times 4 jobs/DPR), there might be times when the processing of some DPRs was held up because only ten could be running the Execute job at a time.
- c. In such a case it might be possible to increase the number of CPUs allocated to the mode so that more than ten DPRs could be running the Execute job simultaneously.

Before data processing resources can be defined, it is necessary to know what resources are actually available at the DAAC. Some resources are defined in terms of other resources; for example, a string is defined as one or more virtual computers. However, it is generally necessary to have the following types of information available in order to define processing resources:

- a. Host names [“real computers”].
- b. Number of processors [CPUs] available on each host.
- c. Operating System (OS) for each host.
- d. Memory [RAM] on each host.

- e. Total disk space.
- f. AutoSys instance(s) at the DAAC.

Table 12.2-3 presents (in a condensed format) the steps required to determine the actual processing resources to be defined. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

NOTE:- The procedure to determine the actual processing resources to be defined starts with the assumption that the DISPLAY environment variable has been set (Refer to Section 12.2.1).

- 1- In the terminal window, at the command line prompt, start the log-in to the applicable Science Processor by entering:

/tools/bin/ssh <hostname>

- a. Examples of hostnames include **e0spg01, g0spg01, l0spg01, n0spg03**.
- b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
- c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 2.
- d. If you have not previously set up a secure shell passphrase, go to Step 3.

- 2 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:

<Passphrase>

- a. Go to Step 4.

- 3 At the **<user@remotehost>'s password:** prompt enter:

<Password>

- 4 To access the mount point enter:

cd /usr/ecs/<MODE>/CUSTOM/pdps/<processor>/data/DpPrRm/<processor>_disk

- a. Change directory to the disk mount point (e.g.,
/usr/ecs/OPS/CUSTOM/pdps/g0spg01/data/DpPrRm/g0spg01_disk).

- 5 To determine disk size and usage enter:

df -k . (being sure to include the dot)

- a. Information concerning disk size and use is displayed; for example:

Filesystem	Type	kbytes	use	avail	%use	Mounted on
/dev/dsk/rlv/vgo1	xf	413394688	164646048	248748640	40	/vol1

- b. In the preceding example the total disk space is 413,394,688 kilobytes or 413,394.69 megabytes (413 gigabytes).

- 6- To obtain Information concerning the number of CPUs and amount of RAM (memory) enter:

hinv

- a. The hinv command is available on Silicon Graphics, Inc. (SGI) hosts only.
- b. Information concerning CPUs and RAM (memory) is displayed; for example (not all rows are shown):

```
Processor 0: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 1: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 2: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 3: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 4: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 5: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 6: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 7: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 8: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 9: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 10: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 11: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 12: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 13: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 14: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 15: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Secondary unified instruction/data cache size: 1 Mbyte
Data cache size: 32 Kbytes
Instruction cache size: 32 Kbytes
Main memory size: 2048 Mbytes, 8-way interleaved
[...]
```


- c. In the example the science processor has 16 CPUs (Processor 0 – Processor 15) and 2048 megabytes of RAM.

7 Repeat Steps 1 through 6 for all other science processors (if any).

NOTE: Steps 8 through 14 describe the use of the Netscape browser to determine certain types of information concerning computer resources (including the number of CPUs and amount of RAM), which can be determined using the **hinv** command as described in Step 6. However, the “as-built” file accessed using the Netscape browser lists the necessary operating system information in addition to CPU and RAM data. The advantage of the **hinv** command is that it provides real-time data and is reliably up to date. The advantage of the “as-built” file accessed using the Netscape browser is that it provides operating system data that is not available using the **hinv** command.

8 To launch the Netscape web browser enter:

netscape &

- a. It may be necessary to change directories before launching the Netscape web browser (e.g., cd /tools/bin/netscape3.01).
- b. The Netscape web browser is displayed.

9 In the browser’s **Location (Go To)** field enter the following address:

http://cmdm.east.hitc.com/baseline

- a. The ECS Baseline Information System web page is displayed.

10 **Single-click** on the **ECS Configuration** link.

- a. A table of files is displayed.

11 **Single-click** on the **Asbuilts** link for the relevant DAAC.

- a. A list of files is displayed.

12 **Single-click** on the file name corresponding to the desired host (e.g., x0spg01.asbuilt.html).

- a. A report containing the following types of information (among other items) is displayed:
 1. Host Name [“real computer”].
 2. Processors [CPUs].
 3. Operating System.
 4. Memory [RAM].
 5. Interrogation Date (useful in determining how up-to-date the information is).

13 **Single-click** on the browser **Back** button.

- a. The list of “as-built” files is displayed.

14 Repeat Steps 12 and 13 for all other science processors (if any).

15 Exit from the Netscape browser when the necessary information has been acquired by executing the following menu path:

File → Exit

- a. The Netscape browser disappears.
- 16** In the terminal window, at the command line prompt, start the log-in to the Queuing Server host by entering:
- /tools/bin/ssh <hostname>**
- a. Examples of hostnames include **e0sps04, g0sps06, l0sps03, n0sps08**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 17.
 - d. If you have not previously set up a secure shell passphrase, go to Step 18.
- 17** If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
- <Passphrase>**
- a. Go to Step 19.
- 18** At the **<user@remotehost>'s password:** prompt enter:
- <Password>**
- 19** To gain access to the directory containing the AutoSys configuration files enter:
- cd /usr/ecs/<MODE>/COTS/<autotree>/autouser**
- a. Change directory to the directory (e.g., /usr/ecs/<MODE>/COTS/autotreeb/autouser, /usr/ecs/<MODE>/COTS/autotree/autouser, /data1/SHARED/COTS/autotree/autouser) containing the set-up files (e.g., FMR.autosys.csh.g0sps06) and the AutoSys configuration files (e.g., config.FMR).
 - b. The particular path to be typed may vary from site to site.
 - c. The AutoSys instance at the DAAC is identified by three capital letters appended to the beginning of the set-up files and the end of the configuration file.
 1. Typically, AutoSys instances at the DAACs are identified as **FMR**.
 - d. It is possible to have multiple AutoSys instances installed at a DAAC.

Table 12.2-3. Determine Actual Processing Resources - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	Log-in to the applicable Science Processor	enter text, press Enter
2	Enter cd /usr/ecs/<MODE>/CUSTOM/pdps/<processor>/data/DpPrRm/<processor>_disk	enter text, press Enter
3	Enter df -k . (being sure to include the dot)	enter text, press Enter
4	Observe the disk capacity	read text
5	Enter hinv	enter text, press Enter

**Table 12.2-3. Determine Actual Processing Resources - Quick-Step Procedures
(2 of 2)**

Step	What to Enter or Select	Action to Take
6	Observe the number of CPUs and total memory (RAM)	read text
7	Repeat Steps 1 through 6 for all other science processors (if any)	
8	Launch Netscape	enter text, press Enter
9	Enter http://pete.hitc.com/baseline	enter text, press Enter
10	Select ECS Configuration	single-click
11	Select (click on) the Asbuilts for the relevant DAAC	single-click
12	Select the file name corresponding to the desired host	single-click
13	Observe the number of CPUs, total memory (RAM), and Operating System identification	read text
14	Select the browser Back button	single-click
15	Repeat Steps 12 through 14 for all other science processors (if any)	
16	Execute File → Exit to exit from Netscape	single-click
17	Log-in to the Queuing Server host	enter text, press Enter
18	Enter <code>cd /usr/ecs/<MODE>/COTS/<autotree>/autouser</code>	enter text, press Enter
19	Observe the identification of the AutoSys instance	read text

12.2.3 Add a Resource

These procedures address adding such resources as computers, disk partitions, strings, and generic hardware resources to the resource planning list. The ECS Operational Readiness Plan for Release 2.0 (603-CD-003-001) specifies that initially disk partitions at the DAACs are to be split among the operating modes as follows:

- a. OPS – 60%.
- b. TS1 - 20%.
- c. TS-2 - 20%.

However, it may be advantageous to reserve some nominal percentage of the disk (e.g., two to five percent) as a safety buffer. In any case, it is critical to ensure that the sum of the disk space assigned to the various modes is no more than the total disk space available.

Table 12.2-4 presents (in a condensed format) the steps required to add a resource. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Editor** GUI by executing Steps 1-8 of Section 12.2.1 (if the **Resource Editor** GUI is not currently running) then continue with the following steps.
- 2 From the **Resource Editor** GUI, select the type of resource to be added from the list on the **Resource Type** button.
- 3 Either **single-click** on the **New...** button or execute the following menu path:
File → **New**
- 4 Define the resource as specified in the corresponding procedure section.
 - a. Refer to the specified section for defining the desired type(s) of resources:
 1. **Disk** – Section 12.2.3.1.
 2. **Virtual Computer** – Section 12.2.3.2.
 3. **Real Computer** – Section 12.2.3.3.
 4. **String** – Section 12.2.3.4.
 5. **Autosys** – Section 12.2.3.5.
 6. **Hardware** – Section 12.2.3.6.
 - b. Resources should generally be added in the preceding order (due to dependencies among resources).
- 5 After the data have been entered, **single-click** on one of the following buttons:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

Table 12.2-4. Add a Resource - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Editor GUI	Use procedure in Section 12.2.1
2	Select the type of resource from the Resource Type button	single-click
3	Select the New... button	single-click
4	Make entries in the necessary fields	Use procedures in Sections 12.2.3.1 through 12.2.3.6
5	Select Save	single-click

12.2.3.1 Disk Details GUI

- 1 Enter the relevant information in the following fields on the **Disk Details** GUI:
 - a. **Resource Name** User-defined name for the resource. (required)
 1. Example: g0spg01_disk_OPS.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the **Activity** field and then clicking on one of the available options.
 - c. **Partition Size** The size of the disk partition, in **megabytes**. (required)
 1. Although the label on the GUI implies that partition size should be entered in “blocks,” the label is erroneous. Enter the partition size in megabytes.
 - d. **Block Size** Block size in bytes (always 1024) used for the disk. (required)
 - e. **Comments** User comments on the resource.

- 2 After the data have been entered, **single-click** on one of the following buttons:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.3.2 Virtual Computer Details GUI

- 1 Enter the relevant information in the following fields on the **Virtual Computer Details** GUI:
 - a. **Resource Name** User-defined name for the virtual computer. (required)
 1. Example: g0spg01_vc_OPS.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the Activity field and then clicking on one of the available options.
 - c. **Number of CPUs** Number of CPUs within the virtual computer. (required)
 - d. **Total RAM** The total memory for the virtual computer in megabytes. (required)
 - e. **Operating System** The operating system name/version for the computer. (required)
 - f. **Disks** A list of the disks previously defined for that site. This list of disks from which to select is used when a disk is associated (or disassociated) with the computer. After items are highlighted, arrow buttons will move items from this list to **Associated Disks** or from the list of **Associated Disks** to the **Disk** list.
 - g. **Associated Disks** Disks in this list are associated with the computer.
 - h. **Comments** User comments on the resource.
- 2 After the data have been entered, **single-click** on one of the following buttons:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.3.3 Real Computer Details GUI

- 1 Enter the relevant information in the following fields on the **Real Computer Details** GUI:
 - a. **Resource Name** User-defined name for the real resource. (required)
 1. Example: g0spg01.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the Activity field and then clicking on one of the available options.
 - c. **Computers** A list of the virtual computers previously defined for that site. This list of virtual computers from which to select is used when a virtual computer is associated (or disassociated) with the real computer. After items are highlighted, arrow buttons will move items from this list to **Associated Computers** or from the list of **Associated Computers** to the **Computers** list.
 - d. **Associated Computers** Virtual computers in this list are associated with the real computer.
 - e. **Comments** User comments on the resource.
- 2 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.3.4 String Details GUI

- 1 Enter the relevant information in the following fields on the **String Details** GUI:
 - a. **Resource Name** User-defined name for the resource. (required)
 1. Example: g0spg01_string_OPS.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the Activity field and then clicking on one of the available options.
 - c. **Computers** A list of virtual computers previously defined for that site. This list of computers from which to select is used when a computer is associated (or disassociated) with the string. After items are highlighted, arrow buttons will move items from this list to **Associated Computers** or from the list of **Associated Computers** to the **Computer** list.
 - d. **Associated Computers** Virtual computers in this list are associated with the string.
 - e. **Comments** User comments on the resource.
- 2 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.3.5 AutoSys Details GUI

- 1 Enter the relevant information in the following fields on the **Autosys Details** GUI:
 - a. **Resource Name** User-defined name for the AutoSys resource. (required)
 1. Example: FMR.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the Activity field and then clicking on one of the available options.
 - c. **Strings** A list of the strings previously defined for that site. This list of strings from which to select is used when a string is associated (or disassociated) with the AutoSys resource. After items are highlighted, arrow buttons will move items from this list to **Associated Strings** or from the list of **Associated Strings** to the **Strings** list.
 - d. **Associated Strings** Strings in this list are associated with the AutoSys resource.
 - e. **Comments** User comments on the resource.
- 2 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.3.6 Hardware Resource Details GUI

- 1 Enter the relevant information in the following fields on the **Hardware Resource Details** GUI:
 - a. **Resource Name** User-defined name for the resource. (required)
 1. Example: g0spg01_cdrom_OPS.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the Activity field and then clicking on one of the available options.
 - c. **Comments** User comments on the resource.

- 2 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.4 Modify a Resource

Table 12.2-5 presents (in a condensed format) the steps required to modify a resource. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Editor** GUI by executing Steps 1-8 of Section 12.2.1 (if the **Resource Editor** GUI is not currently running) then continue with the steps that follow.
- 2 From the list of resources displayed on the **Resource Editor** GUI, **single-click** on the resource to be modified.
- 3 **Single-click** on the **Modify...** button to access the appropriate Details GUI.
- 4 Make the modifications.
 - a. For field descriptions, refer to Sections 12.2.3.1 through 12.2.3.6.
- 5 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

Table 12.2-5. Modify a Resource - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Editor GUI	Use procedure in Section 12.2.1
2	Select the resource to be modified	single-click
3	Select the Modify... button	single-click
4	Make the modifications	Use procedures in Sections 12.2.3.1 through 12.2.3.6
5	Select Save	single-click

12.2.5 Delete a Resource

Table 12.2-6 presents (in a condensed format) the steps required to delete a resource. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Editor** GUI by executing Steps 1-8 of Section 12.2.1 (if the **Resource Editor** GUI is not currently running) then continue with the following steps.
- 2 From the list of resources displayed on the **Resource Editor** GUI, **single-click** on the resource to be deleted.
- 3 **Single-click** on the **Delete** button.
 - a. A dialogue box pops up to verify whether the resource is really to be deleted.
- 4 **Single-click** on one of the following buttons as appropriate:
 - a. **OK** to remove the resource from the list and from the PDPS database **and** exit.
 - b. **Cancel** to exit **without** deleting the resource.

Table 12.2-6. Delete a Resource - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Editor GUI	Use procedure in Section 12.2.1
2	Select the resource to be deleted	single-click
3	Select the Delete button	single-click
4	Select OK	single-click

12.2.6 Shut Down Resource Definition Applications

When resource definition activities have been completed, the Message Handler, System Name Server, and Resource Model should be shut down to eliminate unneeded processes and allow other operators to gain access to the resource planning applications. If any of the three processes remains active, it is likely to interfere with subsequent attempts to launch resource planning applications.

Shutting down resource definition applications starts with the assumption that the **Resource Editor** GUI is currently being displayed.

Table 12.2-7 presents (in a condensed format) the steps required to shut down resource definition applications. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 To exit from the **Resource Editor** GUI when resource planning activities have been completed execute the following menu path:
File → Exit
 - a. The **Resource Editor** GUI disappears.
- 2 After quitting the **Resource Editor** GUI **single-click** in the UNIX window used to start the resource definition applications.
- 3 Shut down the Message Handler, System Name Server, and Resource Model by entering:

EcPIRpSlayAll <MODE> <application_id>

a. The **Message Handler** GUI disappears.

4 To obtain a list of active processes in the specified mode enter:

ps -ef | grep <MODE>

a. A list of active processes in the specified mode is displayed.

b. If an error message is received when **ps -ef | grep <MODE>** is entered, enter:

ps -auxwww | grep <MODE>

5 Examine the list of processes running in the specified mode to determine whether the Message Handler, System Name Server, and Resource Model processes have actually been shut down.

a. None of the following processes should be active:

1. EcPIRpRe
2. EcPIRpSi
3. EcPIRpTl
4. EcPIMsh
5. EcPISns
6. EcPIRpRm

6 If any of the specified processes [especially the Message Handler, System Name Server, and/or Resource Model process(es)] is/are still active, terminate the active process(es) by entering:

kill -15 process_id1 [process_id2] [process_id3] [...]

7 Repeat Steps 4 through 6 as necessary.

Table 12.2-7. Shut Down Resource Definition Applications - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Execute File → Exit to quit the Resource Editor GUI	single-click
2	Select OK	single-click
3	Select the UNIX window	single-click
4	Enter EcPIRpSlayAll <MODE> <application_id>	enter text, press Enter
5	Enter ps -ef grep <MODE>	enter text, press Enter
6	Verify that the resource planning processes have actually been shut down	observe
7	Enter kill -15 process_id1 [process_id2] [process_id3] [...] to terminate active process(es)	enter text, press Enter

12.3 Scheduling Resources

The Resource Planner and Resource Manager are both involved in resource scheduling using the Resource Scheduler. The Production Planner and Production Monitor are involved in the implementation of ground events.

- a. Resource Planner processes resource reservation requests for ground events.
- b. Resource Manager commits resource reservations.
- c. Production Planner sends committed resource reservations (ground events) to Data Processing via the Planning Workbench.
- d. Production Monitor monitors execution of ground events in processing.

The following process is used for generating and implementing resource reservations (ground events):

- a. Personnel who have a need for Planning Subsystem or Data Processing Subsystem resources submit requests for time on specified resources to accomplish the non-routine activities that they plan to undertake.
 1. Depending on DAAC policy, many personnel may have access to the resource planning applications for creating resource reservation requests.
 2. Alternatively, personnel may have to contact the Resource Planner to have resource reservation requests entered for them.
- b. The Resource Planner reviews requests for resource reservations to determine if the requests are valid.
 1. Request information includes a description of the activity, the resources required, the time period(s) for using the requested resource(s), comments explaining the variance from normal use.
 2. Resource Planner may decide to forward the request to a “sponsor” for validation.
 3. A sponsor is someone who evaluates a resource reservation request based on expertise that is particularly relevant to the resource reservation request.
- c. If the Resource Planner or sponsor determines that the request to reserve the resource is valid, the Resource Planner “approves” it along with all other requests that have been validated.
 1. The set of all validated resource reservation requests is considered a draft Resource Plan.
- d. The scheduling software identifies conflicts (if any) in the draft Resource Plan and alerts the Resource Planner to the problem(s).
- e. If possible, the Resource Planner resolves all conflicts before presenting the proposed plan to the Resource Manager to have the resources committed.
 1. However, during the conflict-resolution process the Resource Planner may have to consult with resource requesters and the Resource Manager to ensure that the reserved resources will not have adverse effects on the DAAC’s high-priority events.
- f. When the Resource Planner has achieved a conflict-free plan, it is presented to the Resource Manager to be implemented.
- g. The Resource Manager “commits” the resource plan, which signals the Planning Subsystem that the plan can be implemented.
 1. Committing a plan actually involves committing all of the individual approved resource reservation requests that collectively make up the plan.
- h. All committed resource reservations are automatically included in the next production plan to be activated through the Planning Workbench and are subsequently sent to Data Processing.

1. Resource reservations/ground events are not sent to data processing until they have been included in a production plan.
2. Refer to Section 13, Production Planning, to see how production plans are created and activated.
- i. In Data Processing a ground event job for each resource reservation is sent to the specified resource(s) at the indicated start time.
 1. If a data processing job is already using the specified resource(s) at the ground event's scheduled start time, the data processing job runs to completion before releasing the resource(s) to the ground event job.

Table 12.3-1, below, provides an Activity Checklist of Resource Scheduling activities.

Table 12.3-1. Resource Scheduling - Activity Checklist

Order	Role	Task	Section	Complete?
1	Resource Planner or DAAC Staff	Launch the Resource Scheduler	(P) 12.3.1	
2	Resource Planner or DAAC Staff	Create a Resource Reservation Request	(P) 12.3.2	
3	Resource Planner or DAAC Staff	Edit a Resource Reservation Request	(P) 12.3.3	
4	Resource Planner or Sponsor	Validate or Reject a Resource Reservation Request	(P) 12.3.4	
5	Resource Planner	Approve a Resource Reservation Request	(P) 12.3.5	
6	Resource Manager/Resource Planner	Commit Resource Reservation Requests	(P) 12.3.6	
7	Resource Planner	Review the Resource Timeline	(P) 12.3.7	
8	Resource Planner	Delete a Resource Reservation Request	(P) 12.3.8	
9	Resource Planner or DAAC Staff	Shut Down the Resource Scheduler	(P) 12.3.9	

12.3.1 Launch the Resource Scheduler

The **Resource Scheduler** is invoked from a UNIX command line prompt. Table 12.3-2 presents (in a condensed format) the steps required to launch the **Resource Scheduler**. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0

- a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.
- 2** In the terminal window, at the command line prompt, start the log-in to the Planning/Management Workstation by entering:
- /tools/bin/ssh <hostname>**
- a. Examples of hostnames include **e0pls03, g0pls01, l0pls02, n0pls02**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.
- 3** If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
- <Passphrase>**
- a. Go to Step 5.
- 4** At the **<user@remotehost>'s password:** prompt enter:
- <Password>**
- 5** In the terminal window, at the command line, enter:
- cd /usr/ecs/<MODE>/CUSTOM/utilities**
- a. **<MODE>** is current mode of operation.
 1. TS1 - Science Software Integration and Test (SSI&T)
 2. TS2 - New Version Checkout
 3. OPS - Normal Operations
 - b. “utilities” is the directory containing the Planning Subsystem start-up scripts.
- 6** Set the application environment variables by entering:
- setenv ECS_HOME /usr/ecs/**
- a. Application home environment is entered.
 - b. When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to set it manually.
- 7** Start the Resource Planning background processes by entering:
- EcPIRpAllStart <MODE> <application_id>**
- a. The Resource Planning background processes are launched.
 - b. The application_id or MSGSRV_ID is a number from 1 to 5. It identifies the message service in use so messages can be directed to the proper message handler GUI. Consequently, it is a good idea to use the same application_id consistently during a resource planning session.

8 Start the **Resource Scheduler** GUI by entering:

EcPIRpSiStart <MODE> <application_id>

- a. The Resource Scheduler is launched.
- b. The **Resource Scheduler** Graphical User Interface (GUI) is accessed. The GUI displays the Resource Reservation List, activity type, and a series of buttons that enable the following operations:
 1. **New...** Create a resource reservation request. (Section 12.3.2)
 2. **Modify...** Edit or review the details of an existing resource reservation request. (Section 12.3.3)
 3. **Approve** Used to indicate that the resource reservation request(s) has (have) been validated and a draft resource plan can be created. Clicking on this button causes the Planning Subsystem to determine whether there are conflicts between this resource reservation and other reservations. The Planning Subsystem detects conflicts and reports them to the operator. (Section 12.3.5)
 4. **Commit globally** Commit all “approved” resource reservations; at this point the ground events will be accessible by the production planning software (Section 12.3.6); however, resource reservations/ground events are not sent to data processing until they have been included in an activated production plan.
 5. **Time Line** Display a timeline-oriented view of the resource plan. (Section 12.3.7)
 6. **Report**The **Report** option is disabled. The reports have been deleted from the system requirements.

Table 12.3-2. Launch the Resource Scheduler - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the ECS System using secure shell	enter text, press Enter
2	Enter cd /usr/ecs/<MODE>/CUSTOM/utilities	enter text, press Enter
3	Set the environment variables if necessary	enter text, press Enter
4	Enter EcPIRpAllStart <MODE> <application_id>	enter text, press Enter
5	Enter EcPIRpSiStart <MODE> <application_id>	enter text, press Enter

12.3.2 Create a Resource Reservation Request

Table 12.3-3 presents (in a condensed format) the steps required to create a Resource Reservation Request. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1 (if the GUI is not currently running) then continue with the following steps.
- 2 From the **Resource Scheduler** GUI, **single-click** on the **New...** button to access the **Resource Reservation Request Edit/Definition** GUI.

- 3 Enter resource request identification information into the displayed fields. Press **Tab** to move from field to field. **NOTE:** Data that is system-generated is identified.
 - a. **Request Name** User-provided name for the resource request. (required)
 - b. **Edited Date** System-generated date of request entry.
 - c. **Originator** User-provided name of the authorized user preparing the resource request.
 - d. **Sponsor** User-provided name of the individual who is to review and validate the Resource Request; the subject-matter-expert. (required)

- 4 Enter resource scheduling information into the displayed fields. Press **Tab** to move from field to field.
 - a. **Activity Type** User-provided description of the type of activity; selected by the user from a selection list of valid options. (required)
 - b. **Priority** User-provided priority for the activity. Use the slider to select the appropriate priority on a scale from 0 to 100. 1 denotes the highest priority and 100 designates the lowest.
 - c. **Description** User-provided description of the activity for which the resource is required. (required)
 - d. **Resource...** See Section 12.3.2.1, below. (required)
 - e. **Interval...** Not applicable to new resource reservation requests; may be applicable when editing a resource reservation request. See Section 12.3.3.1, below.

- 5 Enter duration information into the displayed fields to define the period over which the resource is required. Press **Tab** to move from field to field.
 - a. **Start Date** User-provided start date of the resource request period. Enter in *MM/DD/YYYY* format. (required)
 - b. **Start Time** User-provided start time of the resource request. Enter in *hh:mm:ss* format. (required)
 1. **Start Time** must be later than the time when the resource reservation request will be saved; otherwise, it will not be possible to save the request.
 - c. **Stop Date** User-provided stop date of the resource request period. Enter in *MM/DD/YYYY* format. If a reservation is to be repeated over some **frequency** (see below), the stop date specifies the end date in the date range of the reservation request. (required)
 - d. **Stop Time** User-provided stop time of the resource request. Enter in *hh:mm:ss* format. (required)
 - e. **Frequency** See Section 12.3.2.2, below.

- 6 Enter comments concerning the resource reservation request in the **Comment** field.

- 7 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save data.
 1. The resource reservation must be “saved” prior to validating or rejecting. After the request has been saved, it can then be **validated** or **rejected**.
 2. The selections **Validated** and **Rejected** are further discussed in Section 12.3.3.
 - b. **Clear** to clear entries. Once cleared, the entries are deleted from the system.
 - c. **Cancel** to exit screen without saving the request.

Table 12.3-3. Create a Resource Reservation - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the New... button	single-click
3	Enter resource identification information	enter text, press tab
4	Enter resource scheduling information	enter text, press tab
5	Enter duration information	enter text, press tab
6	Enter comments	enter text, press tab
7	Select Save	single-click

12.3.2.1 Selecting Resources...

Clicking on the **Resource...** button accesses a **Resources Selection** screen. The **Request Name** is blank and is to remain empty when creating a new resource reservation request. This screen provides a pair of lists: **Resources** and **Selected Resources**. The **Resources** list itemizes available resources. The **Selected Resources** list itemizes those resources that have been selected for incorporation into the resource reservation. The user selects the desired resource(s) and, using the arrow buttons, moves the resource(s) from one list to the other list.

- 1 **Single-click** on your selections in the list and **single-click** on the desired arrow to move resources between the **Resources** and **Selected Resources** lists.
- 2 **Single-click** on one of the following buttons as appropriate:
 - a. **OK** to save the selections and exit the screen.
 - b. **Cancel** to exit the screen **without** saving changes.

12.3.2.2 Selecting Frequency

The **Frequency** option button provides the mechanism that allows the user to specify whether the resource reservation request describes a one-time event or a recurring event. Clicking on **Frequency** allows the user to specify options for periodic resource requests; that is, to specify the frequency of occurrence of a repeating resource need. Several options for expressing the frequency are available in the **Frequency** selection list box combined with a text field that provides a qualifier (i.e., number of days) for the **Every_?_days** selection only. The frequency specified defaults to **Once** to indicate that the resource need covers the entire time period covered by 'Start Time' and 'Stop Time.' Other options are identified in Table 12.3-4. The dates generated are inserted in the **Selected Intervals** list box, described in Section 12.3.2.3, below.

Table 12.3-4. Frequency Qualifiers

Frequency	Text Qualifier:	Result:
Once	--	The default. Resource reservation covering the period from the start time and stop time for the start date specified.
Daily	--	Resource reservation for every day, between the start date and end date, for the start time and end time specified.
Weekly	--	Resource reservation for every week occurring on the day specified by the start date, repeated until the end date as specified.
Every_2_weeks	--	Resource reservation occurring biweekly on the day specified by the start date, repeated until the end date as specified.
Monthly	--	Resource reservation for every month on the start day of the month, repeated until the end date as specified.
Mon_thru_Fri	--	Resource reservation for every Monday through Friday, between the start date and end date, for the start time and end time specified.
Mon_Wed_Fri	--	Resource reservation for every Monday, Wednesday, and Friday, between the start date and end date, for the start time and end time specified.
Tues_Thurs	--	Resource reservation for every Tuesday and Thursday, between the start date and end date, for the start time and end time specified.
Every_?_days	<i>n</i>	Resource reservation for every <i>n</i> days, between the start date and end date, for the start time and end time specified.
Weekend	--	Resource reservation for every Saturday and Sunday, between the start date and end date, for the start time and end time specified.

12.3.3 Edit a Resource Reservation Request

Table 12.3-5 presents (in a condensed format) the steps required to edit a Resource Reservation Request. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1, if not currently running, then continue with the following steps.
- 2 From the **Resource Scheduler** GUI, **single-click** on the resource reservation request to be modified.
- 3 **Single-click** on the **Modify...** button to access the **Resource Reservation Request Edit/Definition** GUI.

- 4 Make the modifications to affected fields. (See Section 12.3.2, above.)
 - a. **Interval...** is applicable when editing a resource reservation request if certain intervals are to be excluded from the resource reservation. See Section 12.3.3.1, below.

- 5 If appropriate at this time, **single-click** on either **Validated** or **Rejected**.
 - a. **Validated** indicates that the reservation request is complete and ‘makes sense’; that is, the request includes the appropriate resources consistent with the type of activity that is being proposed.
 - b. **Rejected** indicates that the reservation request is rejected.
 - c. At this time, the **Comment** field may also be updated.
 - d. The **Status** field contains the status of the reservation request.
 1. Status is system-generated based on user-input in other fields.

- 6 After data is entered, **single-click** on the appropriate button(s):
 - a. **Save** to save data and exit screen.
 - b. **Clear** to clear entries. Once cleared, the entries are deleted from the system.
 - c. **Cancel** to exit screen.

Table 12.3-5. Edit a Resource Reservation Request - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the resource reservation request to be modified	single-click
3	Select the Modify... button	single-click
4	Make modifications to affected fields	Use procedure in Section 12.3.2
5	Select either the Validated button or the Rejected button, if applicable	single-click
6	Select Save	single-click

12.3.3.1 Deselecting Intervals...

The **Interval...** button provides the mechanism to tailor a **Frequency-based** request by overriding selected intervals (**Note:** the initial resource reservation must be saved prior to tailoring frequency-based requests.). Selecting the **Interval...** button, displays a secondary screen that provides a pair of lists: **Unselected Intervals** and **Selected Intervals**. **Unselected Intervals** lists the dates that will not be reserved for the reservation request. **Selected Intervals** lists the dates that will be included for the request. The Selected Interval dates are automatically generated by the system, based upon the **Frequency** option selected (see Section 12.3.2.2, above). You can move them to or from the **Unselected Intervals** list to modify the automated list. Dates are moved from one list to the other by selecting the dates and using the arrow keys. The **Request Name** is also displayed.

- 1 **Single-click** on your selections and **single-click** on the desired arrow to move dates between the **Selected Intervals** and **Unselected Intervals** lists.

- 2 **Single-click** on one of the following buttons as appropriate:
 - a. **OK** to save the selections and exit the screen.
 - b. **Cancel** to exit the screen **without** saving changes.

12.3.4 Validate or Reject a Resource Reservation Request

All resource reservation requests must be validated and approved before scheduling. Validation is the process whereby a request is checked for completeness, and its purpose is deemed reasonable. After reviewing a resource reservation request, the Resource Planner may choose to consult with appropriate DAAC staff or assign a staff member (“sponsor”) to validate a request. When the request is rejected, the status of the request is changed to "rejected" on the screen.

Table 12.3-6 presents (in a condensed format) the steps required to validate or reject a Resource Reservation Request. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1, if not currently running, then continue with the following steps.
- 2 From the **Resource Scheduler** GUI, **single-click** on the resource reservation request to be modified.
- 3 **Single-click** on the **Modify...** button to access the **Resource Reservation Request Edit** GUI.
- 4 **Single-click** on either **Validated** or **Rejected**.
 - a. **Validated** indicates that the reservation request is complete and ‘makes sense’; that is, the request includes the appropriate resources consistent with the type of activity that is being proposed.
 - b. **Rejected** indicates that the reservation request is rejected.
 - c. At this time, the **Comment** field may also be updated.
 - d. The **Status** field contains the status of the reservation request.
 1. Status is system-generated based on user-input in other fields.
- 5 After data is entered, **single-click** on the appropriate button(s):
 - a. **Save** to save data.
 - b. **Clear** to clear entries. Once cleared, the entries are deleted from the system.
 - c. **Cancel** to exit screen.

Table 12.3-6. Validate or Reject a Resource Reservation Request - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the resource reservation request to be modified	single-click
3	Select the Modify... button	single-click
4	Select either the Validated button or the Rejected button, as appropriate	single-click
5	Select Save	single-click

12.3.5 Approve a Resource Reservation Request

The **Approve** button is used when all reviews that are a part of the resource planning process have taken place and there are no objections to the resource usage as described by the request. Clicking on this button will verify that there are no conflicts between this resource reservation and other reservations. If conflicts are detected, a screen will pop up listing the conflicts to be addressed for resolution. Click **OK** to collapse the pop-up screen. Clicking on **Approve** generates the pop-up screen again (if conflicts exist). Approval occurs after a request has been validated and the event time is acceptable.

Table 12.3-7 presents (in a condensed format) the steps required to approve a Resource Reservation Request. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1** Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1, then continue with the following steps.
- 2** From the **Resource Scheduler** GUI, **single-click** on the resource reservation request to be approved.
- 3** **Single-click** on the **Approve** button.
 - a. If there are resource conflicts resulting from the attempt to approve the resource reservation request, a pop-up dialogue box appears indicating that the approval failed and making reference to the **Message Handler** GUI for further information.
- 4** **Single-click** on the **OK** button to collapse the pop-up dialogue box.
 - a. If there are no resource conflicts to be resolved, the entry in the Status column of the **Resource Scheduler** GUI indicates that the request is "Approved" (changes from "Validated"). [End of procedure.]

- b. If there are resource conflicts to be resolved, the entry in the Status column of the **Resource Scheduler** GUI indicates that the request has "Conflicts" (changes from "Validated"). [Continue with Step 5.]
- 5 If there are resource conflicts to be resolved, examine the information displayed on the **Resource Scheduler** GUI.
 - a. Although the pop-up dialogue box makes reference to the **Message Handler** GUI for further information, no relevant data seems to be displayed there. Therefore, it is more appropriate to check for conflicts in the duration and frequency information for the resource reservation requests displayed on the **Resource Scheduler** GUI. When more than one resource reservation request is scheduled for the same date and time, there may be a conflict (if the same resource is specified in the requests).
 - b. It may be necessary to examine individual resource reservation requests in detail. If so, use the procedure to **Edit a Resource Reservation Request** (Section 12.3.3).
 - 6 If necessary, consult with the resource requester(s), Resource Manager and other personnel to determine which resource reservation request(s) to modify or delete in order to create a conflict-free resource plan.
 - 7 If applicable, go to the procedure to **Delete a Resource Reservation Request** (Section 12.3.8) and delete resource reservation request(s) as necessary to resolve the conflicts.
 - 8 If applicable, go to the procedure to **Edit a Resource Reservation Request** (Section 12.3.3) and modify/validate resource reservation request(s) as necessary to resolve the conflicts.
 - 9 If applicable, return to Step 2 to approve a modified resource reservation request.
 - a. The modified procedure must have been "validated." If necessary, refer to the procedure to **Validate or Reject a Resource Reservation Request** (Section 12.3.4).

Table 12.3-7. Approve a Resource Reservation Request - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the resource reservation request to be approved	single-click
3	Select the Approve button	single-click
4	Select the OK button	single-click
5	If there are resource conflicts to be resolved, examine the information displayed on the Resource Scheduler GUI	observe
6	Resolve conflicts as necessary	Use procedures in Sections 12.3.8, 12.3.3, and/or 12.3.4

12.3.6 Commit Resource Reservation Requests

Clicking on the **Commit globally** button commits all approved reservation requests and makes them accessible to Production Planning. All committed resource reservations are automatically included in the next production plan to be activated through the Planning Workbench and are subsequently sent to Data Processing. Note that resource reservations/ground events cannot take effect until they have been sent to Data Processing as part of an activated production plan. (Refer to Section 13, Production Planning, to see how production plans are created and activated.)

In Data Processing a “ground event” job for each resource reservation is sent to the specified resource(s) at the indicated start time. If a data processing job is already using the specified resource(s) at the ground event’s scheduled start time, the data processing job runs to completion before releasing the resource(s) to the ground event job.

Table 12.3-8 presents (in a condensed format) the steps required to commit a Resource Reservation Request. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 From the **Resource Scheduler** GUI, **single-click** on the **Commit globally** button.
 - a. Status shows **Committed** for all previously **Approved** requests.
- 2 To view a graphical representation of the resource plan execute the procedure in Section 12.3.7.
- 3 To exit from the **Resource Scheduler** GUI execute the procedure in Section 12.3.9.

NOTE: Resource reservations/ground events are not sent to data processing and cannot be implemented until they have been included in a production plan. Refer to Section 13, Production Planning, for the procedure on creating (including activating) production plans.

Table 12.3-8. Commit Resource Reservation Requests - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Select the Commit globally button	single-click
2	View a graphical representation of the resource plan if desired	Use the procedure in Section 12.3.7
3	Exit from the Resource Scheduler GUI if desired	Use the procedure in Section 12.3.9

12.3.7 Review the Resource Timeline

The Resource Planning utilities allow the user to view the Resource Plan as a timeline. Table 12.3-9 presents (in a condensed format) the steps required to review the Resource Timeline. If you are already familiar with the procedures, you may prefer to use the quick-step

table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1, then continue with the following steps.
- 2 From the **Resource Scheduler** GUI **single-click** on the **Timeline** button.
 - a. The **Resource Timeline** GUI is displayed.
 - b. The display represents a set of resources, arranged along the left side of the screen and some period of time as indicated across the top edge of the screen.
 - c. The use of a resource over a period of time is represented by one or more 'resource reservation' bars across the screen.
 - d. A bar represents a time period during which a resource reservation has been planned for the resource.
 1. Each bar has the name of the resource reservation and a brief description.
 2. For time periods during which a reservation has not been placed against a resource, that resource is planned for use by a default activity, e.g., science processing computers will be used for science processing unless a reservation has been placed against that resource .
 3. Scroll bars allow scrolling up and down through the full list of resources and left and right in time.
- 3 Adjust the **Resource Timeline** window size and the view of the timeline as necessary using the mouse.
 - a. Grab a corner of the timeline window with the cursor and resize the window as desired.
 - b. Scroll up or down through the full list of resources.
 - c. Scroll left or right to go backward or forward in time.
- 4 If a different time scale (start and end dates and times) is desired, perform Steps 5 through 7; otherwise, go to Step 8.
- 5 Execute the following menu path:
Display → Change Time Scale
 - a. The **plan window edit** window is displayed.
- 6 In the **Plan Win Start** and **Plan Win End** fields of the **plan window edit** window enter the date and time for the desired start and end times using the following format:
<DD MMM YYYY hh:mm:ss>
- 7 When the appropriate date and time have been entered, **single-click** on the appropriate button from the following selections:
 - a. **OK** - to accept the changes and dismiss the **plan window edit** window.
 - b. **Apply** - to accept the changes without dismissing the **plan window edit** window.
 - c. **Cancel** - to cancel the changes and dismiss the **plan window edit** window.

- 8 If a different time span is desired, **single-click** and **hold** on the **Show** option button and select (highlight then release the mouse button) the desired time span from the option menu that is displayed:
- 1 hr
 - 4 hr
 - 8 hr
 - 12 hr
 - 24 hr
 - 48 hr
 - 4 day
 - 1 week
 - 2 week
 - 1 month
 - full scale
- 9 If no resources are displayed on the GUI or if different resources should be displayed, perform Steps 10 through 14; otherwise, go to Step 15.
- 10 Execute the following menu path:
Display → Change resources
- The **Resource edit** window is displayed.
- 11 If adding resource(s) from the **Available Resources** list to the **Viewed Resources** list, select (highlight) the resource(s) to be added, then click on the **Add** button to move the resource(s) to the **Viewed Resources** list.
- Highlighted resource(s) appear(s) on the **Viewed Resources** list.
- 12 If deleting resource(s) from the **Viewed Resources** list, select (highlight) the resource(s) to be removed, then click on the **Del** button to remove the resource(s) from the **Viewed Resources** list.
- Highlighted resource(s) disappear(s) from the **Viewed Resources** list.
- 13 If changing the order in which resources are listed in the **Viewed Resources** list, select (highlight) the resource to be moved, then **single-click** on the up or down arrow as necessary to reposition the selected resource.
- Highlighted resource changes position in the **Viewed Resources** list.
- 14 When the **Viewed Resources** list contains the desired set of resources, **single-click** on the appropriate button from the following selections:
- OK** - to accept the changes and dismiss the **Resource edit** window.
 - Apply** - to accept the changes without dismissing the **Resource edit** window.
 - Cancel** - to cancel the changes and dismiss the **Resource edit** window.
- 15 If different color coding of the timeline is desired, perform Steps 16 through 20; otherwise, go to Step 21.
- 16 Execute the following menu path:
Display → Change colors
- The **Color Selections** window is displayed.

- 17 **Single-click** on the name of one of the resource reservations to be recolored.
 - a. The resource reservation is highlighted.
- 18 **Single-click** on the desired color (in the color palette) to be applied to the highlighted resource reservation.
- 19 Repeat Steps 17 and 18 as necessary.
- 20 When the appropriate color changes have been made, **single-click** on the appropriate button from the following selections:
 - a. **OK** - to accept the changes and dismiss the **Color Selections** window.
 - b. **Apply** - to accept the changes without dismissing the **Color Selections** window.
 - c. **Cancel** - to cancel the changes and dismiss the **Color Selections** window.
- 21 Observe the resource reservation information displayed on the **Resource Timeline** GUI.
- 22 Repeat the previous steps as necessary.
- 23 If it becomes necessary to exit from the timeline GUI execute the following menu path:
File → **Quit**

Table 12.3-9. Review the Resource Timeline - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the Timeline button	single-click
3	Execute Display → Change Time Scale window	single-click
4	Enter plan window start date and time	enter text
5	Enter plan window end date and time	enter text
6	Select Ok	single-click
7	Select time span	single-click
8	Execute Display → Change Resources	single-click
9	Select resources to be viewed	single-click resources
10	Select Add	single-click
11	Select viewed resource to be reordered	single-click resource
12	Reorder viewed resources using up/down arrows	single-click
13	Select Ok	single-click
14	Execute Display → Change Colors	single-click
15	Select resource reservation	single-click
16	Select new color for resource reservation	single-click
17	Select Ok	single-click
18	Observe the resource reservation information	observe
19	Execute File → Quit to quit the timeline	single-click

12.3.8 Delete a Resource Reservation Request

Table 12.3-10 presents (in a condensed format) the steps required to delete a resource reservation request. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1, then continue with the following steps.
- 2 From the **Resource Scheduler** GUI, highlight (click on) the resource reservation request you want to delete.
- 3 Execute the following menu path:
File → Delete
 - a. Status shows "Deleted" for the selected request. The resource reservation request is not removed from the database at this point and is available for future reporting but will have no impact on resource planning. Resource reservations are removed from the Resource reservations (PDPS) database through routine database maintenance activities.
- 4 To exit from the **Resource Scheduler** GUI execute the procedure in Section 12.3.9.

Table 12.3-10. Delete a Resource Reservation Request - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the resource reservation request to be deleted	single-click
3	Execute File → Delete	single-click
4	Exit from the Resource Scheduler GUI if desired	Use procedure in Section 12.3.9

12.3.9 Shut Down the Resource Scheduler

When resource scheduling activities have been completed, the Message Handler, System Name Server, and Resource Model should be shut down to eliminate unneeded processes and allow other operators to gain access to the resource planning applications. If any of the three processes remains active, it is likely to interfere with subsequent attempts to launch resource planning applications.

Shutting down the Resource Scheduler starts with the assumption that the **Resource Scheduler** GUI has been launched and is currently being displayed.

Table 12.3-11 presents (in a condensed format) the steps required to shut down resource scheduling applications. If you are already familiar with the procedures, you may prefer to use

the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 To exit from the **Resource Scheduler** GUI when resource planning activities have been completed execute the following menu path:
File → Exit
 - a. The **Resource Scheduler** GUI disappears unless there are resource reservation requests with a status of “approved”.
 - b. If there are any resource reservation requests with a status of “approved” listed on the **Resource Scheduler** GUI, a **Close Application** pop-up dialogue box is displayed with a message “Status of the listed reservations” and a list of the resource reservation requests with “approved” status.
- 2 If the **Close Application** pop-up dialogue box is displayed, **single-click** on the appropriate button from the following selections:
 - a. **Ok** - to quit the **Resource Scheduler** GUI and dismiss the dialogue box.
 1. Selecting **Ok** effectively commits all “approved” Resource Reservations.
 - b. **Cancel** - to dismiss the dialogue box and return to the **Resource Scheduler** GUI.
- 3 After quitting the **Resource Scheduler** GUI **single-click** in the UNIX window used to start the resource scheduling applications.
- 4 Shut down the Message Handler, System Name Server, and Resource Model by entering:
EcPIRpSlayAll <MODE> <application_id>
 - a. The **Message Handler** GUI disappears.
- 5 To obtain a list of active processes in the specified mode enter:
ps -ef | grep <MODE>
 - a. A list of active processes in the specified mode is displayed.
 - b. If an error message is received when **ps -ef | grep <MODE>** is entered, enter:
ps -auxwww | grep <MODE>
- 6 Examine the list of processes running in the specified mode to determine whether the Message Handler, System Name Server, and Resource Model processes have actually been shut down.
 - a. None of the following processes should be active:
 1. EcPIRpRe
 2. EcPIRpSi
 3. EcPIRpTl
 4. EcPIMsh
 5. EcPISns
 6. EcPIRpRm
- 7 If any of the specified processes [especially the Message Handler, System Name Server, and/or Resource Model process(es)] is/are still active, terminate the active process(es) by entering:
kill -15 process_id1 [process_id2] [process_id3] [...]

8 Repeat Steps 5 through 7 as necessary.

Table 12.3-11. Shut Down the Resource Scheduler - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Execute File → Exit to quit the Resource Scheduler GUI	single-click
2	Select OK	single-click
3	Select the UNIX window	single-click
4	Enter EcPIRpSlayAll <MODE> <application_id>	enter text, press Enter
5	Enter ps -ef grep <MODE>	enter text, press Enter
6	Verify that the resource scheduling processes have actually been shut down	Observe
7	Enter kill -15 process_id1 [process_id2] [process_id3] [...] to terminate active process(es)	enter text, press Enter

12.4 Tuning System Parameters

The values assigned to system parameters affect the functioning and performance of the system. When certain parameters are modified, the system operates differently. Changes to some other parameters may not appear to affect the system although there may in fact be subtle effects. In any case before system parameters are modified it is essential to understand what will happen to system functioning and performance.

Many system parameters may be subject to control by Configuration Management (CM). When making or requesting a change to system parameters, the CM process at the particular site must be followed (if applicable).

Values are assigned to Data Processing Subsystem and Planning Subsystem parameters in the following databases:

- a. PDPS database.
- b. Configuration Registry database.

In general the system parameters in the database are modified using the GUIs. The system parameters specified in configuration files are modified by editing the appropriate configuration file.

The Configuration Registry Server provides a single interface (via a Sybase server) for retrieving configuration attribute-value pairs for ECS servers from the Configuration Registry database. When ECS servers are started, they access the Configuration Registry Database to obtain needed configuration parameters.

The Database Administrator has access to a Configuration Registry GUI for viewing and editing configuration data in the database. Therefore, it is necessary to coordinate with the Database Administrator when changes to configuration parameters are needed. Also, as previously mentioned, changes to configuration-controlled parameters are subject to approval through the site CM process.

Default and adjusted values assigned to system parameters vary from site to site. For guidance concerning the assignment of values to parameters included in the Configuration Registry refer to document 910-TDA-022, Custom Configuration Parameters. The document is available at <http://cmdm.east.hitc.com/baseline/> under “Technical Documents.”

The following parameters are examples of parameters whose values may be modified to enhance system functioning or performance:

- a. AppLogSize
 1. Maximum size of the application log (ALOG) file for a particular application.
- b. AppLogLevel
 1. Level of detail provided in the ALOG file for a particular application.
- c. DebugLevel
 1. Level of detail provided in the debug log file for a particular application.
- d. DpPr_MAX_RETRIES
 1. Number of retries to the Science Data Server for acquires/inserts before giving up.
- e. DpPr_WAIT_PERIOD
 1. Time (in seconds) to wait between retries to the Science Data Server.
- f. ListenThreads
 1. Number of listen threads assigned to a particular application.
- g. DpPrRM_MAX_RETRIES
 1. Number of retries when creating a Data Manager object (trying to allocate).
- h. DpPrRM_RETRY_PERIOD
 1. Amount of time (in seconds) between retries when creating a Data Manager object (trying to allocate).
- i. DpPrAutoSysMaxJobs
 1. Maximum number of jobs in AutoSys at one time. Dividing the value assigned to DpPrAutoSysMaxJobs by four produces the number of PGEs that can be in AutoSys at one time.
 2. Changing the value assigned to DpPrAutoSysMaxJobs affects the number of jobs (for the applicable mode) allowed in AutoSys at a time. The DpPrAutoSysMaxJobs parameter and number of CPUs assigned to the mode should be adjusted as necessary to ensure that all CPUs can be used but AutoSys is not overloaded with jobs waiting to be processed.
 3. Refer to Section 12.4.2 for further information.
- j. MaxSlippagePerc
 1. Percentage by which a granule can slip and still be considered a match.
- k. AcceptableCertainty
 1. Minimum overlap a granule must have.
- l. DBConnections
 1. Number of connections needed by a particular application. Subscription Manager maintains only **one** connection to the database.
- m. SleepDelayForFailures
 1. Amount of time (in seconds) to wait before reprocessing failed notifications. If the specified value is less than 60, a default value of 60 seconds would be assumed.

- n. SleepDelayForTimers
 - 1. Amount of time (in seconds) the Subscription Manager should sleep between checking for expired timers. It should be set to the minimum amount of time a timer will be set for at this DAAC. The minimum it can be set to is 60 seconds.

NOTE: When the value assigned to a parameter has been changed and saved in the Configuration Registry, the modified value does not take effect until the affected server has been restarted. For example, if the debug level for the Subscription Manager log has been changed from “2” to “3” in the Configuration Registry, the modification does not affect the recording of data in the log until after a warm restart of the Subscription Manager (at which time the server would read the parameters in the Configuration Registry).

Table 12.4-1, below, provides an Activity Checklist table of System Tuning activities.

Table 12.4-1. Tuning System Parameters - Activity Checklist

Order	Role	Task	Section	Complete?
1	Resource Planner/ Production Planner/ Production Monitor	Monitor the Load on Processing Resources	(P) 12.4.1	
2	Resource Planner/ Production Planner/ Production Monitor	Throttle the Processing Load by Modifying the Maximum Number of Jobs in AutoSys	(P) 12.4.2	

12.4.1 Monitor the Load on Processing Resources

The Production Planner and Production Monitor should work with the Resource Planner to make optimum use of processing resources. The Resource Planner allocates the disk partitions, CPUs, and RAM available for processing among the active modes (e.g., OPS, TS1, TS2). The Production Planner and Production Monitor monitor the load on the processing resources.

The Resource Planner assigns the bulk (typically 60% - 80%) of the processing resources to the OPS mode. The remainder of the processing assets are divided among the modes used for SSI&T and new version software checkout.

The Production Planner and Production Monitor monitor the load on the processing resources to identify whether the actual load is appropriately distributed among modes. They either inform the Resource Planner of under- or over-use of resources as allocated or have the DpPrAutoSysMaxJobs parameter (for EcDpPrJobMgmt) adjusted in the Configuration Registry.

When monitoring the load on the processing resources, the Production Planner and Production Monitor should take the following considerations into account:

- a. Disk space allocated to OPS mode is likely to be used to capacity.
- b. Disk space assigned to the other two modes may not fill up.

- c. There is no one-to-one mapping of CPU allocation with actual CPUs on the science processor.
- d. The operating system (OS) takes care of true CPU and RAM allocation.
 - 1. Actual CPU usage during processing is limited by the OS.
 - 2. If ten CPUs have been specified for a particular mode, only ten Data Processing Requests (DPRs) can be running the Execute job at a given time.
 - 3. What is really being defined is the maximum number of DPRs that will execute at a given time.
- e. CPUs can be over-allocated or under-allocated as necessary to get the most out of the CPUs on each science processor.
- f. If monitoring indicates that the processor is underused when OPS mode is at full processing capacity, the number of CPUs allocated to OPS mode could probably be increased.
- g. If the science processor is at full capacity when OPS mode is at full processing capacity (and the processor may be overworked) the number of CPUs allocated to OPS mode should be reduced.
- h. Random-access memory (RAM) is subject to the same considerations as CPUs.
 - 1. RAM can be over-allocated or under-allocated as necessary to get the most out of the memory on each science processor.

12.4.2 Throttle the Processing Load by Modifying the Maximum Number of Jobs in AutoSys

Another consideration is the throttling of the processing load through the DpPrAutoSysMaxJobs parameter.

- a. If DpPrAutoSysMaxJobs in OPS mode were set at 32 [allowing AutoSys to accommodate eight DPRs (consisting of four jobs each) simultaneously in OPS mode] and ten CPUs were defined for OPS, it would not be possible to utilize all ten CPUs.
- b. If the value of DpPrAutosysMaxJobs were increased to 64 (16 DPRs times 4 jobs/DPR), there might be times when the processing of some DPRs would be held up because only ten could be running the Execute job at a time.
 - 1. In such a case it might be possible to increase the number of CPUs allocated to the mode so that more than ten DPRs could be running the Execute job simultaneously.

The maximum number of jobs in AutoSys is modified by having the Database Administrator change the value assigned to the DpPrAutosysMaxJobs parameter (for EcDpPrJobMgmt) in the Configuration Registry.

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13. Production Planning

13.1 Production Planning Process

The Planning Subsystem supports site operations in developing a production plan based on locally defined strategy. Production Planning involves creation of Production Requests using the Production Request Editor and the scheduling of the Production Requests using the Planning Workbench.

The Production Planner defines ECS science data processing requirements in terms of Production Requests (PRs).

- a. A PR is an order for data to be produced by the Data Processing Subsystem.
- b. Each PR identifies specific science software [in the form of a Product Generation Executive (PGE)] that is to be run and the data (in terms of a time period, set of orbits, etc.) that is to be processed to produce the desired output product(s).

In response to a PR the Planning Subsystem generates either one or a series of Data Processing Requests (DPRs).

- a. Each DPR corresponds to one execution of a single PGE.
- b. Each DPR contains the information that is needed by the Data Processing Subsystem to execute the PGE and produce the desired output product(s).

The Production Planner defines Production Strategies that specify values in several categories related to DPRs.

- a. The values specified in a Production Strategy can be used in determining the priority of each DPR.

The Production Planner creates a Production Plan that specifies which PR(s) [and consequently which DPR(s)] should be sent to Data Processing at one time.

- a. When creating a Production Plan, the Production Planner can associate a particular Production Strategy with the PRs in the plan.
- b. When the Production Planner “activates” a Production Plan, the associated DPRs become accessible to Data Processing.

The Production Planner uses the following principal tools in the Planning Subsystem:

- a. Production Request Editor GUI - for creating Production Requests and Data Processing Requests.
- b. Production Strategies GUI - for creating Production Strategies.
- c. Planning Workbench GUI – for creating and activating Production Plans.
- d. Planning Timeline – for reviewing Production Plans.

Subsequent sections related to Production Planning address the following topics:

- a. Section 13.2 An overview of the process for creating or deleting Production Requests and Data Processing Requests and step-by-step procedures for using the Production Request Editor.
- b. Section 13.3 An overview of the process for creating, modifying, or deleting Production Strategies and step-by-step procedures for using the Production Strategies GUI.
- c. Section 13.4 An overview of the process for creating, activating, or deleting Production Plans and step-by-step procedures for using the Planning Workbench GUI and Planning Timeline.
- d. Section 13.5 An overview and step-by-step procedures for resetting/cleaning the PDPS database.
- e. Section 13.6 Referral to the procedures for tuning system parameters included in Chapter 14, Production Processing.

13.2 Creating/Deleting Production Requests and Data Processing Requests

From the Production Request Editor, the Production Planner can create new production requests, modify or delete production requests, and review or delete data processing requests.

Each procedure outlined has an **Activity Checklist** table that provides an overview of the task to be completed. The outline of the **Activity Checklist** is as follows:

Column one - **Order** shows the order in which tasks should be accomplished.

Column two - **Role** lists the Role/Manager/Operator responsible for performing the task.

Column three - **Task** provides a brief explanation of the task.

Column four - **Section** provides the Procedure (P) section number or Instruction (I) section number where details for performing the task can be found.

Column five - **Complete?** is used as a checklist to keep track of which task steps have been completed.

Table 13.2-1 provides an Activity Checklist for activities related to the creation of Production Requests and Data Processing Requests.

Table 13.2-1. Production Requests and Data Processing Requests - Activity Checklist (1 of 2)

Order	Role	Task	Section	Complete?
1	Production Planner	Launch the Production Request Editor	(P) 13.2.1	
2	Production Planner	Create a New Production Request	(P) 13.2.2	
3	Production Planner	Edit/Modify a Production Request	(P) 13.2.3	

Table 13.2-1. Production Requests and Data Processing Requests - Activity Checklist (2 of 2)

Order	Role	Task	Section	Complete?
4	Production Planner	Delete a Production Request	(P) 13.2.4	
5	Production Planner	Display Data Processing Request Information	(P) 13.2.5	
6	Production Planner	Delete a Data Processing Request	(P) 13.2.6	
7	Production Planner	Re-Generate Granules Affected by Loss of Files from the Archive	(P) 13.2.7	

NOTE: The procedures that follow are written under the assumption that PGEs have been previously created and are available for use with the same rule criteria that you are attempting to use.

13.2.1 Launch the Production Request Editor

The Production Request Editor is invoked from a UNIX command line prompt. Table 13.2-2 presents (in a condensed format) the steps required to launch the Production Request Editor. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

- 2 In the terminal window, at the command line prompt, start the log-in to the Planning/Management Workstation by entering:
/tools/bin/ssh <hostname>
 - a. Examples of hostnames include **e0pls03**, **g0pls01**, or **l0pls02**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.

- 3 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>

- a. Go to Step 5.
- 4** At the `<user@remotehost>`'s **password:** prompt enter:
`<Password>`
- 5** Start the login to DCE by entering:
`dce_login`
- 6** At the **Enter Principal Name:** prompt enter:
`<DCE UserID>`
- 7** At the **Enter Password:** prompt enter: then press the **Return/Enter** key.
`<DCE Password>`
- 8** In the terminal window, at the command line, enter:
`cd /usr/ecs/<MODE>/CUSTOM/utilities`
 - a. `<MODE>` is current mode of operation.
 1. TS1 - Science Software Integration and Test (SSI&T)
 2. TS2 - New Version Checkout
 3. OPS - Normal Operations
 - b. "utilities" is the directory containing the Planning Subsystem start-up scripts.
- 9** Set the application environment variables by entering:
`setenv ECS_HOME /usr/ecs/`
 - a. Application home environment is entered
 - b. When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to set it manually.
- 10** Start the Production Request Editor by entering:
`EcPIPRE_IFStart <MODE>`
 - a. The Production Request Editor is launched.

**Table 13.2-2. Launch the Production Request Editor - Quick-Step Procedures
(1 of 2)**

Step	What to Enter or Select	Action to Take
1	Log in to the Planning host using secure shell	enter text, press Enter
2	Log in to DCE	enter text, press Enter

**Table 13.2-2. Launch the Production Request Editor - Quick-Step Procedures
(2 of 2)**

Step	What to Enter or Select	Action to Take
3	Enter <code>cd /usr/ecs/<MODE>/CUSTOM/utilities</code>	enter text, press Enter
4	Set environment variables if necessary	enter text, press Enter
5	Enter <code>EcPIPRE_IFStart <MODE></code>	enter text, press Enter

13.2.2 Create a New Production Request

The process of creating a new Production Request begins with the Production Planner starting the Production Request Editor GUI. The Production Planner specifies the PGE, duration, and comments for the new Production Request.

TYPES OF DATA PROCESSING: ECS accommodates four general types of data processing.

Routine Processing	Pre-defined software production processing that is periodic and keyed to data arrival. For example, every day a Production Planner includes in the daily schedule a DPR for generating a particular Level 1A product from the most recent Level 0 data from the applicable satellite instrument.
Reprocessing	Typically involves using a new, improved PGE to process data that had previously been processed with an older version of the PGE.
Regeneration	A type of reprocessing that is performed for the purpose of replacing a missing or damaged product. It is necessary when an existing product has been corrupted or deleted. If the damaged or missing product is needed for shipping or as input for additional processing, it must be recreated. To the extent possible the regenerated file is created using the same input, the same processing parameters, and the same algorithm as the original file.
On-Demand Processing	Involves ad-hoc processing initiated by an end-user (as opposed to the Production Planner). For example, a researcher using data from the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) instrument on the Terra satellite may need a particular Level 2 product that has not yet been generated. The ASTER researcher would submit an on-demand request to have the product generated from a Level 1B product stored in the archive.

NOTE: When reprocessing, it is important to generate DPRs for one chain completely before generating any DPRs for the next chain. For example, if PGE1 produces Product1 that is input to PGE2 that produces Product2 that is input to PGE3 that produces Product3, PRs for PGE1, PGE2, and PGE3 should be created for each of those DPRs for Chain1. Then PRs for Chain2 can be created, etc.

A reprocessing DPR selects the latest version granule in the database as input. Consequently, if Product1 from Chain2 were in the database before the DPR for Chain1 PGE2 was created, the Chain1 DPR for PGE2 would select the Product1 from Chain2 as its input and Product1 from Chain1 would not be used.

PRODUCTION RULES: Production Rules provide templates for Instrument Teams to describe the relationship(s) between PGEs and their input and output data. The assumption of this documentation is that the user has knowledge of the specific production rules under which the PGE was created. Listed below is a sampling of the available production rules.

Basic Temporal	Temporal (time) range of inputs matches the temporal range of outputs.
Advanced Temporal	Temporal range of inputs is offset from the expected temporal range of inputs and outputs.
Alternate Inputs	PGE is run with different inputs based on the availability of various alternate input data sets.
Optional Inputs	PGE is run with specified optional inputs if available; otherwise, PGE is run without them.
Min/Max Granules	Minimum number of input granules needed for full data coverage and maximum number of input granules to search for may be specified. Minimum and maximum number of outputs expected from the PGE may be specified.
Optional DPRs	The only DPRs executed are those for which the non-routine key input data actually become available (i.e., are either produced in data processing or can be acquired from the archive).
Metadata Checks	DPR is run only if input data's metadata value(s) meet(s) certain criteria.
Metadata Query	Input granule selection is based on metadata value(s).
Spatial Query/Spatial Pad	Input granule selection is based on the spatial coverage of another input (i.e., the key input). Spatial Pad involves adding area to all sides of the key input's spatial shape. All granules that intersect the expanded area are retrieved.

Closest Granule	DPR is generated if a required input granule within a particular time range (rather than an exact time) is available; otherwise, no DPR is generated.
Orbital Processing	Selection of input times is based on orbit information.

Table 13.2-3 presents (in a condensed format) the steps required to create a new production request. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Production Request Editor** (refer to Section 13.2.1).
 - a. The Production Request Editor GUI is displayed.
- 2 **Single-click** on the **PR Edit** tab.
 - a. The **PR Edit** GUI is displayed.

NOTE: If the GUI is unresponsive, always check to see if a prompt window is hidden behind the main GUI waiting for a response. Respond to the window, then continue with the Production Request Editor GUI.

- 3 **Single-click** and **hold** the **PR Type** option button to display a menu of types of production requests, **move** the mouse cursor to the desired selection (highlighting it), then **release** the mouse button.
 - a. Options are: **Routine**, **On-Demand** [not currently available for selection], and **Reprocessing**.
- 4 **Single-click** and **hold** the **User Type** option button to display a menu of types of users, **move** the mouse cursor to the desired selection (highlighting it), then **release** the mouse button.
 - a. Options are: Operator, DAAC Manager, Scientist, and Researcher.

NOTE: The **PR Name** and **Origination Date** fields will be filled automatically when the Production Request is saved at the end of the procedure. (You do not need to fill in these fields.)

- 5 In the **Originator** field either enter the actual name of the originator or enter:
<username>

- 6 In the **Priority** field enter:
<Priority>
- a. Enter a number in the range of one (1) to ten (10).
 1. One (1) has the highest priority; ten (10) has the lowest priority.
 - b. The **Priority** field specifies the **Production Request Editor** priority to be included in the Data Processing Request(s) that result(s) from the Production Request.
 - c. **Production Request Editor Priority** is subsequently weighted according to the value specified in the Production Strategy selected from the Planning Workbench when a Production Plan is created that uses the Production Request.
- 7 **Single-click** on the **PGE...** button.
- a. The **PGE** GUI is displayed.
- 8 Select the desired PGE by **single-clicking** on the PGE.
- a. The desired **PGE** is highlighted.
- 9 **Single-click** the **Ok** button.
- a. The **PR Edit** GUI is displayed.
 - b. The following fields are automatically filled:
 1. **Satellite Name.**
 2. **Instrument Name.**
 3. **PGE Name.**
 4. **PGE Version.**
 5. **Profile ID.**
- 10 **Single-click** on the **PGE Parameters...** button.
- a. The **PGE Parameters** GUI is displayed.
 - b. PGE parameter data are displayed in a table that has the following columns:
 1. **Parameter Name.**
 2. **Logical Id.**
 3. **Default Value.**
 4. **Override Value.**
 5. **Description.**
- 11 Select the parameter (if any) with the default value to be changed by **single-clicking** on the **Parameter Name** row.
- a. The parameter row is highlighted.
 - b. Only the default values can be modified.
 - c. Modify parameter values when and as directed by the customer (e.g., MODIS) only.
- 12 If a parameter with a default value to be changed has been selected, in the **Override Value** field enter:
<override value>
- 13 If a parameter with a default value to be changed has been selected, **single-click** on the **Apply** button at the bottom of the **PGE Parameter Mappings** window.
- a. The new value is displayed in the **Override Value** column.
 - b. Repeat Steps 11 through 13 to modify additional parameters (if applicable).
- 14 **Single-click** on the **Ok** button to approve the changes.

- a. The **PR Edit** GUI is displayed.

****The procedures that follow involve the implementation of specific PRODUCTION RULES.****

MODIS uses

- 1) Temporal Rules, to include Basic and Advanced Temporal specifications,
- 2) Orbit-Based Activation **and**
- 3) Period/Calendar Specification,
- 4) Conditional Activation,
- 5) Additional inputs **and**
- 6) DataBase Query.

ASTER uses both Temporal Rules, Basic and Advanced Temporal specifications. In addition, **ASTER** routine processing makes use of the Optional DPRs Production Rule to schedule and execute **ASTER** PGEs for new data that have been archived. The Production Planner specifies the **insertion time** range (i.e., the time period when the desired data were archived) as opposed to the **collection time** (when the satellite instrument gathered the data).

MISR has primarily “orbit” based PGEs.

Multiple “production rules” can be combined to complete a PR, however, **Temporal- and Orbit-based rules** cannot be combined.

To execute either a **Basic or Advanced Temporal Production Rule**, you must complete Steps 14, specified above in 13.2.2. and specify date and time information for processing (Steps 30 and 31). Then continue processing with Step 34, etc. as necessary.

METADATA-BASED PRODUCTION RULE

- 15 If the PGE is subject to a metadata-based production rule and the value(s) to be checked need(s) to be changed, **single-click** on the **Metadata Checks...** button, perform Steps 16 through 20 as applicable; otherwise go to Step 21.
 - a. The **MetadataChecks** GUI page is displayed.
 - b. The **MetadataChecks** GUI has an **InputDataType** window that lists the input data types for the PGE.
 - c. In addition, the **MetadataChecks** GUI has a metadata checks (**MetaDataField-Operator-Value-Type**) window in which there is a table that lists the following information concerning each metadata check:
 1. **MetaDataField.**
 2. **Operator.**
 3. **Value.**
 4. **Type.**
 - d. Initial values for metadata checks are entered during SSI&T; however, it is possible to modify the values using the **MetadataChecks** GUI when creating a production request.
 1. Modify metadata check values when and as directed by the customer (e.g., MODIS) only.
- 16 If it is necessary to change any value(s) for metadata checks, select an input data type with a value to be changed by **single-clicking** on the corresponding row in the **InputDataType** window.
 - a. The input data type row is highlighted.

- b. The metadata check information for the highlighted input data type is displayed in the **MetaDataField-Operator-Value-Type** window.
- 17** Select (highlight) a metadata field with a comparison value to be changed by **single-clicking** on the corresponding row in the **MetaDataField-Operator-Value-Type** window.
- a. The metadata field row is highlighted in the **MetaDataField-Operator-Value-Type** window.
 - b. The identity of the metadata field is displayed in the **MetaDataField** window.
- 18** If it is necessary to change any value(s) for metadata checks, in the **Value** field enter:
<value>
- 19** **Single-click** on the appropriate button from the following selections:
- a. **OK** - to approve the new value and dismiss the **MetadataChecks** GUI.
 - 1. The Production Request - PR Edit GUI is displayed.
 - 2. Go to Step 21.
 - b. **Apply** - to approve the new value without dismissing the **MetadataChecks** GUI.
 - 1. Go to Step 20.
 - c. **Cancel** - to return to the **Production Request - PR Edit** GUI without saving the new value.
 - 1. The **Production Request - PR Edit** GUI is displayed.
 - 2. Go to Step 21.
- 20** If any additional value(s) to be checked need to be changed, repeat Steps 16 through 19 as necessary.

ALTERNATE INPUTS PRODUCTION RULE

- 21** If the PGE is subject to the **Alternate Inputs Production Rule** and the timer settings or the order of alternate inputs need to be changed, **single-click** on the **Alternate Input Values...** button and perform Steps 22 through 27 as applicable; otherwise go to Step 28.
- The **AlternateInputValues** GUI page is displayed.
 - The **AlternateInputValues** GUI has an **AlternateListName** window that lists the applicable alternate inputs.
 - In addition, the **AlternateInputValues** GUI has an alternate input (**Order-Data Type-LogicalID-Timer**) window in which there is a table that lists the following information concerning each alternate input:
 - Order.**
 - Data Type.**
 - LogicalID.**
 - Timer.**
 - The initial set-up for alternate inputs is entered during SSI&T; however, it is possible to modify the set-up using the **AlternateInputValues** GUI when creating a production request.
- 22** If it is necessary to change timer settings or the order of alternate inputs, first select (highlight) an alternate input to be changed by **single-clicking** on the corresponding row in the **AlternateListName** window.
- The alternate input row is highlighted.
 - Information concerning the highlighted alternate input is displayed in the **Order-Data Type-LogicalID-Timer** window.
- 23** Select (highlight) an alternate input with timer settings or the order of alternate inputs to be changed by **single-clicking** on the corresponding row in the **Order-Data Type-LogicalID-Timer** window.
- Alternate input row is highlighted in the **Order-Data Type-LogicalID-Timer** window.
 - The data type of the alternate input is displayed in the **Data Type** field.
- 24** If it is necessary to change the order of alternate inputs, **single-click** on the up/down arrow buttons adjacent to the **Order-Data Type-LogicalID-Timer** window as necessary until the highlighted alternate input has the proper order listed in the **Order** column of the window.
- If necessary, repeat Steps 23 and 24 to change the order of additional alternate inputs.
- 25** If the timer setting for an alternate input is to be modified, verify that the alternate input with the timer setting to be changed has been highlighted then in the **Timer** fields enter:
<hh:mm:ss>
- Another method of changing timer settings (other than typing the numbers) is to **single-click** in each of the timer fields in turn and click on the up/down buttons adjacent to the **Timer** fields until the correct time is indicated.
- 26** **Single-click** on the appropriate button from the following selections:
- OK** - to approve the new alternate input setting(s) and dismiss the **AlternateInputValues** GUI.
 - The **Production Request - PR Edit** GUI is displayed.
 - Go to Step 28.

- b. **Apply** - to approve the new alternate input setting(s) without dismissing the **AlternateInputValues** GUI.
 - 1. Go to Step 27.
- c. **Cancel** - to return to the **Production Request - PR Edit** GUI without saving the new alternate input setting(s).
 - 1. The **Production Request - PR Edit** GUI is displayed.
 - 2. Go to Step 28.

27 If any additional alternate input setting(s) need to be changed, repeat Steps 22 through 26 as necessary.

ASTER routine processing makes use of the **Optional DPRs Production Rule** to schedule and execute *ASTER PGEs* for new data that have been archived. The *Production Planner* specifies the **insertion time** range (i.e., the time period when the desired data were archived) as opposed to the **collection time** (when the satellite instrument gathered the data).

- 28** **Single-click** on either the **Collection Time** or **Insertion Time** button (as applicable) if data are to be processed on the basis of time (rather than orbit).
- a. Normally the **Collection Time** (time when the data were collected by the instrument on the satellite) is used for specifying what data are to be processed.
 - b. The **Insertion Time** option is available primarily for *ASTER* processing to allow the generation of DPRs for all data contained on an *ASTER* tape received from the *ASTER* Ground Data System (GDS).

TIME- OR ORBIT-BASED PROCESSING?

- 29** **Single-click** on either the **UTC Time** (Coordinated Universal Time) button or the **Orbit** button, depending on whether data to be processed is specified by time or orbit.
- a. If **UTC Time** is selected, go to Step 30.
 - b. If **Orbit** is selected go to Step 32.

TEMPORAL PRODUCTION RULES

30 Enter the desired data start date and time in the **Begin** fields in the following format:

<MM/DD/YYYY hh:mm:ss>

- a. As data are entered in each field the cursor automatically advances to the next field.
- b. Another method of entering date and time (other than typing the numbers) is to **single-click** in each of the date/time fields in turn and click on the up/down buttons adjacent to the date/time fields until the correct date/time is indicated.

31 Enter the desired data end date and time in the **End** fields in the following format:
<MM/DD/YYYY hh:mm:ss>

ORBITAL PROCESSING PRODUCTION RULE

32 If the Orbital Processing Production Rule applies, in the **From** field enter:
<first orbit number>

33 If the Orbital Processing Production Rule applies, in the **To** field enter:
<last orbit number>

INTERMITTENT ACTIVATION PRODUCTION RULE

34 If the Intermittent Activation Production Rule applies, in the **Skip** field enter:
<number of DPRs>

- a. If the Intermittent Activation Production Rule applies, perform Steps 35 and 36.
- b. If the Intermittent Activation Production Rule does not apply, go to Step 37.

35 If the Intermittent Activation Production Rule applies, in the **Keep** field enter:
<number of DPRs>

36 If the first DPR is to be skipped, **single-click** on the **SkipFirst** button.

37 If applicable, in the **Comments** field enter:
<comments>

38 Start the process of saving the production request and generating DPRs by executing the following menu path:

File → Save As

- a. The **File Selection** window is displayed.

39 In the **Selection** field enter:
<PR name>

40 **Single-click** on the **OK** button to save the production request.

- a. Eventually a **Production Request Explosion into DPRs** dialogue box is displayed.
 1. It may take several minutes or even hours for the process to complete.
 2. If the explosion into DPRs is successful, the production request and corresponding DPR(s) are saved in the PDPS database and the Production Request **PR Name** and **Origination Date** fields are automatically updated.

3. If the explosion into DPRs is not successful, the dialogue box contains a message to that effect and it will be necessary to troubleshoot the problem.

- 41 **Single-click** on the **OK** button to dismiss the **Production Request Explosion into DPRs** dialogue box.
 - a. The dialogue box is dismissed.
- 42 To clear the entries on the **Production Request Editor** GUI execute the following menu path:
File → New
 - a. Return to Step 3 to create another new PR.
- 43 To exit the **Production Request Editor** execute the following menu path:
File → Exit

Table 13.2-3. Create a New Production Request - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	Launch Production Request Editor GUI	Use procedure in Section 13.2.1
2	Select PR Edit tab	single-click
3	Select <PR type> from the PR Type: button	single-click
4	Select <user type> from the User Type: button	single-click
5	Enter <originator> in the Originator: field	press Tab
6	Enter <priority> in the Priority: field	press Tab
7	Select PGE... button	single-click
8	Select <PGE> from the PGE Selection list	single-click
9	Select OK	single-click
10	If changing PGE parameters, select PGE Parameters... button	single-click
11	If changing PGE parameters, select <parameter> from the PGE Parameter Mappings list	single-click
12	If changing the PGE parameters, enter <override value> in the Override Value field	enter text
13	If changing PGE parameters, select OK	single-click
14	If changing metadata value(s), select Metadata Checks... button	single-click
15	If changing metadata value(s), select <input data type> from the InputDataType list	single-click
16	If changing metadata value(s), select <metadata field> from the MetaDataField-Operator-Value-Type list	single-click
17	If changing metadata value(s), enter <value> in the Value field	enter text

Table 13.2-3. Create a New Production Request - Quick-Step Procedures (2 of 2)

Step	What to Enter or Select	Action to Take
18	If changing metadata value(s), select OK	single-click
19	If changing alternate input timer settings or the order of inputs, select Alternate Input Values... button	single-click
20	If changing alternate input timer settings or the order of inputs, select <alternate input> from AlternateListName list	single-click
21	If changing alternate input timer settings or the order of inputs, select <alternate input> from Order-DataType-LogicalID-Timer list	single-click
22	If changing the order of alternate inputs, reorder inputs in Order-DataType-LogicalID-Timer list using up/down arrows	single-click
23	If changing alternate input timer settings, enter <hh:mm:ss> in Timer fields	enter text
24	If changing alternate input timer settings or the order of inputs, select OK	single-click
25	Select either Collection Time or Insertion Time (as applicable)	single-click
26	Select either UTC Time or Orbit (as applicable)	single-click
27	Enter <MM/DD/YYYY hh:mm:ss> in the Begin fields (if applicable)	enter text, press Tab
28	Enter the <MM/DD/YYYY hh:mm:ss> in the End fields (if applicable)	enter text, press Tab
29	Enter the < first orbit number> in the From field (if applicable)	enter text
30	Enter < last orbit number> in the To field (if applicable)	enter text
31	Enter <number of DPRs> in the Skip field (if applicable)	enter number
32	Enter <number of DPRs> in the Keep field (if applicable)	enter number
33	Select SkipFirst (if applicable)	single-click
34	Enter <comment> in the Comment field (if applicable)	enter text
35	Execute File → Save As	single-click
36	Enter <PR name> in the Selection field	enter text
37	Select Ok	single-click
38	Select Ok	single-click

13.2.3 Edit/Modify a Production Request

Edits or modifications to a previously created production request result in a new production request. The new production request must be saved with a new name.

Table 13.2-4 presents (in a condensed format) the steps required to edit/modify a production request. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1** Launch the **Production Request Editor** by performing procedure 13.2.1.
 - a. The Production Request Editor GUI is displayed.
- 2** **Single-click** on the **PR Edit** tab.
 - a. The **PR Edit GUI** is displayed.
- 3** To display a list of Production Requests from which to select the PR to be opened execute the following menu path:
File → Open
 - a. A list of Production Requests is displayed in the **File Selection** window.
- 4** Select (highlight) the PR to be edited/modified by **single-clicking** on the corresponding PR name in the list of PRs.
- 5** **Single-click** on the **OK** button.
 - a. The PR information appears in the **PR Edit GUI**.

NOTE: Perform only those steps of the procedure that are applicable to the changes you want to make. You do not have to go through all of the fields in the PR to successfully modify it. However, you must save the modified PR to make the changes effective.

- 6** To change the type of production request select the desired **PR Type** from the option button by **single-clicking** and **holding, moving** the mouse cursor to the desired selection (highlighting it), then **releasing** the mouse button.
- 7** To change the user type select the desired **User Type** from the option button by **single-clicking** and **holding, moving** the mouse cursor to the desired selection (highlighting it), then **releasing** the mouse button.
- 8** To change the originator in the **Originator** field either enter the actual name of the originator or enter:
<username>
- 9** To change the **Production Request Editor Priority** in the **Priority:** field enter:
<Priority>

- 10 If changing the PGE, **single-click** on the **PGE...** button.
 - a. The **PGE** GUI is displayed.
- 11 If changing the PGE, select the desired PGE by **single-clicking** on the PGE.
- 12 If changing the PGE, **single-click** the **Ok** button.
- 13 To change PGE parameters first **single-click** on the **PGE Parameters...** button.
 - a. The **PGE Parameters** GUI displays.
- 14 When changing PGE parameters, select a parameter to be modified by **single-clicking** on the **Parameter Name** row.
 - a. The **parameter** row is highlighted.
- 15 When changing PGE parameters, in the **Override Value** field enter:
<override value>
 - a. Some PGEs may NOT have modifiable parameters.
- 16 When changing PGE parameters, **single-click** on the **Apply** button at the bottom of the **PGE Parameter Mappings** window.
- 17 When changing PGE parameters, **single-click** on the **Ok** button to approve the changes.
 - a. The Production Request Editor GUI is displayed.
- 18 If the PGE is subject to a metadata-based production rule and the value(s) to be checked need(s) to be changed, **single-click** on the **Metadata Checks...** button.
- 19 If it is necessary to change any value(s) for metadata checks, select an input data type with a value to be changed by **single-clicking** on the corresponding row in the **InputDataType** window.
- 20 If it is necessary to change any value(s) for metadata checks, select (highlight) a metadata field with a comparison value to be changed by **single-clicking** on the corresponding row in the **MetaDataField-Operator-Value-Type** window.
- 21 If it is necessary to change any value(s) for metadata checks, in the **Value** field enter:
<value>

- 22 If it is necessary to change any value(s) for metadata checks, **single-click** on the appropriate button from the following selections:
- OK** - to approve the new value and dismiss the **MetadataChecks** GUI.
 - Apply** - to approve the new value without dismissing the **MetadataChecks** GUI.
 - Cancel** - to return to the **Production Request - PR Edit** GUI without saving the new value.
- 23 If the PGE is subject to the **Alternate Inputs Production Rule** and the timer settings or the order of alternate inputs need to be changed, **single-click** on the **Alternate Input Values...** button.
- 24 If it is necessary to change timer settings or the order of alternate inputs, first select (highlight) an alternate input to be changed by **single-clicking** on the corresponding row in the **AlternateListName** window.
- 25 If it is necessary to change timer settings or the order of alternate inputs, select (highlight) an alternate input with timer settings or the order of alternate inputs to be changed by **single-clicking** on the corresponding row in the **Order-DataType-LogicalID-Timer** window.
- 26 If it is necessary to change the order of alternate inputs, **single-click** on the up/down arrow buttons adjacent to the **Order-DataType-LogicalID-Timer** window as necessary until the highlighted alternate input has the proper order listed in the **Order** column of the window.
- 27 If the timer setting for an alternate input is to be modified, verify that the alternate input with the timer setting to be changed has been highlighted then in the **Timer** fields enter:
<hh:mm:ss>
- 28 If it is necessary to change timer settings or the order of alternate inputs, **single-click** on the appropriate button from the following selections:
- OK** - to approve the new alternate input setting(s) and dismiss the **AlternateInputValues** GUI.
 - Apply** - to approve the new alternate input setting(s) without dismissing the **AlternateInputValues** GUI.
 - Cancel** - to return to the **Production Request - PR Edit** GUI without saving the new alternate input setting(s).
- 29 If data are to be processed on the basis of time (rather than orbit), **single-click** on either the **Collection Time** or **Insertion Time** button (as applicable).
- 30 **Single-click** on either the **UTC Time** (Coordinated Universal Time) button or the **Orbit** button, depending on whether data to be processed is specified by time or orbit.
- 31 If data are to be processed on the basis of time and the data start time is to be modified, enter the desired data start date and time in the **Begin** fields in the following format:
<MM/DD/YYYY hh:mm:ss>
- 32 If data are to be processed on the basis of time and the data end time is to be modified, enter the desired data end date and time in the **End** fields in the following format:

<MM/DD/YYYY hh:mm:ss>

- 33 If the Orbital Processing Production Rule applies and the first orbit of data is to be modified, in the **From** field enter:
<*first orbit number*>
- 34 If the Orbital Processing Production Rule applies and the last orbit of data is to be modified, in the **To** field enter:
<*last orbit number*>
- 35 If the Intermittent Activation Production Rule applies and the number of DPRs to skip is to be modified, in the **Skip** field enter:
<*number of DPRs*>
- 36 If the Intermittent Activation Production Rule applies and the number of DPRs to keep is to be modified, in the **Keep** field enter:
<*number of DPRs*>
- 37 If the Intermittent Activation Production Rule applies and the first DPR is to be skipped, verify that the **SkipFirst** button has been activated (**single-click** on the button if necessary).
- 38 If applicable, in the **Comments** field enter:
<*comments*>
- 39 To save the modified production request execute the following menu path:
File → **Save As**
a. File Selection Window appears.
- 40 In the **Selection** field enter:
<*PR name*>
a. Production Request is named.
b. Name must be changed.
- 41 **Single-click** on the **Ok** button.
a. Eventually a **Production Request Explosion into DPRs** dialogue box is displayed.
- 42 **Single-click** on the **OK** button to dismiss the **Production Request Explosion into DPRs** dialogue box.
a. The dialogue box is dismissed.

Table 13.2-4. Edit/Modify a Production Request - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	Launch Production Request Editor	Use procedure in Section 13.2.1
2	Select PR Edit	single-click
3	Execute File → Open	single-click
4	Select <PR name> from the Production Requests: list	single-click
5	Select OK	single-click
6	Modify the <PR type> from the PR Type: button (if applicable)	single-click
7	Modify the <user type> from the User Type: button (if applicable)	single-click
8	Modify the <originator> in the Originator: field (if applicable)	enter text
9	Modify the <priority> in the Priority: field (if applicable)	enter number
10	If changing the PGE, select PGE... button	single-click
11	If changing the PGE, select <PGE> from the PGE Selection list	single-click
12	If changing the PGE, select OK	single-click
13	If changing PGE parameters, select PGE Parameters... button	single-click
14	If changing PGE parameter values, select <parameter> from the PGE Parameter Mappings list	single-click
15	If changing PGE parameter values, enter <override value> in the Override Value field	enter text
16	If changing PGE parameter values, select OK	single-click
17	If changing metadata value(s), select Metadata Checks... button	single-click
18	If changing metadata value(s), select <input data type> from the InputDataType list	single-click
19	If changing metadata value(s), select <metadata field> from the MetaDataField-Operator-Value-Type list	single-click
20	If changing metadata value(s), enter <value> in the Value field	enter text
21	If changing metadata value(s), select OK	single-click
22	If changing alternate input timer settings or the order of inputs, select Alternate Input Values... button	single-click

Table 13.2-4. Edit/Modify a Production Request - Quick-Step Procedures (2 of 2)

Step	What to Enter or Select	Action to Take
23	If changing alternate input timer settings or the order of inputs, select <alternate input> from AlternateListName list	single-click
24	If changing alternate input timer settings or the order of inputs, select <alternate input> from Order-DataType-LogicalID-Timer list	single-click
25	If changing the order of alternate inputs, reorder inputs in Order-DataType-LogicalID-Timer list using up/down arrows	single-click
26	If changing alternate input timer settings, enter <hh:mm:ss> in Timer fields	enter text
27	If changing alternate input timer settings or the order of inputs, select OK	single-click
28	Select either Collection Time or Insertion Time (as applicable)	single-click
29	Select either UTC Time or Orbit (as applicable)	single-click
30	Enter <MM/DD/YYYY hh:mm:ss> in the Begin fields (if applicable)	enter text, press Tab
31	Enter the <MM/DD/YYYY hh:mm:ss> in the End fields (if applicable)	enter text, press Tab
32	Enter the < first orbit number> in the From field (if applicable)	enter number
33	Enter < last orbit number> in the To field (if applicable)	enter number
34	Enter <number of DPRs> in the Skip field (if applicable)	enter number
35	Enter <number of DPRs> in the Keep field (if applicable)	enter number
36	Select SkipFirst (if applicable)	single-click
37	Modify <comment> in the Comment field (if applicable)	enter text
38	Execute File → Save As	single-click
39	Enter <PR name> in the Selection field	enter text
40	Select Ok	single-click
41	Select Ok	single-click

13.2.4 Delete a Production Request

Production Requests can be deleted if necessary. Table 13.2-5 presents (in a condensed format) the steps required to delete Production Requests. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Production Request Editor** (refer to Section 13.2.1).
 - a. The Production Request Editor GUI is displayed.
- 2 **Single-click** on the **PR List** tab.
 - a. The **PR List** GUI is presented.
 - b. A list of Production Requests is displayed.
- 3 If filtering of the list of Production Requests is desired, **single-click** and **hold** the **PR Type** option button to display a menu of types of Production Requests, **move** the mouse cursor to the desired selection (highlighting it), then **release** the mouse button.
 - a. Options are: **All** [default selection], **Routine**, **OnDemand**, and **Reprocessing**.
 - b. A list of Production Requests of the specified type is displayed.
- 4 **Single-click** on the Production Request to be deleted.
 - a. The Production Request to be deleted is highlighted.
- 5 Execute the following menu path:
Edit→**Delete**
 - a. A dialogue box is displayed requesting confirmation of the decision to delete the Production Request.
- 6 **Single-click** on the **OK** button to delete the Production Request.
 - a. If there are no dependencies among Production Requests, a confirmation dialogue box is displayed.
 - b. If there are dependencies among Production Requests, a “List Of Orphan DPRs” dialogue box is displayed.
- 7 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to confirm deletion of the Production Request(s) and dismiss the dialogue box.
 1. A “deletion completed” dialogue box is displayed.
 2. The Production Request(s) is/are deleted.
 - b. **Cancel** - to preserve the Production Request(s) and dismiss the dialogue box.
 1. The dialogue box is dismissed.
 2. The Production Request(s) is/are not deleted.
- 8 **Single-click** on **OK** to dismiss the “deletion completed” dialogue box.
 - a. The “deletion completed” dialogue box is dismissed.
- 9 To start the process of exiting from the **Production Request Editor** GUI execute the following menu path:
File → **Exit**
 - a. A **Do you really want to exit?** dialogue box is displayed.
- 10 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to exit from the Production Request Editor GUI.
 1. The **Production Request Editor** GUI is dismissed.
 - b. **Cancel** - to return to the **Production Request Editor** GUI.

Table 13.2-5. Delete a Production Request - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch Production Request Editor	Use procedure in Section 13.2.1
2	Select PR List tab	single-click
3	Select <PR name> from the Production Requests list	single-click
4	Execute Edit→Delete	single-click
5	Select OK	single-click
6	Select OK	single-click
7	Select OK	single-click

13.2.5 Display Data Processing Request Information

The process of displaying Data Processing Request information begins with the Production Planner launching the Production Request Editor. The Production Planner can review DPRs associated with a specific PR. The Production Planner can review such DPR values as input granule(s), output granule(s), predicted and actual start times, data start time, status, and priority.

Table 13.2-6 presents (in a condensed format) the steps required to display and review DPRs. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Production Request Editor** (refer to Section 13.2.1).
 - a. The Production Request Editor GUI is displayed.
- 2 **Single-click** on the **DPR List** tab.
 - a. The **DPR List** GUI is presented.
- 3 If filtering of the list of Production Requests is desired, **single-click** and **hold** the **PR Type** option button to display a menu of types of Production Requests, **move** the mouse cursor to the desired selection (highlighting it), then **release** the mouse button.
 - a. Options are: **ALL** [default selection], **Routine**, **OnDemand**, and **Reprocessing**.
- 4 **Single-click** on the **Production Request** pull-down arrow.
 - a. A list of Processing Requests is displayed.
- 5 **Single-click** on the Production Request for which a DPR listing is desired.
 - a. The Production Request is entered into the **Production Request** field.
- 6 **Single-click** on the **Filter** button.
 - a. The list of DPRs associated with the selected Production Request is displayed.
- 7 **Single-click** the **DPR View** tab.
 - a. The **DPR View** GUI is displayed.
- 8 Execute the following menu path:

- File → Open**
- a. The **File Selection** GUI is displayed.
- 9** **Single-click** on the desired DPR from list.
- a. DPR appears in the **Selection** field.
- 10** **Single-click** on the **OK** button.
- a. The **DPR** information is displayed on the **DPR View** GUI.
 - b. The **DPR ID** is a modification of the original PGE name.
- 11** Review **Data Processing Request Identification** information displayed.
- a. DPR Name.
 - b. **PR Name.**
 - c. **Origination Date.**
 - d. **Originator.**
 - e. **PGE ID.**
 - f. **Data Start Time.**
 - g. **Data Stop Time.**
- 12** **Single-click** on the **PGE Parameters...** button.
- a. The PGE Parameter Mappings GUI displays.
- 13** Review the **PGE Parameter Mappings** information displayed.
- a. PGE parameter data are displayed in a table that has the following columns:
 1. **Parameter Name.**
 2. **Logical Id.**
 3. **Default Value.**
 4. **Override Value.**
 5. **Description.**
- 14** **Single-click** on the **Ok** button.
- a. The **PGE Parameter Mappings** GUI is dismissed.
 - b. The **DPR View** GUI is displayed.
- 15** **Single-click** on the **PGE File Mappings...** button.
- a. The **UR File Mappings** GUI is displayed.
- 16** Review the **Universal Reference (UR) File Mappings** information displayed.
- a. **Input Data.**
 1. **Logical Id.**
 2. **Granule Id.**
 3. **Start Time(UTC)** (date and time).
 4. **Stop Time (UTC)** (date and time).
 5. **Availability** (date and time).
 6. **UR** (granule universal reference).
 - b. **Output Data** (Displays the same data as shown for Input Data).
- 17** **Single-click** on the **Ok** button.
- a. The **UR File Mappings** GUI is dismissed.
 - b. The **DPR View** GUI is displayed.

- 18 Review the **DPR Status** information displayed.
 - a. Predicted Start Time (date and time).
 - b. **Actual Start Time** (date and time).
 - c. **Priority**.
 - d. **Status**.
 - e. **Predicted** and **Actual Start Times** and **Status** are not displayed if the Production Request has not been scheduled.

- 19 Repeat steps 2 through 18 to review multiple DPRs associated with multiple PRs.

- 20 To start the process of exiting from the **Production Request Editor** GUI execute the following menu path:

File → Exit

 - a. A **Do you really want to exit?** dialogue box is displayed.

- 21 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to exit from the Production Request Editor GUI.
 1. The **Production Request Editor** GUI is dismissed.
 - b. **Cancel** - to return to the **Production Request Editor** GUI.

Table 13.2-6. Display Data Processing Request Information - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch Production Request Editor	Use procedure in Section 13.2.1
2	Select DPR List tab	single-click
3	Select <PR name> from the Production Request option list	single-click
4	Select Filter	single-click
5	Select <DPR ID> from the Data Processing Requests list	single-click
6	Select DPR View tab	single-click
7	Execute File → Open	single-click
8	Select <DPR ID> from the Data Processing Requests list	single-click
9	Select Ok	single-click
10	Review DPR information	read text
11	Select PGE Parameters... button	single-click
12	Review PGE parameters	read text
13	Select OK	single-click
14	Select PGE File Mappings... button	single-click
15	Review input and output granule information	read text
16	Select OK	single-click
17	Repeat Steps 2 through 16 to review additional DPRs	

13.2.6 Delete a Data Processing Request

DPRs can be deleted manually if necessary. Table 13.2-7 presents (in a condensed format) the steps required to delete DPRs. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Production Request Editor** (refer to Section 13.2.1).
 - a. The Production Request Editor GUI is displayed.
- 2 **Single-click** on the **DPR List** tab.
 - a. The **DPR List** GUI is presented.
- 3 If filtering of the list of Production Requests is desired, **single-click** and **hold** the **PR Type** option button to display a menu of types of Production Requests, **move** the mouse cursor to the desired selection (highlighting it), then **release** the mouse button.
 - a. Options are: **ALL** [default selection], **Routine**, **OnDemand**, and **Reprocessing**.
- 4 **Single-click** on the **Production Request** pull-down arrow.
 - a. A list of Production Requests is displayed.
- 5 **Single-click** on the Production Request for which a DPR listing is desired.
 - a. The Production Request is entered into the **Production Request** field.
- 6 **Single-click** on the **Filter** button.
 - a. A list of the DPRs associated with the Production Request is displayed.
- 7 **Single-click** on the DPR to be deleted.
 - a. The DPR to be deleted is highlighted.
- 8 Execute the following menu path:
Edit→Delete
 - a. A DPR deletion confirmation dialogue box is displayed requesting confirmation of the decision to delete the DPR.
- 9 Click on the appropriate button from the following selections:
 - a. **OK** - to confirm deletion of the DPR and dismiss the dialogue box.
 1. A deletion dialogue box is displayed.
 2. The DPR is deleted.
 3. If the DPR was the only DPR in the Production Request, the PR is deleted too.
 - b. **Cancel** - to preserve the DPR and dismiss the dialogue box.
 1. The deletion confirmation dialogue box is dismissed.
 2. The DPR is not deleted.
- 10 Select **OK** to dismiss the dialogue box.
 - a. The dialogue box is dismissed.
- 11 To start the process of exiting from the **Production Request Editor** GUI execute the following menu path:

File → Exit

- a. A **Do you really want to exit?** dialogue box is displayed.

12 Single-click on the appropriate button from the following selections:

- a. **OK** - to exit from the Production Request Editor GUI.
 - 1. The **Production Request Editor** GUI is dismissed.
- b. **Cancel** - to return to the **Production Request Editor** GUI.

Table 13.2-7. Delete a Data Processing Request - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch Production Request Editor	Use procedure in Section 13.2.1
2	Select DPR List tab	single-click
3	Select <PR name> from the Production Request option list	single-click
4	Select Filter	single-click
5	Select <DPR ID> (DPR to be deleted) from the Data Processing Requests list	single-click
6	Execute Edit → Delete	single-click
7	Select OK	single-click
8	Select OK	single-click

13.2.7 Re-Generate Granules Affected by Loss of Files from the Archive

The entry point for this procedure is the “Data Recovery Process” in Chapter 17, including (especially) the “Data Recovery Procedure for Known Files” and “SDSRV Retrieval of Granule Production History Metadata” sections.

The role of this procedure is to initiate production of replacements for granules previously generated within this DAAC but now lost due to failure in the ECS Archive. In order to achieve this, Production Requests (PRs) for the generation of the replacement granules must be created, entered into a Production Plan, and activated.

The PRs are created using the Production Request Editor (PRE). However, first the necessary parameters of the PRs must be retrieved from the Production History file (PH) of the lost granule. The PH file is itself acquired by use of the QA Monitor tool and, though the PH UR is supplied in the input to this process, this can be achieved only by first using the QA Monitor tool to search the SDSRV database for granules matching the lost granule. Hence, this process commences with use in the QA Monitor GUI of the attributes of each lost granule (shortname, versionID etc.) supplied in the input to this procedure. Refer to Chapter 17 for further information on the wider context of this procedure.

The input to this procedure is the “Granules for PDPS Re-Generation” list. This is a list of granules and associated metadata generated by the procedure “SDSRV Retrieval of Granule Production History Metadata” (refer to Chapter 17). While the list can be obtained electronically,

its use in this procedure is line-by-line. However, if available electronically, entries from it can be ‘cut and pasted’ into the input fields of the QA monitor GUI to avoid typing errors.

The outputs of the procedure are as follows:

- a. Granule re-generation Production Requests entered into a production plan.
- b. The “PDPS Residual Granules List” which is a list of Granules which this PDPS can not re-generate or which it has been decided do not justify re-generation. This list is returned to the process in Chapter 17.

Note that the following assumptions apply to the application of this procedure:

- a. The Science Data Server (SDSRV) will provide a list of granules to be regenerated (“Granules for PDPS Re-Generation”). This list will contain information about the granules to be regenerated and a Universal Reference (UR) for the associated Production History tar file.
- b. When reproducing lost granules, all outputs of the PGE, not just those equivalent to the lost granule(s), will be produced and archived.
- c. It cannot be guaranteed that the PGE re-run will use the same inputs as were used during its original execution due to the variability of: Optional/Alternate inputs, Metadata Checks, Metadata Query and other Production Rules.
- d. It is possible that at the time of the original run of PGE, certain optional/alternate inputs were not available, which became available later. During the re-run of the PGE use of those additional or other optional inputs cannot be avoided. However, it can be assumed that an equivalent or better product than the original will be produced as a result.
- e. PDPS maintains a minimal amount of granule level versioning. By design, only the latest version of the granule will be used. If the PGE which is to be re-run uses inputs which have more than one granule level version, PDPS will use only the latest version of those inputs. However, if references to those granules have been deleted from the PDPS database (a delete script, which runs periodically, cleans up unused database entries), then PDPS will choose the first one returned from SDSRV. SDSRV does not guarantee any sort of ordering in this case but PDPS will select the latest granule from those returned (Note: depends on fix to NCR ECSed16326).
- f. At Production Request time, the default values for metadata checks can be overridden. The new values used are stored in the PDPS database but not in the Production History. If, at the time of re-run of the PGE, the references to that PGE have been deleted from PDPS database, the default metadata checks will be used. It is possible, therefore, that these default values will cause this DPR not to be run in this instance; e.g. if the metadata checks had been changed in the original run to be less restrictive. If these types of changes to metadata checks are required in order to get DPRs to run, then it is assumed that these defaults are saved as part of the PGE profile.
- g. In a manner that is similar to Metadata Checks, a Metadata Query specifies a query to be used to determine the input granules to be used for a DPR. For reasons of production timing or updated QA values, a product reproduced at a later date could have different granules used as input. Again, it can be assumed that in this case a better product will result.
- h. Other production rules (e.g., spatial query) could make it impossible to reproduce identical granules.
- i. If a PGE (PGE name, version and profile) has to support lost granules regeneration, then that PGE should not be deleted from the PDPS database. This means, in the SSIT Operational Metadata GUI, the delete flag for that PGE should not be checked.

Table 13.2-8 presents (in a condensed format) the steps required to re-generate granules affected by loss of files from the archive. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1- Determine whether all the granules in the input list “Granules for PDPS Re-Generation” should be reproduced.
 - a. It is possible that some granules need not be reproduced, e.g. because a newer version of that product is available.
 - b. Granules that need not be reproduced should be added to the “PDPS Residual Granules” list. Also, at any time during this process, if it is determined that some granules cannot be regenerated or need not be regenerated, then those granules should be included in the “PDPS Residual Granules” list.

- 2- Retrieve (using the QA Monitor GUI) the Production History tar file from the archive for each granule in the “Granules for PDPS Re-Generation” list that needs to be reproduced.
 - a. Procedures for using the QA Monitor GUI are presented in Chapter 15.
 - b. Use the lost granule’s datatype, and “begin date” and “end date” values that encompass its RangeBeginningDateTime and RangeEndingDateTime. Note that the GUI interprets the dates in UTC format.
 - c. For each granule that meets the query conditions and is displayed on the QA Monitor GUI, the granule’s UR, its Production History tar file’s UR, and the name of the Production History tar file are shown. For only one of the granules will the URs (both the granule UR and the Production History UR) match the URs for this granule in the input list.
 1. If the Query failed or did not return any hit that matched, add the granule to “PDPS Residual Granules” list.
 - d. Retrieve the matching granule.
 1. The Production History tar file will be acquired to a directory that is configurable (the name of the configuration parameter is DpPrQA_DATA_DIR, and the default value for this parameter is \$ECS_HOME/<MODE>/CUSTOM/data/DPS).
 2. The name of the tar file is the one that appears under the column **Production History File Name** on the QA Monitor GUI.
 - e. Note that if more than one granule in the input list maps to the same Production History tar file, then the Production History tar file need not be retrieved multiple times.
 - f. The Production History tar file contains the Process Control File (PCF) which has all the information needed to re-run the PGE. The following particulars have to be extracted from the PCF:
 1. PGE Name.
 2. PGE Version.
 3. PGE Profile ID.
 4. DPR Start time.
 5. DPR Stop time.
 6. PGE runtime parameters and their associated values.

- g. Identification of information in the PCF:
 1. The PGE Name, PGE Version, and the PGE Profile appear in the System Runtime Parameters section of the PCF. They are concatenated (with a # sign to separate them) and appear in the place reserved for “Software ID”.
 2. DPR Start time appears in the User Defined Parameter Section of the PCF under the logical ID 10258.
 3. DPR Stop time also appears in the User Defined Parameter Section of the PCF under logical ID 10259.
 4. All other logical IDs in the User Defined Parameter Section of the PCF form the run time parameters and their associated values. Note the logical ID and its corresponding values.
 5. An automated script could be written to extract the values from the PCF.

- 3- If the PGE name, version and profile that is extracted from the PCF does not appear as an Existing/New PGE, then add the granule that is to be regenerated to the “PDPS Residual Granules” list.

- 4- From the SSIT host, launch the **SSIT Manager** GUI and invoke the **PDPS Operational Metadata** GUI.
 - a. Procedures for using SSI&T tools are presented in Chapter 11.

- 5- If the PGE is not registered, register the PGE using the **PDPS Science Update Metadata Update** from the **SSIT Manager** GUI.
 - a. The PGE must be registered before a production request can be entered.

- 6- If it is decided not to re-register the PGE, add the granule that is to be regenerated to the “PDPS Residual Granules” list.

- 7- From the Planning Workstation, launch the **Production Request Editor** GUI as described in Section 13.2.1.

- 8- Enter a Production Request (as described in Section 13.2.2) for the relevant PGE/version/profile ID.
 - a. Use Reprocessing for the Processing Type.
 - b. Use the **DPR Start** and **Stop Time** listed in the Production History for the **Begin** and **End** times.
 - c. View the default PGE runtime parameters and compare them against the runtime parameters obtained from the Production History tar file.
 1. Modify the runtime parameter values to match exactly what was used in the original run.
 - d. If granules that need to be regenerated are produced by PGEs that are chained, then the production requests must be entered in that order.
 1. For instance, if granules A and B are to be regenerated, and PGEs P1 & P2 produce them and if P1 & P2 are chained (P2 takes P1’s outputs as its inputs) then the production request for P1 must be entered before entering one for P2.

- 9- Launch the Planning Workbench from the Planning Workstation as described in Section 13.3.1.
- 10- Create and activate a production plan that includes the newly created production request(s) as described in Section 13.3.2.
- 11- Return the output (“PDPS Residual Granules”) list to the “Data Recovery Procedure for Known Files” procedure in Chapter 17 for further processing.
 - a. Those granules which were not re-generated by this process are listed in the output (“PDPS Residual Granules”) list.

Table 13.2-8. Re-Generate Granules Affected by Loss of Files from the Archive - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Identify granules to be reproduced	read text
2	Add not-to-be-reproduced granules to the "PDPS Residual Granules "List	enter text
3	Retrieve Production History tar file for each element to be reproduced using the QA Monitor GUI	Use QA Monitor procedures (Chapter 15)
4	Obtain URs from the QA Monitor GUI	Use QA Monitor procedures (Chapter 15)
5	Extract PGE parameters from the Process Control File	Use QA Monitor procedures (Chapter 15)
6	Launch the PDPS Operational Metadata GUI from the SSIT Manager GUI if the applicable PGE is not registered	Use SSIT procedure for launching the PDPS Operational Metadata GUI (Chapter 11)
7	Register the PGE	Use SSIT procedure for registering PGEs (Chapter 11)
8	Launch the Production Request Editor GUI	Use procedure in Section 13.2.1
9	Enter the Production Request for Reprocessing	Use procedure in Section 13.2.2
10	Launch the Planning Workbench	Use procedure in Section 13.3.1
11	Create and activate a plan for the newly created Production Request	Use procedure in Section 13.3.2
12	Return the output (“PDPS Residual Granules”) list to the “Data Recovery Procedure for Known Files” procedure (Chapter 17)	

13.3 Creating/Modifying/Deleting Production Strategies

A Production Strategy is a high-level set of priorities by which the Production Planner defines the rules for priorities and preferences in the processing of DPRs. The Production Planner uses the **Production Strategies** GUI to prepare Production Strategies.

Production Strategies work on two levels. First, the Production Planner can update lists of DPR attributes so that each value an attribute can have is tied to a particular priority. For example, the DPR attribute “PR Type” has three values that may have their default priority of (e.g., 2) changed as follows (on a scale of 1 to 10):

- a. Routine 6
- b. On-Demand 10
- c. Reprocessing 4

Next, the Production Planner can change the weight that each attribute's priority is given. For example, weights (from 1 to 100) might be assigned to the DPR attributes as follows:

- a. PR Type 45
- b. User Type 15
- c. PGE Type 20

A weight is also given to the priority specified when the Production Planner created the Production Request as shown in the following example:

- a. Production Request Editor 20

The total weights assigned to PR Type, User Type, PGE Type and Production Request Editor [Priority] must equal 100.

The values included in the selected strategy are read by the Planning Workbench when prioritizing the DPRs in a production plan.

Finally, there is a Late Start Delta that can be used to increase the priority of all jobs that have been waiting in the Production Queue for more than a day.

Table 13.3-1 provides an Activity Checklist for activities related to the creation of Production Strategies.

Table 13.3-1. Production Strategies - Activity Checklist

Order	Role	Task	Section	Complete?
1	Production Planner	Launch the Production Strategies GUI	(P) 13.3.1	
2	Production Planner	Define or Modify a Production Strategy	(P) 13.3.2	
3	Production Planner	Review the Current Active Strategy	(P) 13.3.3	
4	Production Planner	Delete a Production Strategy	(P) 13.3.4	

13.3.1 Launch the Production Strategies GUI

The Production Strategies GUI is invoked as described in the procedure that follows. Table 13.3-2 presents (in a condensed format) the steps required to launch the Production Strategies GUI. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

- 2 In the terminal window, at the command line prompt, start the log-in to the Planning/Management Workstation by entering:
/tools/bin/ssh <hostname>
 - a. Examples of hostnames include **e0pls03**, **g0pls01**, or **l0pls02**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.

- 3 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
 - a. Go to Step 5.

- 4 At the **<user@remotehost>'s password:** prompt enter:
<Password>

- 5 In the terminal window, at the command line, enter:
cd /usr/ecs/<MODE>/CUSTOM/utilities
 - a. **<MODE>** is current mode of operation.
 1. TS1 - Science Software Integration and Test (SSI&T)
 2. TS2 - New Version Checkout
 3. OPS - Normal Operations
 - b. “utilities” is the directory containing the Planning Subsystem start-up scripts.

- 6 Set the application environment variables by entering:
setenv ECS_HOME /usr/ecs/
 - a. Application home environment is entered
 - b. When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to set it manually.

- 7 Start the Production Strategies GUI by entering:
EcPIProdStratStart <MODE>
 - a. The Production Strategies GUI is launched.

Table 13.3-2. Launch the Production Strategies GUI - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the Planning host using secure shell	enter text, press Enter
2	Enter <code>cd /usr/ecs/<MODE>/CUSTOM/utilities</code>	enter text, press Enter
3	Set the environment variables if necessary	enter text, press Enter
4	Enter <code>EcPIProdStratStart <MODE></code>	enter text, press Enter

13.3.2 Define or Modify a Production Strategy

The Production Planner uses the Production Strategies GUI to develop Production Strategies. Table 13.3-3 presents (in a condensed format) the steps required to define or modify a production strategy. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Production Strategies** GUI (refer to Section 13.3.1).
 - a. The **Production Strategies** GUI is displayed.
- 2 If defining a new production strategy, execute the following menu path:
File → **New**
 - a. The fields of the **Production Strategies** GUI are reset.
- 3 If modifying an existing production strategy, first **single-click** the option button associated with the **Production Strategies** field, then highlight (in the option menu) the name of the production strategy to be modified.
 - a. Data pertaining to the selected production strategy are displayed in the applicable fields of the **Production Strategies** GUI.
 - b. Alternatively, it is possible to execute the following menu path: **File** → **Open**, select the desired production strategy from the list on the **Open** window, and **single-click** on the **Ok** button to open the production strategy.
- 4 If changing the default priority for PR Type, in the **Default** field below the **PR Type** button enter:
<default value>
 - a. The range for the default is from 1 to 10.
- 5 If changing the default priority for User Type, in the **Default** field below the **User Type** button enter:
<default value>
- 6 If changing the default priority for PGE Type, in the **Default** field below the **PGE Type** button enter:
<default value>

- 7 If defining or modifying a priority for a type of production request, first **single-click** on the **PR Type** button.
 - a. The different types of production requests are displayed in the **Type List** field at the bottom left of the GUI.
- 8 If defining a priority for a type of production request **not** currently listed in the **PR Type Value-Priority** list, **single-click** on that PR type in the **Type List** field.
 - a. The PR type is highlighted.
 - b. It is possible to highlight multiple PR types (by **single-clicking** on each one in turn) if they are all going to be assigned the same priority.
- 9 If redefining or deleting a priority for a type of production request **already** listed in the **PR Type Value-Priority** list, **single-click** on that PR type in the **Value-Priority** list.
 - a. The PR type is highlighted.
 - b. It is possible to highlight multiple PR types (by **single-clicking** on each one in turn while holding down either the **Shift** key or the **Ctrl** key) if the same action is going to be taken with respect to all of them.
- 10 If defining or modifying (not deleting) a priority, click on the up/down arrow buttons to the right of the **Priority** field until the desired priority value is displayed in the **Priority** field.
 - a. Alternatively, in the **Priority** field enter:
<priority value>
 - b. The acceptable range for the priority is from 1 to 10.
- 11 **Single-click** on the appropriate button from the following selections:
 - a. **Add** - to approve a priority for an additional PR type and display the selected PR type and priority in the **PR Type Value-Priority** list at the left center of the GUI.
 - b. **Modify** - to approve a revised priority for the selected PR type and display the PR type and modified priority in the **PR Type Value-Priority** list.
 - c. **Delete** - to delete the priority for the selected PR type and remove the PR type and priority from the **PR Type Value-Priority** list.
- 12 Repeat Steps 7 through 11 as necessary until all PR Type priorities (as shown in the **PR Type Value-Priority** field) are correct.
- 13 If defining or modifying a priority for a type of user, first **single-click** on the **User Type** button.
 - a. The different types of users are displayed in the **Type List** field at the bottom left of the GUI.
- 14 If defining a priority for a type of user **not** currently listed in the **User Type Value-Priority** list, **single-click** on that user type in the **Type List** field.
 - a. The user type is highlighted.
 - b. It is possible to highlight multiple user types (by **single-clicking** on each one in turn).
- 15 If redefining or deleting a priority for a user type **already** listed in the **User Type Value-Priority** list, **single-click** on that user type in the **Value-Priority** list.
 - a. The user type is highlighted.
 - b. It is possible to highlight multiple user types (by **single-clicking** on each one in turn while holding down either the **Shift** key or the **Ctrl** key).

- 16 If defining or modifying (not deleting) a priority, click on the up/down arrow buttons to the right of the **Priority** field until the desired priority value is displayed in the **Priority** field.
- Alternatively, in the **Priority** field enter:
<priority value>
 - The acceptable range for the priority is from 1 to 10.
- 17 **Single-click** on the appropriate button from the following selections:
- Add** - to approve a priority for an additional user type and display the selected user type and priority in the **User Type Value-Priority** list near the center of the GUI.
 - Modify** - to approve a revised priority for the selected user type and display the user type and modified priority in the **User Type Value-Priority** list.
 - Delete** - to delete the priority for the selected user type and remove the user type and priority from the **User Type Value-Priority** list.
- 18 Repeat Steps 13 through 17 as necessary until all user type priorities (as shown in the **User Type Value-Priority** field) are correct.
- 19 If defining a priority for a type of PGE, first **single-click** on the **PGE Type** button.
- The different types of PGEs are displayed in the **Type List** field at the bottom left of the GUI.
- 20 If defining a priority for a type of PGE **not** currently listed in the **PGE Type Value-Priority** list, **single-click** on that PGE type in the **Type List** field.
- The PGE type is highlighted.
 - It is possible to highlight multiple PGE types (by **single-clicking** on each one in turn).
- 21 If redefining or deleting a priority for a PGE type **already** listed in the **PGE Type Value-Priority** list, **single-click** on that PGE type in the **Value-Priority** list.
- The PGE type is highlighted.
 - It is possible to highlight multiple PGE types (by **single-clicking** on each one in turn while holding down either the **Shift** key or the **Ctrl** key).
- 22 If defining or modifying (not deleting) a priority, click on the up/down arrow buttons to the right of the **Priority** field until the desired priority value is displayed in the **Priority** field.
- Alternatively, in the **Priority** field enter:
<priority value>
 - The acceptable range for the priority is from 1 to 10.
- 23 **Single-click** on the appropriate button from the following selections:
- Add** - to approve a priority for an additional PGE type and display the selected PGE type and priority in the **PGE Type Value-Priority** list near the center of the GUI.
 - Modify** - to approve a revised priority for the selected PGE type and display the PGE type and modified priority in the **PGE Type Value-Priority** list.
 - Delete** - to delete the priority for the selected PGE type and remove the PGE type and priority from the **PGE Type Value-Priority** list.

- 24 Repeat Steps 19 through 23 as necessary until all PGE type priorities (as shown in the **PGE Type Value-Priority** field) are correct.
- 25 In the **Weight** field below the **PR Type** button enter:
<weight>
- The acceptable range for weights is from 1 to 100.
 - The **Total Weight** field displays updated totals of all weighting factors as they are entered.
 - When entering weights for the **PR Type, User Type, PGE Type, and Production Request Editor** factors, relative values can be entered without regard to whether the values in the four categories add up to 100. The **Normalize** button provides a means of eventually ensuring that the total of all four categories equals 100.
 - The assigned weight in each category is multiplied by the priority for each type. To maintain a high priority (low number, such as one), assign a low weight; to ensure a low priority, assign a relatively high weight.
- 26 In the **Weight** field below the **User Type** button enter:
<weight>
- 27 In the **Weight** field below the **PGE Type** button enter:
<weight>
- 28 In the **Production Request Editor** field enter:
<weight>
- The priority to which the weight is applied is the priority assigned using the Production Request Editor when a production request is created.
- 29 **Single-click** on the **Normalize** button.
- The Planning Subsystem adjusts all weighting factors to produce a total weight of 100 (as displayed in the **Total Weight** field).
- 30 If it is necessary to change the priority of jobs that have been waiting in the Production Queue for more than a day, in the **Late Start Delta Priority** field enter:
<priority value>
- The range for the Late Start Delta Priority is from 1 to 100.
- 31 To start the process of saving the production strategy execute the following menu path:
File → Save As
- A **Save As** window similar to the **File Selection** window is displayed.
- 32 In the **Save As** field enter:
<strategy file name>
- 33 **Single-click** on the appropriate button from the following selections:
- OK** - to accept the file name in the **Save As** field.
 - The **Save As** window is dismissed.

2. The production strategy is saved with the specified file name.
 - b. **Cancel** - to dismiss the **Save As** window without saving the production strategy.
- 34** To start the process of modifying or creating another production strategy execute the following menu path:
- File → New**
- a. Return to Step 3 to modify an existing production strategy.
- 35** To start the process of exiting from the **Production Strategies** GUI execute the following menu path:
- File → Exit**
- a. A **Do you really want to exit?** dialogue box is displayed.
- 36** **Single-click** on the appropriate button from the following selections:
- a. **OK** - to exit from the **Production Strategies** GUI.
 1. The **Production Strategies** GUI is dismissed.
 - b. **Cancel** - to return to the **Production Strategies** GUI.

Table 13.3-3. Define a Production Strategy - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	Launch Production Strategies GUI	Use procedure in Section 13.3.1
2	Execute File → New	single-click
3	Enter <default priority> for PR Type if applicable	enter text
4	Enter <default priority> for User Type if applicable	enter text
5	Enter <default priority> for PGE Type if applicable	enter text
6	Select PR Type button.	single-click
7	Select <PR type> from the Type List field	single-click
8	Enter <priority value> in the Priority field	enter text or single-click as necessary
9	Select Add	single-click
10	Repeat Steps 7 through 9 for additional PR types if applicable	
11	Select User Type button.	single-click
12	Select <user type> from the Type List field	single-click
13	Enter <priority value> in the Priority field	enter text or single-click as necessary
14	Select Add	single-click
15	Repeat Steps 12 through 14 for additional user types if applicable	
16	Select PGE Type button.	single-click
17	Select <PGE type> from the Type List field	single-click
18	Enter <priority value> in the Priority field	enter text or single-click as necessary

Table 13.3-3. Define a Production Strategy - Quick-Step Procedures (2 of 2)

Step	What to Enter or Select	Action to Take
19	Select Add	single-click
20	Repeat Steps 17 through 19 for additional PGE types if applicable	
21	Enter <weight> for PR Type	enter text
22	Enter <weight> for User Type	enter text
23	Enter <weight> for PGE Type	enter text
24	Enter <weight> for Production Request Editor	enter text
25	Select the Normalize button	single-click
26	Enter <priority value> for Late Start Delta Priority	enter text
27	Execute File → Save As	single-click
28	Enter <strategy file name> in the Save As field	enter text
29	Select Ok	single-click
30	Execute File → Exit if desired	single-click
31	Select OK	single-click

13.3.3 Review the Current Active Strategy

The Production Planner uses the Production Strategies GUI to review the production strategy applied to the currently active production plan. Table 13.3-4 presents (in a condensed format) the steps required to review the current active strategy. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Production Strategies** GUI (refer to Section 13.3.1).
 - a. The **Production Strategies** GUI is displayed.
- 2 Execute the following menu path:

Options → **activeStrategy**

 - a. The Active Production Strategy window is displayed.
- 3 Review the data displayed in the **Active Production Strategy** window:
 - a. PR Type.
 1. Weight.
 2. Default [value].
 3. [Individual PR types and values if any are listed.]
 - b. User Type.
 1. Weight.
 2. Default [value].
 3. [Individual user types and values if any are listed.]
 - c. PGE Type.
 1. Weight.
 2. Default [value].

3. [Individual PGE types and values if any are listed.]
 - d. Production Request Editor Weight.
 - e. Late Start Delta Priority.
- 4 To exit from the **Active Production Strategy** window and return to the **Production Strategies** GUI **single-click** on the **Cancel** button.
- a. The **Active Production Strategy** window is dismissed.
 - b. The **Production Strategies** GUI is displayed.

Table 13.3-4. Review the Current Active Strategy - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch Production Strategies GUI	Use procedure in Section 13.3.1
2	Execute Options → activeStrategy	single-click
3	Observe the production strategy information	read text
4	Select Cancel	single-click

13.3.4 Delete a Production Strategy

The Production Planner uses the Production Strategies GUI to delete production strategies that are no longer needed. Table 13.3-5 presents (in a condensed format) the steps required to delete a production strategy. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Production Strategies** GUI (refer to Section 13.3.1).
 - a. The **Production Strategies** GUI is displayed.
- 2 **Single-click** the option button associated with the **Production Strategies** field, then highlight (in the option menu) the name of the production strategy to be deleted.
 - a. Data pertaining to the selected production strategy are displayed in the applicable fields of the **Production Strategies** GUI.
 - b. Alternatively, it is possible to execute the following menu path: **File** → **Open**, select the desired production strategy from the list on the **Open** window, and **single-click** on the **Ok** button to open the production strategy.
- 3 Execute the following menu path:
Edit → **Delete**
 - a. A production strategy deletion confirmation dialogue box is displayed requesting confirmation of the decision to delete the production strategy.
- 4 Click on the appropriate button from the following selections:
 - a. **OK** - to confirm deletion of the production strategy and dismiss the dialogue box.
 1. The deletion confirmation dialogue box is dismissed.
 2. The production strategy is deleted.
 - b. **Cancel** - to preserve the production strategy and dismiss the dialogue box.
 1. The deletion confirmation dialogue box is dismissed.

2. The production strategy is not deleted.
- 5 To start the process of exiting from the **Production Strategies** GUI execute the following menu path:
- File → Exit**
- a. A **Do you really want to exit?** dialogue box is displayed.
- 6 **Single-click** on the appropriate button from the following selections:
- a. **OK** - to exit from the **Production Strategies** GUI.
 1. The **Production Strategies** GUI is dismissed.
 - b. **Cancel** - to return to the **Production Strategies** GUI.

Table 13.3-5. Delete a Production Strategy - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch Production Strategies GUI	Use procedure in Section 13.3.1
2	Select <strategy name> from the Production Strategies option list	single-click
3	Execute Edit → Delete	single-click
4	Select OK	single-click
3	Execute File → Exit	single-click
5	Select OK	single-click

13.4 Creating/Deleting Production Plans

The planning process involves the Production Planner preparing monthly and weekly production plans as well as a daily production schedule from the most current weekly plan. Although production planning varies from DAAC to DAAC, the following guidelines are generally applicable:

- a. Monthly plans.
 1. Developed for the coming month and one or two months in advance.
 2. Produced, reviewed, updated, published and distributed approximately two weeks before the beginning of the month.
 3. Plan for the coming month is used to establish a baseline against which production targets can be measured.
- b. Weekly plans.
 1. Produced, reviewed, updated, published and distributed approximately five days before the beginning of the coming week.
 2. Used to produce a baseline for comparison of planned vs. actual production results.
- c. Daily plan or schedule.
 1. Produced each day for the next processing day.
 2. Developed from the current weekly plan, adjusted to reflect the actual processing accomplished and the actual resources available at the time the daily schedule is generated.

3. The daily plan is the type of plan that is implemented through the **Planning Workbench GUI**.
4. If there is a very large processing volume, it may be advisable to divide the daily plan into multiple plans; e.g., one for each shift or one for each four-hour period.

During normal processing, when reasonably accurate predictions of the processing time for the PGEs are available, the processing schedule should result in a reasonably accurate prediction of when data products will be generated. However, during abnormal situations (e.g., equipment failure), what is actually accomplished could depart significantly from the plan. In such situations, the Production Planner may choose to develop new plans to reflect current events. This process is known as “replanning.”

Table 13.4-1 provides an Activity Checklist for activities related to the creation of Production Plans.

Table 13.4-1. Production Plans - Activity Checklist

Order	Role	Task	Section	Complete?
1	Production Planner	Launch the Planning Workbench and Planning Timeline GUIs	(P) 13.4.1	
2	Production Planner	Create a New Production Plan	(P) 13.4.2	
3	Production Planner	Delete a Production Plan	(P) 13.4.3	
4	Production Planner	Review a Plan Timeline	(P) 13.4.4	

13.4.1 Launch the Planning Workbench and Planning Timeline GUIs

The Planning Workbench and Planning Timeline GUIs are invoked from a UNIX command line prompt. Table 13.4-2 presents (in a condensed format) the steps required to launch the Planning Workbench and Planning Timeline GUIs. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 At the UNIX command line prompt enter:
 - setenv DISPLAY <clientname>:0.0**
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.
- 2 In the terminal window, at the command line prompt, start the log-in to the Planning/Management Workstation by entering:
 - /tools/bin/ssh <hostname>**
 - a. Examples of hostnames include **e0pls03**, **g0pls01**, or **l0pls02**.

- b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.
- 3** If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
- a. Go to Step 5.
- 4** At the **<user@remotehost>'s password:** prompt enter:
<Password>
- 5** In the terminal window, at the command line, enter:
cd /usr/ecs/<MODE>/CUSTOM/utilities
- a. **<MODE>** is current mode of operation.
 - 1. TS1 - Science Software Integration and Test (SSI&T)
 - 2. TS2 - New Version Checkout
 - 3. OPS - Normal Operations
 - b. “utilities” is the directory containing the Planning Subsystem start-up scripts.
- 6** Set the application environment variables by entering:
setenv ECS_HOME /usr/ecs/
- a. Application home environment is entered
 - b. When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to set it manually.
- NOTE:** The selection of a start-up script for launching the **Planning Workbench** GUI depends on the number of DPRs in the PDPS database. If the number is very high (~4000), the **EcPISomeStart** script is used to start the underlying processes (Message Handler, System Name Server, and Resource Model). Then additional scripts are used to start the **Planning Workbench** GUI and the **Production Planning Timeline** GUI. If the number of DPRs in the PDPS database is not very high (less than about 4000), the **EcPIAllStart** script is used to start the underlying processes, **Planning Workbench** GUI and **Production Planning Timeline** GUI.
- 7** If the number of DPRs in the PDPS database is not large (less than about 4000), start the Planning Workbench-related applications by entering:
EcPIAllStart <MODE> <Application_id>
- a. The System Name Server and Resource Model are launched.
 - b. The **Message Handler** GUI is displayed.
 - c. Eventually, the **Planning Workbench** GUI is displayed.
 - d. Then the **Production Planning Timeline** GUI is displayed.

1. The **Production Planning Timeline** GUI usually occupies the entire screen when it is initially displayed.
 - e. The **application_id** or **MSGSRV_ID** is a number from 1 to 5. It identifies the message service in use so messages can be directed to the proper message handler GUI. Consequently, it is a good idea to use the same **application_id** consistently during a production planning session.
 - f. Go to Step 11.
- 8** If the number of DPRs in the database is large (~4000 or more), start the Message Handler, System Name Server, and Resource Model by entering:
- EcPISomeStart <MODE> <Application_id>**
- a. The **Message Handler** GUI is displayed.
 - b. Wait until the Resource Model is completely up before proceeding with starting the **Planning Workbench** GUI.
- 9** If the number of DPRs in the database is large (~4000 or more), start the **Planning Workbench** GUI by entering:
- EcPIWbStart <MODE> <Application_id>**
- a. The **Planning Workbench** GUI is displayed.
- 10** If the number of DPRs in the database is large (~4000 or more), start the **Production Planning Timeline** GUI by entering
- EcPITISart <MODE> <Application_id>**
- a. The **Production Planning Timeline** GUI is displayed.
- 11** If the **Production Planning Timeline** GUI is occupying the whole screen, either **single-click** on the “minimize” icon in the upper right corner of the GUI or adjust the window size and the view of the timeline as necessary using the mouse.
- a. Grab a corner of the timeline window with the cursor and resize the window as desired.

Table 13.4-2. Launch the Planning Workbench and Planning Timeline GUIs - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the Planning host using secure shell	enter text, press Enter
2	Enter cd /usr/ecs/<MODE>/CUSTOM/utilities	enter text, press Enter
3	Set environment variables if necessary	enter text, press Enter
4	Enter EcPIAllStart <MODE> <application_id>	enter text, press Enter

13.4.2 Create a New Production Plan

The Production Planner uses the Planning Workbench when creating a plan for production data processing at the DAAC. The Planning Workbench GUI provides the means by which the Production Planner selects specific PRs whose DPRs are to be run. The planning tool provides a forecast of the start and completion times of the jobs based upon historical experience in running

these PGEs (as determined during the SSI&T process). Through the planning tool, when the generated plan is “activated,” the information included in the plan is transferred to the Data Processing Subsystem and loaded into the Platinum AutoSys tool where production processing is managed.

Table 13.4-3 presents (in a condensed format) the steps required to create a new Production Plan. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the Planning Workbench (refer to Section 13.4.1).
 - a. The **Planning Workbench** and **Planning Timeline** GUIs are displayed.
- 2 Execute the following menu path on the **Planning Workbench GUI**:
File → New
 - a. The **New Plan** window is displayed.
- 3 In the **Plan Names** field enter:
<plan name>
 - a. Name is displayed in **Plan Names** field.
 - b. Status is **Candidate**.
- 4 **Single-click** on the appropriate button from the following selections:
 - a. **Ok** - to accept the file name in the **Plan Names** field.
 1. The **New Plan** window is dismissed.
 2. The production plan is saved with the specified file name.
 - b. **Apply** - to save the production plan without dismissing the **New Plan** window.
 1. The production plan is saved with the specified file name.
 - c. **Cancel** - to dismiss the **New Plan** window without saving the production plan.
- 5 If applicable, **single-click** on the option button associated with the **Strategy** field, then select the desired production strategy from the option menu.
- 6 If applicable, in the **Comment** field enter:
<comment>
- 7 Select a Production Request to be scheduled by **single-clicking** on the request line and **single-clicking** on **schedule/unschedule** up and down arrows to move the Production Request from the **Unscheduled** panel to the **Scheduled** panel or vice versa.
 - a. Production Request will appear in the appropriate panel.
 - b. Operator can **single-click** on multiple Production Requests to add them all at the same time.
 - c. If the PR depends upon another PR that is not scheduled, then the following message is displayed: “Production Request ‘xxx’ must be selected before DPR ‘yyy’ of Production Request ‘zzz’ can be scheduled.”
 - d. If all DPRs associated with a PR have been run, the PR cannot be rescheduled.
 - e. If processing of the currently active plan is to be continued when the new plan is activated, include the PR(s) for the currently active plan in the new plan.

- f. In the **Scheduled** list, items with the prefix “GE_” are resource reservations (also called “ground events”).
 - g. All ground events are automatically scheduled with any plan; therefore, the ground events are normally displayed in the Scheduled list.
 - h. Whenever a plan is activated, the ground events are activated as well as the DPRs associated with the specified PRs.
 - i. If a ground event appears in the **Unscheduled** list, the ground event has lost allocations.
- 8** If the priority of any PR in the **Scheduled** list needs to be changed, perform Steps 9 through 13; otherwise go to Step 14.
- 9** **Single-click** on the PR entry in the **Scheduled** list to highlight it.
- 10** **Single-click** on the **Prioritize** button.
- a. The **Priority popup** window is displayed.
- 11** In the **Production Request(s) priority** field enter:
<priority value>
- 12** **Single-click** on the appropriate button from the following selections:
- a. **OK** - to accept the new priority in the **Production Request(s) priority** field.
 - 1. The **Priority popup** window is dismissed.
 - 2. The new priority for the PR is saved in the database.
 - b. **Cancel** - to dismiss the **Priority popup** window without saving the new priority.
- 13** Repeat Steps 9 through 12 for any additional PR(s) needing a change of priority.
- 14** Execute the following menu path:
File → **Save As**
- a. The **Save Plan** window is displayed.
- 15** If the *plan name* for the production plan is not displayed in the **Plan Names** field, enter:
<plan name>
- 16** **Single-click** on the appropriate button from the following selections:
- a. **Ok** - to accept the file name in the **Plan Names** field.
 - 1. The **Save Plan** window is dismissed.
 - 2. The production plan is saved with the specified file name.
 - 3. The **Planning Workbench** GUI is displayed.
 - 4. The **Plan Name** is displayed.
 - 5. The **Status** displayed is **Candidate**.
 - b. **Apply** - to save the production plan without dismissing the **Save Plan** window.
 - 1. The production plan is saved with the specified file name.
 - c. **Cancel** - to dismiss the **Save Plan** window without saving the production plan.
- 17** If the plan is to be activated immediately, perform Steps 18 and 19; otherwise go to Step 20.

- 18 **Single-click** on the **Activate** button.
- a. A **Confirm Activation** dialogue box is displayed.
- 19 **Single-click** on the appropriate button from the following selections:
- a. **Yes** - to activate the plan.
 1. The **Confirm Activation** dialogue box is dismissed.
 2. The new plan is activated.
 3. The time of plan activation is displayed next to **Rollover Time** on the **Planning Workbench** GUI.
 4. When a plan is activated the Data Processing Requests (DPRs) associated with the planned PRs are transferred to Job Management in the Data Processing Subsystem.
 5. Once its data dependencies have been satisfied, each DPR is “released” to be run as processing resources become available.
 6. Activating a new plan causes the current active plan to get "replanned over" by the selected plan.
 - b. **No** – to dismiss the **Confirm Activation** dialogue box without activating the plan.
- 20 If it is desired to baseline the plan, perform Steps 21 through 25; otherwise go to Step 26.
- 21 **Single-click** on the **Baseline** button.
- a. A confirmation dialogue box containing the message **The current plan is <Plan Name>. Do you wish to baseline it?** is displayed.
 - b. Clicking on the **Baseline** button records the plan and the time of baselining.
 - c. A baseline plan can be used as a point of comparison with which to compare future plans and results.
- 22 If it is desired to baseline the plan, **single-click** on the appropriate button from the following selections:
- a. **Yes** - to baseline the plan.
 1. The confirmation dialogue box containing the message **The current plan is <Plan Name>. Do you wish to baseline it?** is dismissed.
 2. The plan is baselined.
 - b. **No** – to dismiss the confirmation dialogue box containing the message **The current plan is <Plan Name>. Do you wish to baseline it?** without baselining the plan.
- 23 Execute the following menu path:
- File → Save As**
- a. The **Save Plan** window is displayed.
- 24 If the *plan name* for the production plan is not displayed in the **Plan Names** field, enter:
<plan name>
- 25 **Single-click** on the appropriate button from the following selections:
- a. **Ok** - to accept the file name in the **Plan Names** field.
 1. The **Save Plan** window is dismissed.
 2. The production plan is saved with the specified file name.
 - b. **Apply** - to save the production plan without dismissing the **Save Plan** window.
 1. The production plan is saved with the specified file name.

- c. **Cancel** - to dismiss the **Save Plan** window without saving the production plan as a baseline plan.
- 26** Repeat Steps 1 through 25 to perform additional production planning activities.
- 27** To view the **Planning Timeline** perform the procedure in Section 13.4.3.
- 28** To quit the **Planning Workbench** GUI when production planning is complete execute the following menu path:
File → Exit
- 29** After quitting the **Planning Workbench** GUI **single-click** in the UNIX window used to start the **Planning Workbench** GUI.
- a. The Message Handler, System Name Server, and Resource Model should be shut down to eliminate unneeded processes and allow other operators to gain access to the Planning Workbench if necessary.
- 30** Shut down Planning Workbench-related applications by entering:
EcPISlayAll <MODE> <Application_id>
- a. The following Planning Workbench-related applications shut down:
 1. Planning Workbench (if it has not already been shut down).
 2. Planning Timeline (if it has not already been shut down).
 3. Message Handler.
 4. System Name Server.
 5. Resource Model.
- 31** Obtain a list of active processes in the specified mode by entering:
ps -ef | grep <MODE>
- a. A list of active processes in the specified mode is displayed.
 - b. If an error message is received when **ps -ef | grep <MODE>** is entered, enter:
ps -auxwww | grep <MODE>
- 32** Examine the list of processes running in the specified mode to determine whether the Message Handler, System Name Server, and Resource Model processes have actually been shut down.
- a. None of the following processes should be active:
 1. EcPIWb
 2. EcPITI
 3. EcPIMsh
 4. EcPISns
 5. EcPIRm
- 33** If any of the specified processes [especially the Message Handler, System Name Server, and/or Resource Model process(es)] is/are still active, terminate the active process(es) by entering:
kill -15 <PROCESS_ID1> <PROCESS_ID2> <...> <PROCESS_IDx>
- 34** Repeat Steps 31 through 33 as necessary.

Table 13.4-3. Create a New Production Plan - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch Planning Workbench	Use procedure in Section 13.4.1
2	Execute File → New	single-click
3	Enter <plan name>	enter text
4	Select Ok	single-click
5	Select <strategy> from Strategy button	single-click
6	Select <Production Request(s)> to schedule/unschedule	single-click
7	Select Schedule button or Unschedule button as applicable	single-click
8	Execute File → Save As	single-click
9	Enter <plan name>	enter text
10	Select Ok	single-click
11	Select Activate if applicable	single-click
12	Select Yes if applicable	single-click
13	Select Baseline if applicable	single-click
14	Select Yes if applicable	single-click
15	Execute File → Save As if applicable	single-click
16	Enter <plan name> if applicable	enter text
17	Select Ok if applicable	single-click
18	View the Planning Timeline if desired	Use procedure in Section 13.4.3
19	Execute File → Exit	single-click
20	Enter EcPISlayAll <MODE> <Application_id>	enter text, press Enter
21	Enter ps -ef grep <MODE>	enter text, press Enter
22	Enter kill -15 <PROCESS_ID1> <PROCESS_ID2> <...> <PROCESS_IDx> to terminate active process(es) if necessary	enter text, press Enter

13.4.3 Delete a Production Plan

The Production Planner uses the Planning Workbench GUI to delete production plans that are no longer needed. Table 13.4-4 presents (in a condensed format) the steps required to delete a production plan. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Planning Workbench** GUI (refer to Section 13.4.1).
 - a. The **Planning Workbench** GUI is displayed.
- 2 Execute the following menu path:
 - File → Open**
 - a. The **Open Plan** window is displayed.

- b. A list of Production Plans is displayed in the **Open Plan** window.
- 3** Select (highlight) the production plan to be deleted by **single-clicking** on the corresponding name in the list of plans.
- a. The plan name is displayed in the **Plan Names** field of the **Open Plan** window.
- 4** **Single-click** on the **OK** button.
- a. The **Open Plan** window is dismissed.
 - b. The plan information is displayed on the **Planning Workbench** GUI.
- 5** Execute the following menu path:
- File → Delete**
- a. The production plan is deleted.
- 6** To quit the **Planning Workbench** GUI execute the following menu path:
- File → Exit**
- 7** After quitting the **Planning Workbench** GUI **single-click** in the UNIX window used to start the **Planning Workbench** GUI.
- a. The Message Handler, System Name Server, and Resource Model should be shut down to eliminate unneeded processes and allow other operators to gain access to the Planning Workbench if necessary.
- 8** Shut down Planning Workbench-related applications by entering:
- EcPISlayAll <MODE> <Application_id>**
- a. The following Planning Workbench-related applications shut down:
 1. Planning Workbench (if it has not already been shut down).
 2. Planning Timeline (if it has not already been shut down).
 3. Message Handler.
 4. System Name Server.
 5. Resource Model.
- 9** Obtain a list of active processes in the specified mode by entering:
- ps -ef | grep <MODE>**
- a. A list of active processes in the specified mode is displayed.
 - b. If an error message is received when **ps -ef | grep <MODE>** is entered, enter:

ps -auxwww | grep <MODE>
- 10** Examine the list of processes running in the specified mode to determine whether the Message Handler, System Name Server, and Resource Model processes have actually been shut down.
- a. None of the following processes should be active:
 1. EcPIWb
 2. EcPITI
 3. EcPlMsh
 4. EcPlSns
 5. EcPlRm

- 11 If any of the specified processes [especially the Message Handler, System Name Server, and/or Resource Model process(es)] is/are still active, terminate the active process(es) by entering:
kill -15 <PROCESS_ID1> <PROCESS_ID2> <...> <PROCESS_IDx>
- 12 Repeat Steps 9 through 11 as necessary.

Table 13.4-4. Delete a Production Plan - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch Planning Workbench GUI	Use procedure in Section 13.4.1
2	Execute File → Open	single-click
3	Select <plan name> from the Production Requests list	single-click
4	Select OK	single-click
5	Execute File→Delete	single-click
6	Execute File → Exit	single-click
7	Enter EcPISlayAll <MODE> <Application_id>	enter text, press Enter
8	Enter ps -ef grep <MODE>	enter text, press Enter
9	Enter kill -15 <PROCESS_ID1> <PROCESS_ID2> <...> <PROCESS_IDx> to terminate active process(es) if necessary	enter text, press Enter

13.4.4 Review a Plan Timeline

Table 13.4-5 presents (in a condensed format) the steps required to review planning timelines. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Planning Workbench** and **Timeline** GUIs (refer to Section 13.4.1).
 - a. The **Planning Timeline** GUI is displayed.
 - b. If you have previously saved a configuration file, you may load it by executing the following menu path:
File → Load Configuration
 1. Change directory in GUI box, if necessary.
 - c. Otherwise continue with Step 2.
- 2 Execute the following menu path:
File → Open Plan
 - a. The **Open Plan** window is displayed with a list of plans.
- 3 **Single-click** on the name (in the **Items** list) of the plan to be reviewed.

- 4 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to open the selected plan and dismiss the **Open Plan** window.
 1. The timeline for the specific plan is displayed.
 2. Name is displayed in the Title bar.
 - b. **Apply** - to open the selected plan without dismissing the **Open Plan** window.
 1. The timeline for the specific plan is displayed.
 2. Name is displayed in the Title bar.
 - c. **Cancel** - to dismiss the **Open Plan** window without opening any plan.

- 5 Observe the production plan information displayed on the timeline GUI.

- 6 If a different time scale (start and end dates and times) is desired, perform Steps 7 through 10; otherwise, go to Step 11.

- 7 Execute the following menu path:
Time → Change Plan Window
 - a. The **plan window edit** window appears with default times.

- 8 In the **Plan Win Start** fields enter the start date and time in the following formats:
<DD MMM YYYY> <hh:mm:ss>

- 9 In the **Plan Win End** fields enter the end date and time in the following formats:
<DD MMM YYYY> <hh:mm:ss>

- 10 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to accept the changes and dismiss the **plan window edit** window.
 - b. **Apply** - to accept the changes without dismissing the **plan window edit** window.
 - c. **Cancel** - to cancel the changes and dismiss the **plan window edit** window.

- 11 If a different time span is desired, **single-click** on the **Show** pushbutton and select one of 11 time increments between **5 min** and **168 hrs** for the timeline scale.
 - a. The entry “**other**” has no purpose at this time.

- 12 If no resources are displayed on the GUI or if different resources should be displayed, perform Steps 13 through 19; otherwise, go to Step 20.

- 13 Execute the following menu path:
Display → Change resources
 - a. Resource edit window with lists of Available Resources and Viewed Resources is displayed.

- 14 **Single-click** resource(s) in desired list.
 - a. Multiple resources may be selected by single-clicking each desired resource.

- 15 **Single-click** either **Add** or **Del**.
 - a. **Add** to move the resource(s) from the **Available** list to the **Viewed** list.
 - b. **Del** to remove items from the **Viewed** List.

- 16 To change the order in which resources are displayed on the timeline, **single-click** on an item in the **Viewed Resources** list.
- 17 To change the order in which resources are displayed on the timeline, **single-click** on the **up** or **down** arrow(s) as appropriate.
 - a. Selected resource moves up or down in order on the list.
- 18 Repeat Steps 16 and 17 as necessary.
- 19 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to accept the changes and dismiss the **Resource edit** window.
 - b. **Apply** - to accept the changes without dismissing the **Resource edit** window.
 - c. **Cancel** - to cancel the changes and dismiss the **Resource edit** window.
- 20 If different color coding of the timeline is desired, perform Steps 21 through 25; otherwise, go to Step 26.
- 21 Execute the following menu path:
Display → **Change colors**
 - a. Color grid appears with a list of Production Requests.
- 22 **Single-click** on the Production Request name.
- 23 **Single-click** on the desired color for the Production Request.
 - a. New color appears on the horizontal bar between color and Production Request selections.
- 24 Repeat Steps 22 and 23 as necessary.
- 25 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to accept the changes and dismiss the **Color Selections** window.
 - b. **Apply** - to accept the changes without dismissing the **Color Selections** window.
 - c. **Cancel** - to cancel the changes and dismiss the **Color Selections** window.
- 26 Observe the production plan information displayed on the timeline GUI.

27 If desired, save the current configuration as a file by executing the following menu path:
File → Save Configuration

28 **Single-click** on the appropriate button from the following selections:
OK - to save the configuration and dismiss the **Color Selections** window.
Apply - to save the configuration without dismissing the **Color Selections** window.
Cancel - to dismiss the **Color Selections** window without saving the configuration.

29 To exit the **Planning Master Timeline** GUI, execute the following menu path:
File → Exit
The **Planning Master Timeline** GUI is dismissed.

Table 13.4-5 Review a Plan Timeline - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	Launch Planning Workbench and Timeline	Use procedure in Section 13.4.1
2	Load configuration file (execute File → Load Configuration) (optional)	single-click
3	Execute File → Open Plan	single-click
4	Select <plan name>	single-click
5	Select Ok	single-click
6	Observe the production plan information	read text
7	Execute Time → Change Plan window	single-click
8	Enter <DD MMM YYYY> <hh:mm:ss> in Plan Win Start fields	enter text
9	Enter <DD MMM YYYY> <hh:mm:ss> in Plan Win End fields	enter text
10	Select Ok	single-click
11	Select <time span> from Show pushbutton	single-click
12	Execute Display → Change resources	single-click
13	Select <resources>	single-click
14	Select Add	single-click
15	Select <viewed resource> to be reordered	single-click
16	Reorder viewed resources using up/down arrows	single-click
17	Select Ok	single-click
18	Execute Display → Change colors	single-click
19	Select <Production Request>	single-click
20	Select <color> for Production Request	single-click
21	Select Ok	single-click
22	Observe the production plan information	read text
23	Execute File → Save Configuration	single-click

Table 13.4-5 Review a Plan Timeline - Quick-Step Procedures (2 of 2)

Step	What to Enter or Select	Action to Take
24	Enter <file name>	enter text
25	Select Ok	single-click
26	Execute File → Exit	single-click

13.5 Resetting/Cleaning the PDPS Database and DPS Disks

Among the scripts in the /usr/ecs/<MODE>/CUSTOM/utilities directory on the Planning/Management Workstation are scripts for performing the following functions:

- a. Resetting databases.
- b. Listing available saved databases.
- c. Saving databases.
- d. Cleaning up tables in a PDPS database.
- e. Ensuring consistency between the file references in various tables in the PDPS database and the files actually staged on the data processing disks.

Table 13.5-1 provides an Activity Checklist for activities related to resetting/cleaning the PDPS database.

Table 13.5-1. Database Cleaning - Activity Checklist

Order	Role	Task	Section	Complete?
1	Production Planner Database Administrator	Save and/or Reset the PDPS Database	(P) 13.5.1	
2	Production Planner Database Administrator	Clean the PDPS Database	(P) 13.5.2	
3	Production Planner Database Administrator	Clean DPS Disks	(P) 13.5.3	

13.5.1 Save and/or Reset the PDPS Database

The utilities directory (/usr/ecs/MODE/CUSTOM/utilities) contains the following three scripts that are used in resetting the database:

- a. reset_db.
- b. list_db.
- c. save_db.

Saving the database using the save_db script produces one ASCII file (with a “.dat” extension) for each database table and writes each file to a specified directory. The saved data can be

restored to the database by running the `reset_db` script with the name of the saved database as an argument.

Resetting the database involves clearing (“wiping out”) the data in the database tables and loading values from a specified “saved database” file. It is important to take into consideration the consequences of resetting the database before performing the procedure. Resetting the database removes and replaces **all** Resource Definitions, Resource Reservations (Ground Events), Production Requests, Data Processing Requests, and Production Plans. There should be coordination with all affected parties, including the Resource Planner, Production Planner, and Production Monitors concerning the effects of resetting the database as well as its after-effects (e.g., recreating resource definitions, resource reservations, and production requests).

Whenever the PDPS database is reset (not including database cleanup by running the `EcPIDbClean` script) it is also necessary to remove all PLS subscriptions in the Communications Subsystem (CSS) Subscription Server database (where the subscriber is Subscription Manager). Production personnel can remove the subscriptions using the Subscription Server GUI (`EcSbSubServerGUI`) if they have access to the GUI. Otherwise, they can request User Services personnel to remove the subscriptions.

As a result of removing the subscriptions, no subscription notification will come through for existing jobs in the newly loaded database. Only new jobs generated using the Production Request Editor will work normally with regard to subscriptions.

The scripts used in saving and/or resetting the database are invoked from a UNIX command line prompt. Table 13.5-2 presents (in a condensed format) the steps required to save and/or reset the PDPS database. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

NOTE: It is important to log in as a user who has “write” permission in the `saved_dumps` directory (`/usr/ecs/MODE/CUSTOM/utilities/saved_db/saved_dumps`); otherwise it will not be possible to save database contents.

1 At the UNIX command line prompt enter:

setenv DISPLAY <clientname>:0.0

- a. Use either the X terminal/workstation IP address or the machine-name for the `clientname`.
- b. When using secure shell, the `DISPLAY` variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

2 In the terminal window, at the command line prompt, start the log-in to the Planning/Management Workstation by entering:

/tools/bin/ssh <hostname>

- a. Examples of hostnames include **e0pls03**, **g0pls01**, or **l0pls02**.

- b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.
- 3** If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
- a. Go to Step 5.
- 4** At the **<user@remotehost>'s password:** prompt enter:
<Password>
- 5** In the terminal window, at the command line, enter:
cd /usr/ecs/<MODE>/CUSTOM/utilities
- a. **<MODE>** is current mode of operation.
 - 1. TS1 - Science Software Integration and Test (SSI&T)
 - 2. TS2 - New Version Checkout
 - 3. OPS - Normal Operations
 - b. “utilities” is the directory containing the Planning Subsystem start-up scripts.
- 6** Set the application environment variables by entering:
setenv ECS_HOME /usr/ecs/
- a. Application home environment is entered
 - b. When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to set it manually.
- 7** If saving the current database is desired, start the process of saving the database by entering:
save_db <Saved_DB_Name>
- a. **<Saved_DB_Name>** is the desired name for the directory into which the data files will be written.
 - b. If there is not already a directory with the specified **<Saved_DB_Name>**, a "**Making directory...**" message is displayed.
 - c. If there is already a directory with the specified **<Saved_DB_Name>**, the following prompt is displayed:
Are you sure you wish you overwrite previously saved version of <Saved_DB_Name>? (Y/N)
- 8** If the prompt **Are you sure you wish you overwrite previously saved version of <Saved_DB_Name>? (Y/N)** appears, enter either **Y** or **N** (as appropriate)
- a. If **y** is entered, the data are saved in the specified directory, replacing the data that had previously been saved there.
 - b. If **n** is entered, an “**Exiting without saving database...**” message is displayed.

- 9 If obtaining a listing of saved databases is desired, generate a listing of the saved databases by entering:

list_db

- a. A listing of saved databases is displayed.
- b. The listing is a useful tool to display the options for resetting the database.

- 10 If resetting the current database is desired, start the database reset process by entering:

reset_db <Saved_DB_Name>

- a. <Saved_DB_Name> refers to the name of the directory containing the data files to be loaded into the database.
- b. The data in the database are replaced with the data from the specified directory.
- c. When the database has been reset a "**Successfully reset the database to <Saved_DB_Name>**" message is displayed.

Table 13.5-2. Save and/or Reset the PDPS Database - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the Planning host using secure shell	enter text, press Enter
2	Enter cd /usr/ecs/<MODE>/CUSTOM/utilities	enter text, press Enter
3	Set environment variables if necessary	enter text, press Enter
4	If saving the current database is desired, enter save_db <Saved_DB_Name>	enter text, press Enter
5	If applicable, enter Y or N to overwrite previously saved version of database or not	enter text, press Enter
6	If obtaining a listing of saved databases is desired, enter list_db	enter text, press Enter
7	If resetting the current database is desired, enter reset_db <Saved_DB_Name>	enter text, press Enter

13.5.2 Clean the PDPS Database

In the /usr/ecs/<MODE>/CUSTOM/utilities directory on the Planning/Management Workstation there is a script that can be run to clean up some tables in a PDPS database. When it runs, the script tries to delete applicable records in the following order:

- a. Data Processing Requests based on timeStamp completionState(SUCC_DEL).
- b. Production Requests that have no associated DPRs.
- c. Dynamic data granules that are not used by any DPR or by the Data Processing Subsystem.
- d. List of data granules that are not deleted because of Data Processing Subsystem usage.
- e. PGEs marked with a deleteFlag.
- f. Science Software that has no associated PGE.

The database cleaning script is invoked from a UNIX command line prompt. Table 13.5-3 presents (in a condensed format) the steps required to clean the PDPS database. If you are

already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

- 2 In the terminal window, at the command line prompt, start the log-in to the Planning/Management Workstation by entering:
/tools/bin/ssh <hostname>
 - a. Examples of hostnames include **e0pls03**, **g0pls01**, or **l0pls02**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.

- 3 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
 - a. Go to Step 5.

- 4 At the **<user@remotehost>'s password:** prompt enter:
<Password>

- 5 In the terminal window, at the command line, enter:
cd /usr/ecs/<MODE>/CUSTOM/utilities
 - a. **<MODE>** is current mode of operation.
 1. TS1 - Science Software Integration and Test (SSI&T)
 2. TS2 - New Version Checkout
 3. OPS - Normal Operations
 - b. “utilities” is the directory containing the Planning Subsystem start-up scripts.

- 6 Set the application environment variables by entering:
setenv ECS_HOME /usr/ecs/
 - a. Application home environment is entered
 - b. When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to set it manually.

- 7 Start the database cleaning script by entering:

EcPIDbClean <MODE> <dbuser> <dbpassword> <dbserver> <months> <days>

- a. <dbuser> is the user name for logging in to isql.
- b. <dbpassword> is the password for isql login.
- c. <dbserver> refers to the name of the PDPS database server (e.g., x0pls02_srvr).
- d. <months> is a number specifying the removal of records that are older than that number of months.
- e. <days> is an optional argument. It is a number that specifies the removal of records that are older than that number of days.
- f. Both <months> and <days> are taken into account by the cleaning script.

- 8 Observe the results as the script runs.
 - a. A UNIX command line prompt is displayed when the script has finished.

Table 13.5-3. Clean the PDPS Database - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the Planning host using secure shell	enter text, press Enter
2	Enter cd /usr/ecs/<MODE>/CUSTOM/utilities	enter text, press Enter
3	Set environment variables if necessary	enter text, press Enter
4	Enter EcPIDbClean <MODE> <dbserver> <dbuser> <dbpassword> <months> <days>	enter text, press Enter
5	Observe script results	read text

13.5.3 Clean DPS Disks

In the /usr/ecs/MODE/CUSTOM/utilities directory on the Queuing Server there is a script (i.e., EcDpPrRmFilesWOGgranules.pl) that can be run to ensure consistency between the file references in various tables in the PDPS database and the files actually staged on the data processing disks. When it runs, the script performs the following functions:

- a. Generates a list of files with consistent references among various tables in the PDPS database for the specified mode.
- b. Checks for files on the disk that are not included in the list of files referenced in the PDPS database and either lists the inconsistent files or generates a script to delete them (as specified by the person running the script).
- c. Checks to determine whether the disk partitions referenced in the PDPS database actually exist on the disk(s).
 1. If the disk partitions are not on the disk(s), the script removes references to them from the database.
- d. Removes all file references in the PDPS database that are not included in the list of files.
 1. The script resets the PIRscDiskPartition according to the remaining DpPrDiskPartition entries (if specified by the person running the script).

The script for cleaning DPS disks is invoked from a UNIX command line prompt. Table 13.5-4 presents (in a condensed format) the steps required to clean the DPS disks. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the

system, or have not performed this task recently, you should use the following detailed procedures.

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

- 2 In the terminal window, at the command line prompt, start the log-in to the Queuing Server by entering:
/tools/bin/ssh <hostname>
 - a. Examples of hostnames include **e0sps04**, **g0sps06**, or **l0sps03**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.

- 3 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
 - a. Go to Step 5.

- 4 At the **<user@remotehost>'s password:** prompt enter:
<Password>

- 5 In the terminal window, at the command line, enter:
cd /usr/ecs/<MODE>/CUSTOM/utilities
 - a. **<MODE>** is current mode of operation.
 1. TS1 - Science Software Integration and Test (SSI&T)
 2. TS2 - New Version Checkout
 3. OPS - Normal Operations
 - b. “utilities” is the directory containing the Planning Subsystem start-up scripts.

- 6 Start the database cleaning script by entering:
EcDpPrRmFilesWOGgranules.pl <dbuser> <dbpassword> <MODE> <dbserver>
fix [or nofix]
 - a. **<dbuser>** is the user name for logging in to isql.
 - b. **<dbpassword>** is the password for isql login.
 - c. **<dbserver>** refers to the name of the PDPS database server (e.g., x0pls02_srvr).
 - d. **fix** (or **nofix**) specifies whether or not inconsistent files are removed from the data processing disks.

- e. An option is to add **>& fix.log** or **>& /usr/ecs/*MODE*/CUSTOM/logs/fix.log** to the end of the command line to direct the output of the script to a log file.
- f. For example:

EcDpPrRmFilesWOGranules.pl pdpsUsers password1 OPS x0pls01_svr nofix

- 7. Observe the results as the script runs.
 - a. A UNIX command line prompt is displayed when the script has finished.

Table 13.5-4. Clean DPS Disks - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the Planning host using secure shell	enter text, press Enter
2	Enter cd /usr/ecs/<MODE>/CUSTOM/utilities	enter text, press Enter
3	Set environment variables if necessary	enter text, press Enter
4	Enter EcDpPrRmFilesWOGranules.pl <dbuser> <dbpassword> <MODE> <dbserver> fix [or nofix]	enter text, press Enter
5	Observe script results	read text

13.6 Tuning System Parameters

The Production Planner works with the rest of the production team (i.e, Resource Planner and Production Monitors) to tune system parameters. Detailed procedures are included in Chapter 14, Production Processing.

14. Production Processing

14.1 Production Processing Process

The Data Processing Subsystem provides a batch processing environment to support the generation of data products. It manages, queues, and executes Data Processing Requests (DPR) on the processing resources at a DAAC. A DPR can be defined as one science processing job. Each DPR encapsulates all of the information needed to execute the processing job. DPRs are submitted from the Planning Subsystem and their processing is triggered by the availability of their input data.

DPRs use Product Generation Executives (PGEs) to perform processing. PGEs result from the integration and test of delivered science algorithms and also user-specific methods in the Data Processing Subsystem. They are encapsulated in the ECS environment through the SDP Toolkit. The Data Processing Subsystem provides the operational interfaces needed to monitor the execution of science software PGEs.

Production Processing requires close monitoring of job processing status/activities and operator intervention as needed to modify job status. In addition it involves monitoring the load on the processing resources to determine whether the load on processing assets is appropriately distributed.

The site M&O Production Monitors use the following principal tools in the Data Processing Subsystem:

- a. AutoSys GUI Control Panel - for launching various AutoSys and AutoXpert GUIs.
- b. AutoSys GUIs.
 1. Job Activity Console (Ops Console) – for monitoring job processing status/activities and modifying job status.
 2. Alarm Manager – for monitoring and responding to AutoSys alarms.
 3. Job Definition GUI – for determining the ownership of jobs in AutoSys.
 4. Monitors/Browsers – for monitoring job processing status/activities and obtaining reports on job processing status.
- c. AutoXpert GUIs.
 1. JobScape – for a Pert-type graphical view of job processing status/activities and for modifying job status.
 2. TimeScape – for a Gantt-type graphical view of job processing status/activities and for modifying job status.
 3. HostScape – for a machine-oriented graphical view of job processing status/activities.

Subsequent sections related to Production Processing address the following topics, including an overview and step-by-step procedures for each topic:

- a. Section 14.2 Launching the AutoSys/AutoXpert GUIs and configuring AutoSys screens/displays.
- b. Section 14.3 Reviewing hardware status, DPR dependency, the DPR production timeline, alarms, and job activities using AutoSys/AutoXpert GUIs.
- c. Section 14.4 Modifying job status.
- d. Section 14.5 Reviewing activity and job dependency reports, and defining and running monitors/browsers.
- e. Section 14.6 Changing the database maintenance time.
- f. Section 14.7 Tuning system parameters.

14.2 Launching the AutoSys/AutoXpert GUIs and Configuring AutoSys Screens/Displays

The AutoSys and AutoXpert GUIs are the principal tools the Production Monitors use for monitoring and controlling activities occurring in Production Processing.

Each procedure outlined will have an **Activity Checklist** table that will provide an overview of the task to be completed. The outline of the **Activity Checklist** is as follows:

Column one - **Order** shows the order in which tasks should be accomplished.

Column two - **Role** lists the Role/Manager/Operator responsible for performing the task.

Column three - **Task** provides a brief explanation of the task.

Column four - **Section** provides the *Procedure (P)* section number or *Instruction (I)* section number where details for performing the task can be found.

Column five - **Complete?** is used as a checklist to keep track of which task steps have been completed.

Table 14.2-1 provides an Activity Checklist for activities related to Launching the AutoSys/AutoXpert GUIs and Configuring AutoSys Screens/Displays.

Table 14.2-1. Launching the AutoSys/AutoXpert GUIs and Configuring AutoSys Screens/Displays - Activity Checklist

Order	Role	Task	Section	Complete?
1	Production Monitor	Launch the AutoSys GUI Control Panel	(P) 14.2.1	
2	Production Monitor	Configure AutoSys/AutoXpert Runtime Options	(P) 14.2.2	
3	Production Monitor	Select Jobs to be Displayed on AutoSys/AutoXpert GUIs	(P) 14.2.3	
4	Production Monitor	Set the Current Job on AutoSys/AutoXpert GUIs	(P) 14.2.4	
5	Production Monitor	Configure HostScape Hardware Groups	(P) 14.2.5	

The process of configuring AutoSys begins when the Production Monitor starts the AutoSys graphical user interface (GUI) Control Panel and changes runtime options or uses the vi editor to modify AutoSys configuration files.

The procedures in this section concern launching the AutoSys GUIs, configuring AutoSys runtime options, and configuring AutoSys hardware groups.

14.2.1 Launch the AutoSys GUI Control Panel

The AutoSys GUI Control Panel is invoked from a UNIX command line prompt. Table 14.2-2 presents (in a condensed format) the steps required to launch the AutoSys GUI Control Panel. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.
- 2- In the terminal window, at the command line prompt, start the log-in to the Queuing Server by entering:
/tools/bin/ssh <hostname>
 - a. Examples of hostnames include **e0sps04**, **g0sps06**, **l0sps03**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.
- 3 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
 - a. Go to Step 5.

- 4 At the `<user@remotehost>`'s **password:** prompt enter:
<Password>
- 5 In the terminal window, at the command line, enter:
cd /usr/ecs/ <MODE>/COTS/autotree/autouser
- <MODE>** is current mode of operation.
 - TS1 - Science Software Integration and Test (SSI&T)
 - TS2 - New Version Checkout
 - OPS - Normal Operations
 - “autouser” is the directory containing the AutoSys configuration files.
 - The path may vary with the specific site installation; e.g., the **autotree** directory may be identified as **autotreeb** at some sites.
- 6 Set the application environment variables by entering:
setenv ECS_HOME /usr/ecs/
source <AUTOSERV_INSTANCE>.autosys.csh.<hostname>
- Application home environment is entered.
 - When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to set it manually.
 - <AUTOSERV_INSTANCE>** (also called an AUTOSYS instance) is installed as part of the Data Processing Subsystem and is identified by three capital letters.
 - AUTOSERV instances at the DAACs are typically identified as **FMR**.
 - Configuration files in the **autouser** directory identify the available AUTOSERV instances. For example, **config.FMR** is the configuration file for AUTOSERV instance **FMR**.
- 7 Launch the **AutoSys GUI Control Panel** by entering:
cd /usr/ecs/ <MODE>/CUSTOM/utilities
EcDpPrAutosysStart <MODE> <AUTOSERV_INSTANCE>
- The **AutoSys GUI Control Panel** is displayed.

Table 14.2-2. Launch the AutoSys GUI Control Panel - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	Log in to the ECS System using secure shell	enter text, press Enter
2	Set the environment variables	enter text, press Enter
3	Enter cd /usr/ecs/ <MODE>/COTS/autotree/autouser	enter text, press Enter
4	Enter source <AUTOSERV_INSTANCE>.autosys.csh.<hostname>	enter text, press Enter

**Table 14.2-2. Launch the AutoSys GUI Control Panel - Quick-Step ProceduresÄ
(2 of 2)Ä**

Step	What to Enter or Select	Action to Take
5	Enter <code>cd /usr/ecs/<MODE>/CUSTOM/utilities</code>	enter text, press Enter
6	Enter <code>EcDpPrAutosysStart <MODE> <AUTOSERV_INSTANCE></code>	enter text, press Enter

14.2.2 Configure AutoSys/AutoXpert Runtime Options

The following AutoSys/AutoXpert Runtime Options may be defined by the Production Monitor operator:

- Refresh Interval - The Refresh Interval is how often the GUI View Region display is updated.
- Ping Interval - The Ping Interval is defined by how often the connectivity is evaluated.
- Hang Time - The Hang Time is the length of time jobs continue to be displayed within a machine after they have completed running.
- Inches/Hour- Inches/Hour specifies how much information is displayed on the screen. All values are initially set to default values by the AutoSys system.

Table 14.2-3 lists the runtime options available for HostScape, TimeScape, and JobScape. Not all options are available for all GUIs.

HostScape displays jobs on a machine-by-machine basis, indicating which AutoSys server/client machines are up and active, and which jobs are running or have recently run on each machine. This interface is used to monitor hardware status in real-time.

TimeScape presents a Gantt-like view of a job processing from a temporal (or time-related) point-of-view. This interface depicts both “command jobs” and “box jobs.” It also depicts the nesting of jobs within boxes and the duration of time it will take for jobs to complete. This interface is used to monitor job flow in real-time.

JobScape presents a Pert-like view of job processing from a logical (or job dependency) point of view. This interface depicts both “command jobs” and “box jobs.” It also depicts the nesting of jobs within boxes and the dependencies between jobs. This interface can be used to monitor job flow in real-time.

Table 14.2-3. Runtime Options Table

Interface	Refresh Interval	Hangtime	PING	Inches/Hour
HostScape	X	X	X	
TimeScape	X			X
JobScape	X			

Table 14.2-4 presents (in a condensed format) the steps required to configure AutoXpert runtime options. If you are already familiar with the procedures, you may prefer to use the quick-step

table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures (perform only those steps applicable to the interface, as defined in Table 14.2-3.):

- 1** Launch the **AutoSys GUI Control Panel** (refer to Section 14.2.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2-** **Single-click** on either **HostScope**, **TimeScope**, or **JobScope** button on the **AutoSys GUI Control Panel**.
 - a. The desired **GUI** dialogue box is displayed.
- 3** Display the **Runtime Options** dialogue box by executing the following menu path:
Options → Edit Runtime Options
 - a. The **Runtime Options** dialogue box is displayed.
- 4** **Single-click Refresh Interval (Seconds)** and enter a value between **1** and **99999**.
 - a. Value is entered.
 - b. Default value is **30**
 - c. **Reloading Job Data** window reappears every **##** seconds.
 - d. If Freeze Frame feature is enabled, changes will not take place until it is disabled.
- 5-** **Single-click Ping Interval (Seconds)** (if applicable) and enter a value between **1** and **99999**.
 - a. Value is entered.
 - b. Default value is **300**
 - c. 99999 means no **ping** commands are issued.
 - d. If Freeze Frame feature is enabled, changes will not take place until it is disabled.
- 6-** **Single-click Hang Time (Minutes)** (if applicable) and enter a value between **1** and **99999**.
 - a. Value is entered.
 - b. Default value is **1**.
 - c. If Freeze Frame feature is enabled, changes will not take place until it is disabled.
- 7** **Single-click Inches/Hr (inches)** (if applicable) and enter a value between **1** and **###**.
 - a. Value is entered.
 - b. Default value is **2**.
 - c. If Freeze Frame feature is enabled, changes will not take place until it is disabled.
- 8** **Single-click Apply**.
 - a. The Runtime Options are set.
- 9** **Single-click OK**.
 - a. The dialogue box closes.

Table 14.2-4. Configure AutoSys/AutoXpert Runtime Options - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.2.1
2	Select either HostScape , TimeScape , or JobScape	single-click
3	Execute Options → Edit Runtime Options	single-click
4	Select Refresh Interval (Seconds)	single-click
5	Enter a value between 1 and 99999	enter number
6	Select Ping Interval (Seconds) (if applicable)	single-click
7	Enter a value between 1 and 99999 (if applicable)	enter number
8	Select Hang Time (Minutes) (if applicable)	single-click
9	Enter a value between 1 and 99999 (if applicable)	enter number
10	Select Inches/Hr (inches) (if applicable)	single-click
11	Enter value (if applicable)	enter number
12	Select Apply	single-click
13	Select OK	single-click

14.2.3 Select Jobs to be Displayed on AutoSys/AutoXpert GUIs

This section explains how to select jobs to be displayed on AutoSys/AutoXpert GUIs. The Production Monitor can select jobs on the basis of the following criteria:

- a. Job Name.
- b. Job Status.
- c. Machine.

The following default values apply to the job selection criteria until the Production Monitor modifies them:

- a. All Jobs.
- b. All Statuses.
- c. All Machines.

Table 14.2-5 presents (in a condensed format) the steps required to select jobs to be displayed on AutoSys/AutoXpert GUIs. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **AutoSys GUI Control Panel** (refer to Section 14.2.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2 **Single-click** on either the **HostScape**, **TimeScape**, or **JobScape** button as applicable.
 - a. The AutoXpert GUI corresponding to the selected button is displayed.
- 3 Execute the following menu path:
View → **Select Jobs to Display**

- d. **Job Selection** dialogue box is displayed.
 - e. **Job selection** has the following default settings:
 - 1. **All Jobs** for **Select by Name**.
 - 2. **All Statuses** for **Select by Status**.
 - 3. **All Machines** for **Select by Machine**.
 - f. If the default settings are the desired settings, proceed to Step 10.
- 4-** If all jobs are to be displayed on the AutoXpert GUI, verify that the **All Jobs** toggle button is selected.
- a. **Single-click** on the **All Jobs** button to change state from unselected to selected or vice versa.
 - 1. When the **All Jobs** option is selected, the **All Jobs** button color is yellow.
 - 2. Leave the **Box Hierarchies: Show Number of Levels** set at **all**.
 - b. Proceed to Step 7.
- 5-** If selecting a particular job or set of jobs by name, first verify that the **All Jobs** button is **unselected**.
- a. **Single-click** on the **All Jobs** button to change state from selected to unselected or vice versa.
- 6-** If selecting a particular job or set of jobs by name, in the **Name Matching Patterns** fields enter:
- <job name>*
- a. The asterisk (*) wildcard character can be used for entering a partial job name.
 - 1. For example, enter ***OPS*** to select jobs with “OPS” in their name.
- 7-** If jobs are to be displayed on the basis of their status, **single-click** on the appropriate button(s) to select the desired status(es) in the **Select by Status** list.
- a. Options are: All Statuses, Starting, Running, Success, Failure, Terminated, Restart, Que Wait, Activated, Inactive, On Hold, On Ice.
 - b. Any or all buttons can be selected.
 - c. Button turns yellow when selected.
- 8-** If jobs are to be displayed regardless of the machine on which they are running, verify that the **All Machines** toggle button is selected.
- a. **Single-click** on the **All Machines** button to change state from unselected to selected or vice versa.
 - 1. When the **All Machines** option is selected, the **All Machines** button color is yellow.
 - b. Proceed to Step 10.
- 9-** If jobs are to be displayed on the basis of the machine on which they are running, **single click** on the name(s) of the desired machine(s) in the **Select by Machine** list.
- a. To select multiple machines **press and hold** either the **Ctrl** key or the **Shift** key while **single-clicking** on individual machines in the **Select by Machine** list.
 - b. Alternatively, to select multiple machines **press and hold** either the **Ctrl** key or the **Shift** key then **single-click** on the first machine and drag the cursor to the name of the last machine to be selected and release the mouse button.
 - 1. Selected machine(s) is (are) highlighted.

- 10 Single-click** on the appropriate button from the following selections:
- a. **OK** - to accept all specified job selection criteria and dismiss the **Job Selection** dialogue box.
 1. Original AutoXpert GUI is displayed.
 2. Jobs are displayed on the AutoXpert GUI based on the specified selection criteria.
 - b. **Apply** - to accept all specified job selection criteria without dismissing the **Job Selection** dialogue box.
 1. Repeat Steps 4 through 10 as necessary to specify additional job selection criteria.
 - c. **Cancel** - to dismiss the **Job Selection** dialogue box without accepting any job selection criteria.
 1. Original AutoXpert GUI is displayed

Table 14.2-5. Select Jobs to be Displayed on AutoSys/AutoXpert GUIs - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.2.1
2	Select either HostScape , TimeScape , or JobScape	single-click
3	Execute View → Select Jobs to Display	single-click
4	Verify that the All Jobs toggle button is selected or unselected as applicable	single-click
5	Enter <job name> if applicable	enter text
6	Select Select by Status toggle button(s) if applicable	single-click
7	Verify that the All Machines toggle button is selected or unselected as applicable	single-click
8	Select name(s) of the desired machine(s) in the Select by Machine list if applicable	single-click
9	Select OK	single-click

14.2.4 Set the Current Job on AutoSys/AutoXpert GUIs

This section explains how to set the “current job” on AutoSys/AutoXpert GUIs. Setting the current job causes the job name to be displayed in the **Current Job Name** field in the Control Region of the AutoXpert GUI. Subsequently clicking on the **Job Console** button on the AutoXpert GUI causes the **Job Activity Console** GUI (also known as the **Ops Console** GUI) to be displayed with information concerning the current job.

Either of the following two methods can be used to set the current job:

- a. Click on the name of a job displayed on an AutoXpert GUI.
- b. Set the current job using the AutoXpert GUI pull-down menu.

Table 14.2-6 presents (in a condensed format) the steps required to set the current job on an AutoSys/AutoXpert GUI using the pull-down menu. If you are already familiar with the

procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **AutoSys GUI Control Panel** (refer to Section 14.2.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2 **Single-click** on either the **HostScape**, **TimeScape**, or **JobScape** button as applicable.
 - a. The AutoXpert GUI corresponding to the selected button is displayed.
- 3 Execute the following menu path:
View → Set Current Job
 - a. **Set Current Job** dialogue box is displayed.
- 4 In the **Filter** field enter:
<job name>
 - a. The asterisk (*) wildcard character can be used for entering a partial job name (e.g., type ***AM1*** to list all jobs with “AM1” in their name).
- 5 **Single-click** on the **Filter** button.
 - a. All jobs that meet the criteria specified in the **Filter** field are displayed in the **Jobs** field.
- 6- **Single-click** on the name of the job to be designated the “current job” from the jobs listed in the **Jobs** field.
 - a. The name of the selected job is displayed in the **Selected Job** field of the **Set Current Job** dialogue box.
- 7 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to accept the selected job and dismiss the **Set Current Job** dialogue box.
 1. Original AutoXpert GUI is displayed.
 2. Selected job is displayed in the **Current Job Name** field in the Control Region of the AutoXpert GUI.
 - b. **Apply** - to accept the selected job without dismissing the **Set Current Job** dialogue box.
 1. Selected job is displayed in the **Current Job Name** field in the Control Region of the AutoXpert GUI.
 - c. **Cancel** - to dismiss the **Set Current Job** dialogue box without setting a “current job.”
 1. Original AutoXpert GUI is displayed

Table 14.2-6. Set the Current Job on AutoSys/AutoXpert GUIs - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.2.1
2	Select either HostScape , TimeScape , or JobScape	single-click
3	Execute View → Set Current Job	single-click
4	Enter <job name>	enter text
5	Select the Filter button	single-click
6	Select the name of the “current job” from those listed in the Jobs field	single-click
7	Select OK	single-click

14.2.5 Configure HostScape Hardware Groups

This section explains how to configure AutoSys hardware groups. The default group is “All Machines.” If the Production Monitor needs to monitor specific sets of machines, groups may be defined.

Table 14.2-7 presents (in a condensed format) the steps required to configure AutoSys hardware groups. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1- At the UNIX command line prompt enter:
cd /usr/ecs/ <MODE>/COTS/autotree/autouser

- 2- Edit the file called **xpert.groups.<AUTOSERV_INSTANCE>** using an appropriate text editor (e.g., vi).

- 3- Enter:
groupname: <groupname>

- 4- Enter:
<machine name>


```

Groupname: Modis
d0pls01
d0sps03
Groupname: SSI&T
d0ais01
d0spg02

```

Figure 14.2-1. AutoSys Hardware Group File Example

(Repeat Step 4 for each item in the group.)

Repeat Steps 3 and 4 for additional groups.

- 5 Save the file.
- 6 Launch the **AutoSys GUI Control Panel** (refer to Section 14.2.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 7 **Single-click HostScape.**
 - a. The **HostScape** GUI page is presented.
- 8- Display the **Machine Group Selection** dialogue box by executing the following menu path:

View → Select Machine Group

 - a. The **Machine Group Selection** dialogue box is presented.
- 9 Select **<machine group>**.
 - a. The **machine group** is highlighted.
- 10 **Single-click Apply** button.
 - a. The selected **machine group** is applied.
- 11 **Single-click OK** button.
 - a. The **Machine Group Selection** dialogue box is closed
 - b. The **HostScape** display should now show the selected group of machines.

Table 14.2-7. Configure HostScape Hardware Groups - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	cd /usr/ecs/ <MODE>/COTS/autotree/autouser	enter text, press Enter
2	Edit file xpert.groups.<AUTOSERV_INSTANCE>	enter text, press Enter
3	Enter groupname: <groupname>	enter text, press Enter
4	Enter <machine name >	enter text, press Enter

**Table 14.2-7. Configure HostScape Hardware Groups - Quick-Step Procedures
(2 of 2)**

Step	What to Enter or Select	Action to Take
5	Repeat Steps 3 and 4 as necessary for additional groups/machines	enter text, press Enter
6	Save the file	enter text, press Enter
7	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.2.1
8	Select HostScape	single-click
9	Execute View → Select Machine Group	single-click
10	Select <machine group> to be presented	single-click
11	Select Apply	single-click
12	Select OK	single-click

14.3 Reviewing Hardware Status, DPR Dependency, the DPR Production Timeline, Alarms, and Job Activities Using AutoSys/AutoXpert GUIs

Hardware status is displayed on the AutoXpert HostScape GUI. The Production Monitor uses the HostScape GUI to determine the status of processors, the condition of the AutoSys queue, whether any processors are overloaded while others are idle, whether there are any system problems, etc.

Table 14.3-1 provides an Activity Checklist for activities related to Reviewing Hardware Status, DPR Dependency, the DPR Production Timeline, Alarms, and Job Activities Using AutoSys/AutoXpert GUIs.

Table 14.3-1. Reviewing Hardware Status, DPR Dependency, the DPR Production Timeline, Alarms, and Job Activities Using AutoSys/AutoXpert GUIs - Activity Checklist

Order	Role	Task	Section	Complete?
1	Production Monitor	Review Hardware Status Using HostScope	(P) 14.3.1	
2	Production Monitor	Select Hardware Status View Options in HostScope	(P) 14.3.2	
3	Production Monitor	Review DPR Dependencies Using JobScope	(P) 14.3.3	
4	Production Monitor	Change the JobScope View Using the Pull-Down Menu	(P) 14.3.4	
5	Production Monitor	Review the DPR Production Timeline Using TimeScope	(P) 14.3.5	
6	Production Monitor	Review Alarms Using the AutoSys Alarm Manager	(P) 14.3.6	
7	Production Monitor	Select Alarms for Alarm Manager Display	(P) 14.3.7	
8	Production Monitor	Specify Job Selection Criteria for the AutoSys Job Activity Console	(P) 14.3.8	
9	Production Monitor	Review Job Activities Using the AutoSys Job Activity Console	(P) 14.3.9	

14.3.1 Review Hardware Status Using HostScope

Table 14.3-2 presents (in a condensed format) the steps required to review hardware status using AutoXpert HostScope. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **AutoSys GUI Control Panel** (refer to Section 14.2.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2 **Single-click** on the **HostScope** button on the **AutoSys GUI Control Panel**.
 - a. The **HostScope** GUI page is presented.
 - b. View presented is **Normal View**.
- 3 Review the Control Region (left side of display) to identify color code for status of machines. This code is displayed on the machine box border in the **View Region**.
 - a. **MACHINE UP** (active) is Green.
 - b. **MACHINE DOWN** (inactive and cannot be reached) is Red.
 - c. Machine Inactive is Black. (Not shown in Control Region)
- 4 Review machine type in **View Region**.
 - a. The **machine name** is displayed.
 - b. Event Server (database server) name appears below list of jobs, if applicable.

- c. Event Processor (AutoSys server/daemon)name appears below list of jobs, if applicable.
- 5 Review machine boxes in the View Region to ascertain status of individual machines.
 - a. The total number of jobs STARTING or RUNNING.
 - b. All jobs in a RUNNING state are listed.
 - 6 Review the **Alarm** indicator/buttons of individual machines in the View Region.
 - a. If an alarm is present, **single-clicking** alarm buttons brings up the **Alarm Manager**.
 - b. Red indicates that an alarm has been generated.
 - c. Gray (default color) indicates normal operation.
 - 7 Review machine connection status in the View Region.
 - a. Solid black line indicates AutoSys can communicate with the client machine Internet daemon.
 - b. Solid red line indicates AutoSys cannot communicate with the client machine Internet daemon; however, the daemon does respond to **ping** commands.
 - c. Dashed red line indicates AutoSys cannot communicate with the client machine; machine is probably turned off.
 - 8 Start the exit from **HostScape** by executing the following menu path:
File → Exit
 - a. A **HostScape Exit** dialogue box is displayed.
 - 9 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to exit from the **HostScape** GUI.
 1. The **HostScape** GUI is dismissed.
 - b. **Cancel** - to return to the **HostScape** GUI.

Table 14.3-2. Review Hardware Status Using HostScape - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.2.1
2	Select HostScape	single-click
3	Review Control Region to identify color code for machine status	observe
4	Review individual machine data in View Region	observe
5	Execute File → Exit	single-click
6	Select OK	single-click

14.3.2 Select Hardware Status View Options in HostScape

The View Options provide three methods to view the hardware status:

- a. The Normal view (default) displays three rows of machines with job activities.
- b. The Global view displays seven rows of machines but not job activities.

- c. The Zoom view displays one machine with great detail: Job name, description, status, and commands.

The Production Monitor may select the Global view to monitor the entire system and in the case of a malfunction, use the Zoom view to focus on the specific problem machine.

Table 14.3-3 presents (in a condensed format) the steps required to change the hardware status view in AutoXpert HostScape. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Select global view by executing the following menu path:
View → Select View Level → Global View
 - a. The **Global** view is displayed.
 - b. No job information is displayed.
- 2 Select a machine by **single-clicking** on <machine name>.
- 3 Execute the following menu path:
View → Zoom in Machine
 - a. The **Zoom** view is displayed.
 - b. A table of **Job Name, Description, Status, and Commands** is displayed.
- 4 Observe individual machine data in the table.
- 5 Select **Dismiss**.
 - a. The **Global** view is displayed.
- 6 Display the **Normal** view of hardware status by executing the following menu path:
View → Select View Level → Normal view
 - a. The **Normal** view is displayed.
 - b. Limited job information is displayed.

Table 14.3-3. Select Hardware Status View Options in HostScape - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Execute View → Select View Level → Global View	single-click
2	Select <machine name>	single-click
3	Execute View → Zoom in Machine	single-click
4	Review individual machine data in table	observe
5	Select Dismiss	single-click
6	Execute View → Select View Level → Normal View	single-click

14.3.3 Review DPR Dependencies Using JobScope

The process of reviewing DPR dependencies begins with the Production Monitor launching AutoXpert JobScope. The JobScope interface is used to monitor job flow in real-time.

Table 14.3-4 presents (in a condensed format) the steps required to review DPR dependencies in AutoXpert JobScope. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **AutoSys GUI Control Panel** (refer to Section 14.2.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2 **Single-click** on the **JobScope** button on the **AutoSys GUI Control Panel**.
 - a. The **JobScope** GUI page is presented.
- 3 Review the Control Region (left side of display) to identify **True** or **False** Dependency Legend.
 - a. **True** (default **solid** arrow) indicates job dependencies have been met.
 - b. **False** (default **dashed** arrow) indicates job dependencies have **not** been met.
 1. Dependency arrows indicate that a job dependency exists for a job. They do not define time-related starting conditions, nor do they describe the type of job dependency, such as success, failure, or running.
- 4 Review the Job Display for status. The following colors represent the default values:
 - a. White indicates job status of **ACTIVATED**.
 - b. Dark Blue indicates job status of **INACTIVE** or **ON_HOLD** or **ON_ICE**.
 - c. Yellow indicates job status of **QUE_WAIT**.
 - d. Orange indicates job status of **RESTART**.
 - e. Green indicates job status of **STARTING** or **RUNNING**.
 - f. Red indicates job status of **FAILURE** or **TERMINATED**.
 - g. Light Blue indicates job status of **SUCCESS**.
- 5 Review the Job Display for job types:
 - a. **Rectangle** depicts **Box Job**.
 - b. **Ellipse** depicts **Command Job**.
 - c. **Hexagon** depicts **File Watcher Job** (not displayed in ECS implementation of AutoXpert).
- 6 Select a job by placing the **cursor** on a job and pressing the **left** mouse button.
 - a. Border around selected job changes to **yellow**.
 - b. Job name appears in **Current Job Name** area of the Control Region.
- 7 Review job descendants by placing the **cursor** on a job and pressing the **right** mouse button.
 - a. Pop-up menu appears with the options **<job name>**, **Show Children**, **Show All Descendants**, **Hide All Descendants**, **Show Job Arrows**, **Hide Job Arrows**, **Show Box Arrows**, **Hide Box Arrows**, **Job Definition**, **View Dependencies**, **Set Simulation**, **Overrides** [grayed out], **Start Job**, **Kill Job**, **Force Start Job**, **On Hold**, **Off Hold**, **On Ice**, **Off Ice**.

- 8 Select **Show Children** on the pop-up menu.
 - a. Job's first level Command and Box Jobs appear.
 - b. Repeat Step 6 to change job selection.
- 9 Select **Show All Descendants** on the pop-up menu.
 - a. Job's Command and Box Jobs appear for all levels.
- 10 Select **Hide All Descendants** on the pop-up menu.
 - a. Default view is displayed.
 - b. All dependents are hidden.
- 11 To change the JobScope view using the **View** pull-down menu perform the procedure to **Change the JobScope View Using the Pull-Down Menu** (Section 14.3.4).
- 12 Start the exit from **JobScope** by executing the following menu path:
File → Exit
 - a. A **JobScope Exit** dialogue box is displayed.
- 13 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to exit from the **JobScope** GUI.
 1. The **JobScope** GUI is dismissed.
 - b. **Cancel** - to return to the **JobScope** GUI.

Table 14.3-4. Review DPR Dependencies Using JobScope - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.2.1
2	Select JobScope	single-click
3	Review Control Region to identify True or False Dependency Legend and status color code	observe
4	Review the job status in View Region	observe
5	Select <job name>	single-click
6	Execute <job name> → Show Children	right-click
7	Review the job status in View Region	observe
8	Execute <job name> → Show All Descendants	right-click
9	Review the job status in View Region	observe
10	Execute <job name> → Hide All Descendants	right-click
11	Review the job status in View Region	observe
12	Change the JobScope view using the pull-down menu if desired	Use procedure in Section 14.3.4
13	Execute File → Exit	single-click
14	Select OK	single-click

14.3.4 Change the JobScape View Using the Pull-Down Menu

This section explains how to change the view on the JobScape GUI. Changing the view affects the level of detail displayed for each job shown in the View Region of the GUI.

As previously mentioned the view can be changed in some ways by simply clicking with the **right** mouse button on the name of a job displayed on an AutoXpert GUI and selecting the desired option from the pop-up menu. The following options related to changing the view and display levels are displayed on the menu:

- a. Show Children.
- b. Show All Descendants.
- c. Hide All Descendants.
- d. Show Job Arrows.
- e. Hide Job Arrows.
- f. Show Box Arrows.
- g. Hide Box Arrows.

Another method for changing the view on the JobScape GUI involves using the **View** pull-down menu. Many of the same choices plus some additional options can be selected using the pull-down menu.

Table 14.3-5 presents (in a condensed format) the steps required to change the JobScape View using the pull-down menu. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 To start selecting a new view execute the following menu path:
View → Set View
 - a. The following menu options are displayed: **Normal Text View, Small Text View, No Text View, Show Arrows, Hide Arrows, View by Id, View by Name** [grayed out].
- 2 **Single-click** to select the desired option from the pull-down menu.
 - a. **Normal Text View** is the default view.
 - b. **Small Text View** is similar to **Normal Text View** but the text and graphics are smaller.
 - c. No text is displayed in the **No Text View**, which provides a global or big-picture view of the jobs currently in processing without specifically identifying them by name.
 - d. **Show Arrows** displays the lines/arrows between jobs.
 1. Is characteristic of the default view.
 - e. **Hide Arrows** removes the lines/arrows between jobs from the display.
 - f. **View by Id** changes the display to provide a sequential reference number for each job rather than showing the job name.
 - g. **View by Name** changes the display to show job names rather than reference numbers.
 1. Is characteristic of the default view.
 2. Is accessible only when the current display is by **Id** number.
- 3 To start selecting a new display level execute the following menu path:

View → Set Display Levels

- a. The following menu options are displayed: **1, 2, 3, 4, 5, All**.
- 4** **Single-click** to select the desired option from the pull-down menu.
- a. **All** is the default type of view.
 - b. Selecting **1** provides a display of the box level only.
 1. Just the box header is shown.
 2. No command jobs are shown.
 - c. If any other selection (i.e., **2, 3, 4, 5**, or **All**) is made (in the ECS implementation), the boxes and command jobs with the boxes are displayed.

Table 14.3-5. Change the JobScope View Using the Pull-Down Menu - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Execute View → Set View	single-click
2	Select the desired option	single-click
3	Execute View → Set Display Levels	single-click
4	Select the desired option	single-click

14.3.5 Review the DPR Production Timeline Using TimeScope

The process of reviewing the DPR Production Timeline begins with the Production Monitor launching AutoXpert TimeScope. The TimeScope interface is used for monitoring actual versus projected job progress in real time.

Table 14.3-6 presents (in a condensed format) the steps required to review the DPR production timeline in AutoXpert TimeScope. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1** Launch the **AutoSys GUI Control Panel** (refer to Section 14.2.1).
 - a. The AutoSys GUI Control Panel is displayed.
- 2** **Single-click** on the **TimeScope** button on the **AutoSys GUI Control Panel**.
 - a. The **TimeScope** GUI page is presented.
 - b. Current time is displayed in red.
- 3** Review **Actual/Projected** Legend in lower left of the **Control Region** and compare to **View Region**.
 - a. **Projected** is a rectangular (blue filled) graphic, to show average job completion time.
 - b. **Actual** is a striped (white and blue) ribbon, to show how much of the job has completed.
 - c. If stripe is green, job is running.
 - d. If stripe is black, job has completed.

- 4 Review job descendants by placing the **cursor** on a job and pressing the **right** mouse button.
 - a. Pop-up menu appears.
 - b. An asterisk (*) indicates that a Box Job's descendants have been hidden.
- 5 Select **Show Children** on the pop-up menu.
 - a. Job's first level Command and Box Jobs appear.
- 6 Select **Show All Descendants** on the pop-up menu.
 - a. Job's Command and Box Jobs appear with all levels.
- 7 Select **Hide All Descendants** on the pop-up menu.
 - a. All descendants are removed.
- 8 Start the exit from **TimeScape** by executing the following menu path:
File → Exit
 - a. A **TimeScape Exit** dialogue box is displayed.
- 9 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to exit from the **TimeScape** GUI.
 1. The **TimeScape** GUI is dismissed.
 - b. **Cancel** - to return to the **TimeScape** GUI.

Table 14.3-6. Review the DPR Production Timeline Using TimeScape - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.2.1
2	Select TimeScape	single-click
3	Review Control Region to identify Actual/Projected Legend and status color code	observe
4	Review the job status in View Region	observe
5	Select <job name>	single-click
6	Execute <job name> → Show Children	right-click
7	Review the job status in View Region	observe
8	Execute <job name> → Show All Descendants	right-click
9	Review the job status in View Region	observe
10	Execute <job name> → Hide All Descendants	right-click
11	Review the job status in View Region	observe
12	Execute menu path File → Exit	single-click
13	Select OK	single-click

14.3.6 Review Alarms Using the AutoSys Alarm Manager

The process of reviewing alarms begins with the Production Monitor starting the AutoSys **Alarm Manager**. The **Alarm Manager** allows the Production Monitor to view alarms as they arrive, provide a response, and change the alarm status. The Alarm Manager is also configurable for the types of alarms that are displayed.

Table 14.3-7 presents (in a condensed format) the steps required to review alarms using the AutoSys Alarm Manager. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **AutoSys GUI Control Panel** (refer to Section 14.2.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2 **Single-click** on the **Ops Console** button on the **AutoSys GUI Control Panel**.
 - a. The **Ops Console** GUI is displayed.
- 3 **Single-click** on the **Alarm** button.
 - a. The **Alarm Manager** GUI page is presented.
 - b. Alarms are displayed in reverse order of occurrence; the most recent alarm appears at the top of the list.
- 4 Perform the procedure **Select Alarms for Alarm Manager Display** to display a particular selection of alarms on the AutoSys **Alarm Manager** if desired (refer to Section 14.3.7).
- 5 If desired, verify that the freeze-frame feature of the **Alarm Manager** GUI is activated (**single-click** on the **Freeze Frame** button if necessary).
 - a. The freeze-frame feature prevents the **Alarm Manager** from being updated, disrupting the display.
- 6 **Single-click** on an alarm in the **Alarm List**.
 - a. Information for **Alarm Type, Job Name, Time, State, Comment** is displayed.
 - b. Alarm is displayed in detail in the **Currently Selected Alarm** region of the display.
 - c. Refer to Table 14.3-8 for descriptions of AutoSys alarms.
- 7 If a response is to be documented, **single-click** in the **Response** edit box.
- 8 If a response is to be documented, enter:
<text>
 - a. Response is entered.
- 9 Update **Alarm State** by **single-clicking** on the proper radio button.
 - a. Options are: Open, Acknowledged, Closed.
 - b. Alarm State is updated.
- 10 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to enter all alarm responses and dismiss the **Alarm Manager** GUI.
 1. Job Activity Console (Ops Console) GUI is displayed.

- b. **Apply** - to enter all alarm responses without dismissing the **Alarm Manager** GUI.
 - 1. Repeat Steps 6 through 10 as necessary to review and update additional alarms.
 - c. **Cancel** - to return to the **Job Activity Console (Ops Console)** GUI without entering any alarm responses.
 - 1. Job Activity Console (Ops Console) GUI is displayed.
- 11** If the **Alarm Manager** GUI has not been dismissed, information concerning a job for which there is an alarm can be reviewed by performing Steps 12 through 17.
- 12** Verify that the alarm has been highlighted in the **Currently Selected Alarm** region of the display (**single-click** on the alarm in the **Alarm List** if necessary).
- 13** **Single-click** on the **Select Job** button.
- a. **Job Activity Console (Ops Console)** GUI is displayed with information concerning the selected job.
- 14** Review the information displayed on the AutoSys **Job Activity Console (Ops Console)**.
- 15** Start the exit from the AutoSys **Job Activity Console (Ops Console)** by **single-clicking** on the **Exit** button.
- a. **AutoSys JAC Exit** GUI is displayed.
- 16** **Single-click** on the appropriate button from the following selections:
- a. **OK** - to dismiss the **Job Activity Console (Ops Console)** GUI.
 - 1. AutoSys **Job Activity Console (Ops Console)** GUI is dismissed.
 - b. **Cancel** - to return to the **Job Activity Console (Ops Console)** GUI.
 - 1. AutoSys **Job Activity Console (Ops Console)** GUI is displayed.
- 17** Return to Step 10.

Table 14.3-7. Review Alarms Using the AutoSys Alarm Manager - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.2.1
2	Select Ops Console	single-click
3	Select Alarm	single-click
4	Select alarms for Alarm Manager display if desired	Use procedure in Section 14.5.2 if applicable
5	Select the Freeze Frame button if desired	single-click
6	Select an alarm in the Alarm List	single-click
7	Enter <text> in the Response edit box if desired.	enter text
8	Update the Alarm State by selecting the proper radio button (Open , Acknowledged , or Closed)	single-click

Table 14.3-7. Review Alarms Using the AutoSys Alarm Manager - Quick-Step Procedures (2 of 2)

Step	What to Enter or Select	Action to Take
9	Select Apply	single-click
10	Repeat Steps 3 through 9 to review/update additional alarms	
11	If there is an alarm for which the job information is to be reviewed, verify that the alarm that has been highlighted in the Alarm List	single-click
12	Select the Select Job button	single-click
13	Review the information displayed on the Job Activity Console	observe
14	Select Exit	single-click
15	Select OK	single-click

Table 14.3-8. AutoSys Alarms (1 of 3)

ALARM	CODE*	DESCRIPTION
AUTO_PING		The autoping command has found a problem in trying to communicate with the Remote Agent on a client machine.
CHASE	514	The chase command has found a problem with a job that is supposedly running. The job and problem are listed.
DATABASE_COMM	516	The Remote Agent had trouble sending an event to the database. The job probably ran successfully. Inspect the Remote Agent Log file to determine what happened.
DB_PROBLEM	523	There is a problem with one of the AutoSys databases. This alarm can trigger a user-specified notification procedure.
DB_ROLLOVER	519	AutoSys has rolled over from Dual Server to Single Server Mode. This alarm can trigger a user-specified notification procedure.
DUPLICATE_EVENT	524	Duplicate events have been received in the Event Server. Typically, this means that two Event Processors are running, although “duplicate events” can also be caused by Event Server configuration errors.
EP_HIGH_AVAIL	522	The Event Processor High Availability system has detected some system or network problems. This alarm can trigger a user-specified notification procedure.
EP_ROLLOVER	520	The Shadow Event Processor is taking over processing. This alarm can trigger a user-specified notification procedure.
EP_SHUTDOWN	521	The Event Processor is shutting down. This may be due to a normal shutdown (SEND_EVENT) or due to an error condition. This alarm can trigger a user-specified notification procedure.

Table 14.3-8. AutoSys Alarms (2 of 3)

ALARM	CODE*	DESCRIPTION
EVENT_HDLR_ERROR	507	The Event Processor had an error while processing an event. The job associated with the event should be inspected to see if manual intervention is required.
EVENT_QUE_ERROR	508	An event could not be marked as processed. This is usually due to a problem with the Event Server.
FORKFAIL	501	The Remote Agent was unable to start the user command because it was unable to get a process slot on the machine. AutoSys automatically attempts a RESTART when this happens.
INSTANCE_UNAVAILABLE	525	When different AutoSys instances communicate with each other, this alarm is generated when a receiving AutoSys instance (i.e., its Event Server) cannot be reached. The Event Server is probably down.
JOBFAILURE	503	A job has failed. Its current status is FAILURE.
JOBNOT_ONICEHOLD	509	To place a job either ON_HOLD or ON_ICE, a JOB_ON_HOLD or JOB_ON_ICE event (as applicable) is sent. There are certain conditions when the job cannot be placed ON_HOLD or ON_ICE (e.g., if it is already running). In such cases the alarm is sent alerting the operator that the job could not be put ON_HOLD or ON_ICE (as applicable).
MAXRUNALARM	510	The job has been running for a time greater than that defined in the Maximum Run Alarm (max_run_alarm) field for the job. The job may continue to run; however, a warning alarm is generated.
MAX_RETRYS	505	AutoSys continues attempting to restart a job if there are system problems or if the job is configured for application restarts (n_retrys). There is a limit to the number of times it will attempt a restart, as defined in the AutoSys configuration files (using MaxRestartTrys). When that limit has been reached, the MAX_RETRYS alarm is sent to alert operators that AutoSys has given up trying to start the job. After the problem has been fixed the job must be started manually.
MINRUNALARM	502	The job has completed running in a time less than that defined in the Minimum Run Alarm (min_run_alarm) field for the job.
MISSING_HEARTBEAT	513	A job has not sent a HEARTBEAT within the interval specified for the job. The operator should inspect the job to determine the cause.
RESOURCE	512	A resource needed for the job was not available. The types of resources are: (a) number of process slots and (b) file space. Specific information about the problem is in the comment associated with the alarm. If AutoSys encounters a resource problem, it attempts to restart the job after a suitable delay.
STARTJOBFAIL	506	AutoSys was unable to start the job. This is generally due to communication problems with the remote machine. AutoSys attempts to restart the job.

Table 14.3-8. AutoSys Alarms (3 of 3)

ALARM	CODE*	DESCRIPTION
VERSION_MISMATCH	518	Generated by the Remote Agent when calling the routine (e.g., Event Processor, chase , clean_files , autoping , etc.) has a different version number than the Remote Agent. Inspect the Remote Agent Log file for the exact version mismatch. The proper Remote Agent version should be installed.

*The code number is used for viewing the event in the event table in the AutoSys database.

14.3.7 Select Alarms for Alarm Manager Display

Table 14.3-9 presents (in a condensed format) the steps required to select the types of alarms to be displayed on the AutoSys **Alarm Manager** for controlling which alarms are displayed. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **AutoSys GUI Control Panel** (refer to Section 14.2.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2 **Single-click** on the **Ops Console** button on the **AutoSys GUI Control Panel**.
 - a. The **Ops Console** GUI is displayed.
- 3 **Single-click** on the **Alarm** button.
 - a. The **Alarm Manager** GUI is presented.
- 4 To display the **Alarm Selection** GUI execute the following menu path:
View → Select Alarms...
 - a. **Alarm Selection** GUI is displayed.
 - b. Alarm Selection defaults are...
 1. **All Types** for **Select by Type**
 2. **Open** and **Acknowledged** for **Select by State**
 3. **All Times** for **Select by Time**
 - c. If the default settings are the desired settings, proceed to Step 15.
- 5 If all types of alarms are to be displayed on the **Alarm Manager** GUI, verify that the **All Types** toggle button is selected in the **Select by Type** area.
 - a. **Single-click** on the **All Types** button to change state from unselected to selected or vice versa.
 1. When the **All Types** option is selected, the **All Types** button color is yellow.
 - b. Proceed to Step 7.
- 6 If selecting a particular type of alarm or set of alarm types, **single-click** on the name(s) of the desired alarm(s) in the **Select by Type** list.
 - a. To select multiple types of alarms **press and hold** either the **Ctrl** key or the **Shift** key while **single-clicking** individual alarms in the **Alarm List**.
 - b. Alternatively, to select multiple types of alarms **press and hold** either the **Ctrl** key or the **Shift** key, then **single-click** on the first type of alarm and drag the cursor to the last type of alarm to be selected and release the mouse button.

1. Selected alarm(s) is (are) highlighted.
 - c. Refer to Table 14.3-8 for descriptions of AutoSys alarms.
- 7 If all alarm states are to be displayed on the **Alarm Manager** GUI, verify that the **All States** toggle button is selected in the **Select by State** area.
 - a. **Single-click** on the **All States** button to change state from unselected to selected or vice versa.
 1. When the **All States** option is selected, the **All States** button color is yellow.
 - b. Proceed to Step 9.
 - 8 If selecting a particular alarm state or set of alarm states to be displayed on the **Alarm Manager** GUI, **single-click** on the name(s) of the desired alarm state(s) in the **Select by State** list.
 - a. Options are **Open, Acknowledged, or Closed**.
 - b. Any or all buttons can be selected.
 - c. Button turns yellow when selected.
 - 9 If alarms at all times are to be displayed on the **Alarm Manager** GUI, verify that the **All Times** toggle button is selected in the **Select by Time** area.
 - a. **Single-click** on the **All Times** button to change state from unselected to selected or vice versa.
 1. When the **All Times** option is selected, the **All Times** button color is yellow.
 - b. Proceed to Step 15.
 - 10 If selecting a particular date/time range for alarms to be displayed on the **Alarm Manager** GUI, first verify that the **All Times** toggle button is **unselected**.
 - a. **Single-click** on the **All Times** button to change state from unselected to selected or vice versa.
 - 11 If selecting a particular date/time range for alarms to be displayed on the **Alarm Manager** GUI, in the **From Date** field enter:
<MM/DD/YYYY>
 - a. Press **Tab** to advance to the next field.
 - 12 If selecting a particular date/time range for alarms to be displayed on the **Alarm Manager** GUI, in the **From Time** field enter:
<hh:mm>
 - a. Press **Tab** to advance to the next field.
 - 13 If selecting a particular date/time range for alarms to be displayed on the **Alarm Manager** GUI, in the **To Date** field enter:
<MM/DD/YYYY>
 - a. Press **Tab** to advance to the next field.
 - 14 If selecting a particular date/time range for alarms to be displayed on the **Alarm Manager** GUI, in the **To Time** field enter:
<hh:mm>

- 15 **Single-click** on the appropriate button from the following selections:
- OK** - to accept all specified alarm selections and dismiss the **Alarm Selection** GUI.
 - Alarm Manager** GUI is displayed.
 - Apply** - to accept all specified alarm selections without dismissing the **Alarm Selection** GUI.
 - Repeat Steps 5 through 15 as necessary to specify additional alarm selection criteria.
 - Cancel** - to dismiss the **Alarm Selection** GUI without accepting any alarm selections.
 - Alarm Manager** GUI is displayed.
- 16 If an audible signal is desired for alarm notification, execute the following menu path:
- Options** → **Sound On**
- Sound On** Toggle button appears yellow when sound function has been activated.

Table 14.3-9. Select Alarms for Alarm Manager Display - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.2.1
2	Select Ops Console	single-click
3	Select Alarm	single-click
4	Execute View → Select Alarms...	single-click
5	Select type(s) of alarms to be displayed from the Select by Type list	single-click
6	Select state(s) of alarms to be displayed from the Select by State list	single-click
7	Select All Times for time(s) of alarms to be displayed (if desired)	single-click
8	Enter <MM/DD/YYYY> in the From Date field if selecting a particular date/time range for alarms	enter text, press Tab
9	Enter <hh:mm> in the From Time field if selecting a particular date/time range for alarms	enter text, press Tab
10	Enter <MM/DD/YYYY> in the To Date field if selecting a particular date/time range for alarms	enter text, press Tab
11	Enter <hh:mm> in the To Time field if selecting a particular date/time range for alarms	enter text, press Tab
12	Select Apply	single-click
13	Select Ok	single-click
14	Execute Options → Sound On if desired	single-click

14.3.8 Specify Job Selection Criteria for the AutoSys Job Activity Console

During start-up the Job Management server in the Data Processing Subsystem determines the number of jobs in the PDPS database associated with Job Management's operating mode and compares the number with the maximum allowable for the mode for the appropriate types of

processing. The parameters and corresponding values are specified in the Configuration Registry. For example, the following parameters/values might be specified for EcDpPrJobMgmt for the OPS mode:

- a. DpPrAutoSysInstances = FMR FMROD FMRRP
- b. DpPrAutoSysMaxJobs = 80 80 80
- c. DpPrAutoSysLoadThreshold = 1 1 1

In the example the first parameter (DpPrAutoSysInstances) lists the different AutoSys instances and/or the Job Management queues associated with AutoSys instances in the OPS mode. In this case there is one instance of AutoSys (i.e., FMR) and three queues, one for routine processing and the others (indicated by the extensions "OD" and "RP") for on-demand processing and reprocessing.

The second parameter (DpPrAutoSysMaxJobs) specifies the maximum number of jobs in AutoSys for each instance listed for the DpPrAutoSysInstances parameter and/or the maximum number of jobs in AutoSys for each type of processing. In the example, AutoSys could simultaneously manage a maximum of 80 routine processing, 80 on-demand processing, and 80 reprocessing jobs.

The third parameter (DpPrAutoSysLoadThreshold) shows the minimum number of AutoSys Jobs that must be freed up before any new job(s) can be loaded from the corresponding queue. In the example, whenever one job is completed in AutoSys for any type of processing a new job can be loaded into AutoSys from the corresponding queue.

Job Management deletes from AutoSys the successfully completed jobs associated with the applicable mode only. Deleting completed jobs makes room for other jobs in the processing queues. It is possible to distribute the optimum number of jobs among the active modes and types of processing according to their level of activity (refer to Section 14.7.2).

The process of reviewing Job Activities begins with the Production Monitor launching the **AutoSys GUI Control Panel**. The **Job Activity Console (Ops Console)**, which is accessible from the control panel, is the primary interface that allows the operator to monitor all jobs that are defined to AutoSys. The **Job Selection** GUI sets the criteria for jobs to be displayed on the **Job Activity Console**.

Table 14.3-10 presents (in a condensed format) the steps required to filter (select) jobs to be displayed on the **Job Activity Console (Ops Console)** GUI. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **AutoSys GUI Control Panel** (refer to Section 14.1.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2 **Single-click** on the **Ops Console** button on the **AutoSys GUI Control Panel**.
 - a. The AutoSys **Job Activity Console (Ops Console)** is displayed.
 - b. No job information is displayed on the **Job Activity Console** when it is brought up using the **Ops Console** button on the **AutoSys GUI Control Panel**.

- 3** To display the **Job Selection** GUI execute the following menu path:
View → Select Jobs
- a. The **Job Selection** view is displayed.
 - b. Job selection has the following default settings:
 1. **All Jobs (Job Name)** for **Select by Name**.
 2. **All Statuses** for **Select by Status**.
 3. **All Machines** for **Select by Machine**.
 4. **Unsorted** for **Sort Order**.
 - c. If the default settings are the desired settings, proceed to Step 14.
- 4** If all jobs are to be displayed on the **Job Activity Console (Ops Console)**, verify that the **All Jobs** toggle button is selected.
- a. **Single-click** on the **All Jobs** button to change state from unselected to selected or vice versa.
 1. When the **All Jobs** option is selected, the **All Jobs** button color is yellow.
 - b. Proceed to Step 10.
- 5** If selecting a particular job by job name, verify that the **Job Name** button is selected.
- a. **Single-click** on the **Job Name** button to change state from selected to unselected or vice versa.
- 6** If selecting a particular job by job name, in the **Job Name** field enter:
<job name>
- a. Proceed to Step 10.
- 7** If selecting a particular box job by name, verify that the **Box Name** button is selected.
- a. **Single-click** on the **Box Name** button to change state from selected to unselected or vice versa.
- 8** If selecting a particular box job by name, in the **Box Name** field enter:
<box name>
- 9** If selecting a particular box job by name, in the **Box Levels** field enter:
<number of box levels>
- a. Options include any valid positive integer or the word “all.”
 1. “0” - indicates that only the top-level box specified in the **Box Name** field is to be displayed.
 2. “1” - indicates that the specified top-level box and all direct descendant boxes and enclosed jobs are to be displayed.
 3. “all” - indicates that all jobs in the box are to be displayed.
- 10** If jobs are to be displayed on the basis of their status, **single-click** on the appropriate button(s) to select the desired status(es) in the **Select by Status** list.
- a. Options are All Statuses, Starting, Running, Success, Failure, Terminated, Restart, Que Wait, Activated, Inactive, On Hold, On Ice.
 - b. Any or all buttons can be selected.
 - c. Button turns yellow when selected.

- 11** If jobs are to be displayed regardless of the machine on which they are running, verify that the **All Machines** toggle button is selected.
- Single-click** on the **All Machines** button to change state from unselected to selected or vice versa.
 - When the **All Machines** option is selected, the **All Machines** button color is yellow.
 - Proceed to Step 14.
- 12** If jobs are to be displayed on the basis of the machine on which they are running, **single-click** on the name(s) of the desired machine(s) in the **Select by Machine** list.
- To select multiple machines **press and hold** either the **Ctrl** key or the **Shift** key while **single-clicking** on individual machines in the **Select by Machine** list.
 - Alternatively, to select multiple machines **press and hold** either the **Ctrl** key or the **Shift** key then **single-click** on the first machine and drag the cursor to the name of the last machine to be selected and release the mouse button.
 - Selected machine(s) is (are) highlighted.
- 13** **Single-click** on the desired **Sort Order**.
- Options are **Start Time**, **End Time**, **Job Name**, **Job Status**, **Machine Name**, and **Unsorted**.
- 14** **Single-click** on the appropriate button from the following selections:
- OK** - to accept all specified job selection criteria and dismiss the **Job Selection GUI**.
 - Job Activity Console (Ops Console)** is displayed.
 - Apply** - to accept all specified job selection criteria without dismissing the **Job Selection GUI**.
 - Repeat Steps 4 through 14 as necessary to specify additional job selection criteria.
 - Cancel** - to dismiss the **Job Selection GUI** without accepting any job selection criteria.
 - Job Activity Console (Ops Console)** is displayed.

Table 14.3-10. Specify Job Selection Criteria for the AutoSys Job Activity Console - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.2.1
2	Select Ops Console	single-click
3	Execute View → Select Jobs	single-click
4	Verify that the All Jobs toggle button is selected or unselected as applicable	single-click
5	Enter <job name> if applicable	enter text
6	Enter <box name> if applicable	enter text
7	Select Select by Status toggle button(s) if applicable	single-click
8	Verify that the All Machines toggle button is selected or unselected as applicable	single-click
9	Select name(s) of the desired machine(s) in the Select by Machine list if applicable	single-click

Table 14.3-10. Specify Job Selection Criteria for the AutoSys Job Activity Console - Quick-Step Procedures (2 of 2)

Step	What to Enter or Select	Action to Take
10	Select the desired machine(s) in Select by Machine area	single-click
11	Select the desired Sort Order	single-click
12	Select OK	single-click

14.3.9 Review Job Activities Using the AutoSys Job Activity Console

Table 14.3-11 presents (in a condensed format) the steps required to review job activities using the AutoSys **Job Activity Console**. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Specify job selection criteria for the AutoSys **Job Activity Console** - Refer to Section 14.3.1.
- 2 Review jobs in the **Job List** region of the **Job Activity Console**.
 - a. **Job Name, Description, Status, Commands, and Machine** are displayed in a table.
- 3 **Single-click** anywhere on a job row to display detailed information.
 - a. Job details are displayed in the **Currently Selected Job** region of the **Job Activity Console**.
- 4 Review the data in the **Currently Selected Job** region of the display.
 - a. Job name (**Currently Selected Job**), **Description, Command, Start Time** (and date), **End Time** (and date), **Run Time, Status, Exit Code, Next Start, Machine, Queue Name, Priority, and Num. of Tries** are displayed in a table.
- 5 Review **Starting Conditions**.
 - a. Overall job **Starting Conditions** are displayed.
 - b. Individual (atomic) starting conditions are displayed, including **Atomic Condition, Current State, and T/F** (whether the current state evaluates true or false) are displayed.
 - c. **Single-clicking** on a specific starting condition causes the **Currently Selected Job** to be updated to reflect the selected “upstream” dependency.
- 6 Review the **Job Report** region.
 - a. **Single-click** on the **Summary, Event, and None** buttons in the **Reports** area to view different reports.
 - b. Selected report button turns yellow.
 - c. **Summary** report shows the result of the last execution of the job including the following types of information: **Job Name, Last Start, Last End, Status, Run**.
 - d. **Event** report lists all events from the last execution of the job including the following types of information: **Status** [Event], **Time, Ntry** [number of tries], **EventState** [e.g., “Processed”], **ProcessTime, Machine**.

- 7 To change the state of the freeze-frame feature of the **Job Activity Console (Ops Console)** GUI **single-click** on the **Freeze Frame** toggle button.
 - a. The freeze-frame feature prevents the **Job Activity Console (Ops Console)** GUI from being updated, disrupting the display.
 - b. Deactivating the freeze-frame feature allows the display to be updated with new information.
 - c. By default the freeze-frame feature is activated.
 - d. The **Freeze Frame** toggle button is yellow when the freeze-frame feature is activated.

- 8 Start the exit from the AutoSys **Job Activity Console (Ops Console)** by **single-clicking** on the **Exit** button.
 - a. **AutoSys JAC Exit** GUI is displayed.
 - b. Subsequent procedure sections describe features that are accessible through the **Actions** and **Show** regions of the **Job Activity Console** (refer to Section 14.4).
 - c. Use and configuration of **Alarm** functions were described in previous sections.

- 9 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to dismiss the **Job Activity Console (Ops Console)** GUI.
 1. AutoSys **Job Activity Console (Ops Console)** GUI is dismissed.
 - b. **Cancel** - to return to the **Job Activity Console (Ops Console)** GUI.
 1. AutoSys **Job Activity Console (Ops Console)** GUI is displayed.

Table 14.3-11. Review Job Activities Using the AutoSys Job Activity Console - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Specify job selection criteria for the Job Activity Console	Use procedure in Section 14.3.8
2	Review jobs in the Job List region	observe
3	Select a job row for which detailed information is to be displayed	single-click
4	Review the data in the Currently Selected Job region	observe
5	Review the data in the Starting Conditions region	observe
6	Review reports in the Job Reports region	single-click
7	Select Exit	single-click
8	Select OK	single-click

14.4 Modifying Job Status

At times the Production Monitor may need to modify a particular job in any of the following ways:

- a. Start the job.
- b. Kill the job.

- c. Force the job to start.
- d. Place the job on hold.
- e. Take the job off hold.

The Production Monitor has the option of the following three methods for making those types of modifications to a particular job:

- a. Menu accessed by clicking the **right** mouse button on the relevant job name on either the **JobScope** or **TimeScope** GUI.
- b. Buttons in the **Actions** region of the **Job Activity Console (Ops Console)**.
- c. AutoSys **Send Event** GUI.

In AutoSys terms a control action such as starting or killing a job is accomplished by sending an “event” to the job. An event is basically a message. For example, clicking on the **Start Job** button on the AutoSys **Job Activity Console** begins the process by which AutoSys sends a “start” message to the **Currently Selected Job**.

In addition to the previously mentioned modifications to job status, the buttons in the **Actions** region of the **Job Activity Console (Ops Console)** allow the Production Monitor to generate one of the following types of reports:

- a. Jobs Completed.
- b. Jobs Waiting.

The menu accessed using the right mouse button on one of the AutoXpert GUIs allows the Production Monitor to initiate either of the following actions (in addition to the previously mentioned modifications to job status):

- a. Put the job on ice.
- b. Take the job off ice.

The **Send Event** GUI allows the Production Monitor to initiate a very broad range of actions, including any of the following items:

- a. Start the job.
- b. Kill the job.
- c. Force the job to start.
- d. Place the job on hold.
- e. Take the job off hold.
- f. Change the job’s status.
- g. Change the job’s queue priority.
- h. Put the job on ice.
- i. Take the job off ice.
- j. Stop the daemon (stop the Event Processor in an emergency).
- k. Set a global value.
- l. Send a signal concerning the job.
- m. Make a comment (for example, why a job start was forced).

Guidelines for Reporting Unsuccessful Completion of On-Demand Jobs

- a. Under any of the following circumstances involving an on-demand job notify User Services of the problem in accordance with the applicable local policy:
 - 1. Job is killed.
 - 2. Job terminates and cannot be restarted.
 - 3. A FAILPGE granule is created.
- b. The DAAC is obliged to send an e-mail message to the requester of an unsuccessful on-demand job to explain why the request cannot be fulfilled.

Guideline for Putting Jobs “On Ice” or “On Hold”

- a. Ensure that the job to be put either “on hold” or “on ice” is not already in a “starting” or “running” state. (A job that is either “starting” or “running” cannot be put “on hold” or “on ice.”)

Guidelines for Force-Starting Jobs

- a. Force-start command jobs (e.g., preprocessing or postprocessing) only; do not attempt to force-start a box job.
 - 1. The software does not support box job force-starts. (Although it may work fine in some cases, it can cause the PDPS database to get out of sync and prevent the DPR (and possibly other DPRs) from running successfully.)
 - 2. If a box job were force-started, the allocation portion of the preprocessing job would run again. Allocation might choose a different science processor than was chosen the previous time the job ran. Using a different science processor could cause failure of the job.
 - 3. After each job (and often within each job) the state of the DPR is tracked in various tables in the database. Box job force-starts lack the code needed to check the state of the box and perform the cleanup activities necessary for starting over.
- b. Ensure that the GUI has refreshed and the job to be force-started is not already running before trying to force-start a job. (If a job is already running, it should not be force-started.)
 - 1. If using AutoSys/AutoXpert 3.4.2 or a later version, it should not be possible to force-start jobs that are already running.
- c. If any command job other than execution fails, force-start the job that failed only. Do not force start any preceding or succeeding jobs in the box.
- d. If execution fails, it is not safe to restart it unless the post-processing job had been put on hold and the failure was detected before postprocessing started running.
- e. If execution fails and the failure was not detected before postprocessing started running, the DPR must run to completion as a failed PGE and the DPR must be deleted and recreated.

In any case the Production Monitor may implement certain changes of job status only when the Production Monitor “owns” the job affected by the modification.

Table 14.4-1 provides an Activity Checklist for activities related to Modifying Job Status.

Table 14.4-1. Modifying Job Status - Activity Checklist (1 of 2)

Order	Role	Task	Section	Complete?
1	Production Monitor	Determine the Ownership of an AutoSys Job	(P) 14.4.1	
2	Production Monitor	Send an Event to a Job	(P) 14.4.2	
3	Production Monitor	Send an Event to a Job from an AutoXpert GUI	(P) 14.4.2.1	
4	Production Monitor	Send an Event to a Job from the Job Activity Console	(P) 14.4.2.2	

Table 14.4-1. Modifying Job Status - Activity Checklist (2 of 2)

Order	Role	Task	Section	Complete?
5	Production Monitor	Send an Event to a Job from the Send Event GUI	(P) 14.4.2.3	
6	Production Monitor	Cancel a Sent Event	(P) 14.4.3	
7	Production Monitor	Perform Job Management Functions	(P) 14.4.4	

14.4.1 Determine the Ownership of an AutoSys Job

AutoSys is very much ownership-aware. Only the “owner” of a job has “edit” privileges and can make changes to the status of an owned job.

AutoSys recognizes ownership in terms of two factors:

- a. User ID.
- b. Machine where the operator (user) logged in.

For example, cmshared@g0sps06 identifies the operator who logged in as “cmshared” at machine g0sps06. Any operator who logs in as “cmshared” at another machine (e.g., g0pls01) would not be able to change the status of a job “owned” by cmshared@g0sps06. Consequently, to have any real effect on a job first it is necessary to log in as the job’s owner and launch the AutoSys GUIs as that owner.

Table 14.4-2 presents (in a condensed format) the steps required to determine the ownership of a job. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **AutoSys GUI Control Panel** (refer to Section 14.1.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2 Click on the **JobScape** button on the **AutoSys GUI Control Panel**.
 - a. The **JobScape** GUI is displayed.
- 3 Place the mouse cursor on the relevant job and **single-click** and **hold** the **right** mouse button.
 - a. Pop-up menu appears.
 - b. Options are **Show Children, Show All Descendants, Hide All Descendants, Show Job Arrows, Hide Job Arrows, Show Box Arrows, Hide Box Arrows, Job Definition, View Dependencies, Set Simulation Overrides** [grayed out], **Start Job, Kill Job, Force Start Job, On Hold, Off Hold, On Ice, Off Ice**.
- 4 Select **Job Definition** from the pop-up menu (release the right mouse button).
 - a. The **Job Definition** GUI is displayed.
 - b. If the current UserID does not “own” (have edit permissions on) the job, a **Job Security MESSAGE** window is displayed.
- 5 If a **Job Security MESSAGE** window is displayed, **single-click** on the **Ok** button.
 - a. The **Job Security MESSAGE** window is dismissed.

- 6 Review the entry in the **Owner** field of the **Job Definition** GUI.
 - a. Job owner is identified in the **Owner** field of the **Job Definition** GUI.
 - b. Job name is listed in the **Job Name** field of the **Job Definition** GUI.

NOTE: Jobs should **not** be deleted using the AutoSys **Job Definition** GUI because it does not communicate with the PDPS database.

- 7 To exit from the **Job Definition** GUI, **single-click** on the **Exit** button.

Table 14.4-2. Determine the Ownership of an AutoSys Job - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.1.1
2	Select JobScope	single-click
3	Select <job name>	single-click
4	Execute <job name> → Job Definition	right-click
5	Review the job owner information in the Owner field	observe
6	Select Exit to quit Job Definition	single-click

14.4.2 Send an Event to a Job

As previously mentioned there are three methods for making certain types of modifications (e.g., start or kill) to a particular job:

- a. Menu accessed by clicking the **right** mouse button on the relevant job name on either the **JobScope** or **TimeScope** GUI.
- b. Buttons in the **Actions** region of the **Job Activity Console (Ops Console)**.
- c. AutoSys **Send Event** GUI.

14.4.2.1 Send an Event to a Job from an AutoXpert GUI

Table 14.4-3 presents (in a condensed format) the steps required to send an event to a job from an AutoXpert GUI. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **AutoSys GUI Control Panel** (refer to Section 14.1.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2 **Single-click** on either the **JobScope** button or the **TimeScope** button (as desired) on the **AutoSys GUI Control Panel**.
 - a. The selected GUI (i.e., **JobScope** or **TimeScope**) is displayed.

- 3 Place the mouse cursor on the relevant job and **single-click** and **hold** the **right** mouse button.
 - a. Pop-up menu appears.
 - b. Options are **Show Children, Show All Descendants, Hide All Descendants, Show Job Arrows, Hide Job Arrows, Show Box Arrows, Hide Box Arrows, Job Definition, View Dependencies, Set Simulation Overrides** [grayed out], **Start Job, Kill Job, Force Start Job, On Hold, Off Hold, On Ice, Off Ice**.
- 4 Select the event (e.g., **Force Start Job, On Hold**) to be sent to the job from the pop-up menu (release the right mouse button).
 - a. A confirmation dialogue box is displayed.
- 5 **Single-click** on the appropriate button from the following selections:
 - a. **Yes** - to send the event to the job.
 1. The confirmation dialogue box is dismissed.
 2. The specified action is taken.
 - b. **No** – to dismiss the confirmation dialogue box without sending the event to the job.
- 6 Start the exit from **JobScape** or **TimeScape** by executing the following menu path:
File → Exit
 - a. **JobScape** [or **TimeScape**] **Exit** GUI is displayed.
- 7 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to dismiss the **JobScape** or **TimeScape** GUI.
 1. AutoXpert **JobScape** or **TimeScape** GUI is dismissed.
 - b. **Cancel** - to return to the **JobScape** or **TimeScape** GUI.
 1. AutoXpert **JobScape** or **TimeScape** GUI is displayed.

Table 14.4-3. Send an Event to a Job from an AutoXpert GUI - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.1.1
2	Select either JobScape or TimeScape	single-click
3	Execute <job name> → <event>	right-click
4	Select Yes	single-click
5	Execute File → Exit if desired	single-click
6	Select OK if desired	single-click

14.4.2.2 Send an Event to a Job from the Job Activity Console

Table 14.4-4 presents (in a condensed format) the steps required to send an event to a job from the **Job Activity Console (Ops Console)**. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Specify job selection criteria for the AutoSys **Job Activity Console** - Refer to Section 14.3.8.
- 2 Verify that the job with the status to be modified is listed in the **Currently Selected Job** field of the **Job Activity Console (Ops Console)**.
 - a. **Single-click** on the job row in the **Job List** region of the **Job Activity Console** if necessary.
 1. Information concerning the selected job is displayed in the **Currently Selected Job** region of the **Job Activity Console**.
- 3 **Single-click** on the button corresponding to the desired action to be taken with respect to the selected job (if there is a corresponding button in the **Actions** region of the **Job Activity Console**).
 - a. Options are **Start Job**, **Kill Job**, **Force Start Job**, [Put Job] **On Hold**, [Take Job] **Off Hold**, [Display] **Jobs Completed** [Report], [Display] **Jobs Waiting** [Report].
 - b. A confirmation dialogue box is displayed.
- 4 **Single-click** on the appropriate button from the following selections:
 - a. **Yes** - to send the event to the job.
 1. The confirmation dialogue box is dismissed.
 2. The specified action is taken.
 - b. **No** – to dismiss the confirmation dialogue box without sending the event to the job.
- 5 Start the exit from the **Job Activity Console (Ops Console)** GUI by **single-clicking** on the **Exit** button.
 - a. **AutoSys JAC Exit** GUI is displayed.
 - b. Subsequent procedure sections describe features that are accessible through the **Actions** and **Show** regions of the **Job Activity Console** (refer to Section 14.4).
 - c. Use and configuration of **Alarm** functions were described in previous sections.
- 6 **Single-click** on the appropriate button from the following selections:
 - a. **OK** - to dismiss the **Job Activity Console (Ops Console)** GUI.
 1. AutoSys **Job Activity Console (Ops Console)** GUI is dismissed.
 - b. **Cancel** - to return to the **Job Activity Console (Ops Console)** GUI.
 1. AutoSys **Job Activity Console (Ops Console)** GUI is displayed.

Table 14.4-4. Send an Event to a Job from the Job Activity Console – Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Specify job selection criteria for the Job Activity Console	Use procedure in Section 14.3.8
2	Review jobs in the Job List region	Observe
3	Select a job row for which detailed information is to be displayed	Single-click
4	Select the button corresponding to the desired action to be taken	Single-click
5	Select Yes	Single-click
6	Select Exit if desired	single-click
7	Select OK if desired	single-click

14.4.2.3 Send an Event to a Job from the Send Event GUI

Table 14.4-5 presents (in a condensed format) the steps required to send an event to a job from the **Send Event** GUI. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Specify job selection criteria for the AutoSys **Job Activity Console** - Refer to Section 14.3.8.
- 2 In the **Job List** region of the **Job Activity Console** **single-click** on the job row corresponding to the job with the status to be modified.
 - a. Information concerning the selected job is displayed in the **Currently Selected Job** region of the **Job Activity Console**.
- 3 **Single-click** on the **Send Event** button in the **Actions** Region of the **Job Activity Console**.
 - a. **Send Event** GUI is displayed.
 - b. **Send Event** defaults are:
 1. **Start Job** for **Event Type**.
 2. **Now** for **Time**.
 3. **Normal** for **Send Priority**.
 - c. If the default settings are the desired settings, proceed to Step 18.
- 4 Verify that the correct job is listed in the **Job Name** field of the **Send Event** GUI.
 - a. If not, **single-click** on the **Cancel** button and select the correct job (return to Step 2).
- 5 **Single-click** on the **Event Type** to be sent to the job in AutoSys.
 - a. Options are **Start Job, Job On Hold, Job Off Hold, Comment, Stop Demon, Force Start Job, Job On Ice, Job Off Ice, Kill Job, Change Status, Change Priority, Set Global, and Set Signal**.
 - b. Remember that a job with status of either “starting” or “running” cannot be put “on hold” or “on ice.”
 - c. Note that the GUI has an option to **Cancel Previously Sent Event**.
- 6 To select a future time for sending the event to the job **single-click** on the **Future** button.
 - a. If **Now** (the default value) is desired, proceed to Step 10.
 1. Current date and time are default values.
- 7 In the **Date** field enter:
<MM/DD/YYYY>
- 8 In the **Time** field enter:
<hh:mm>
- 9 **Single-click** on either the **A.M.** or **P.M.** button as applicable.
- 10 If **Comment** was selected as the **Event Type**, in the **Comment** field enter:
<comment>

- a. **Comment** is a free-form field for entering text to be sent to the specified job.
- 11** Verify the entry in the **AUTOSERV Instance** field.
- a. If incorrect enter:
<**AUTOSERV Instance**>
 - b. **AUTOSERV Instance** field specifies the instance of AutoSys to which the event will be sent. (You can send events to instances of AutoSys other than the one you are running.)
 - c. The current AutoSys instance should be displayed by default in the **AUTOSERV Instance** field.
- 12** If **Set Global** was selected as the **Event Type**, in the **Global Name** field enter:
<**Global Name**>
- a. The **Global Name** and **Global Value** fields are accessible only if **Set Global** was selected in the **Event Type** region.
 - b. The name in the **Global Name** field identifies a variable that is made available to all jobs in AutoSys; consequently, it is a “global” variable.
- 13** If **Set Global** was selected as the **Event Type**, in the **Global Value** field enter:
<**Global Value**>
- 14** If either **Send Signal** or **Kill Job** was selected as the **Event Type**, in the **Signal** field enter:
<**number of UNIX signal**>
- a. The **Signal** field is accessible only if **Send Signal** or **Kill Job** was selected in the **Event Type** region.
 - b. Numbers corresponding to UNIX signals are shown in Table 14.4-6.
- 15** If **Change Status** was selected as the **Event Type**, **single-click** on the **Status** option menu button and select the desired status.
- a. Options are: **Running, Success, Failure, Terminated, Starting, and Inactive.**
 - b. **Status** can be changed only if **Change Status** was selected in the **Event Type** region.
- 16** If **Change Priority** was selected as the **Event Type**, in the **Queue Priority** field enter:
<**Queue Priority**>
- 17** If sending the event to the job is due to an emergency condition, **single-click** on the **High** button in the **Send Priority** area.
- a. **Send Priority** refers to the priority for sending the selected event to the job (not the job priority).
 - b. Options are **Normal** and **High**.
 - c. **High** priority is reserved for emergencies.
- 18** **Single-click** on the **Execute** button.
- a. A confirmation dialogue box is displayed.
- 19** **Single-click** on the appropriate button from the following selections:
- a. **Yes** - to send the event to the job.

1. The confirmation dialogue box is dismissed.
 2. The selected event is sent to the specified job.
 3. **Job Activity Console** is displayed.
 4. Once an event has been sent from the **Send Event** dialogue, it may not be possible to cancel or modify it.
- b. **No** – to dismiss the confirmation dialogue box and return to the **Send Event** GUI without sending the event to the job.
- 20 Start the exit from the **Job Activity Console (Ops Console)** GUI by **single-clicking** on the **Exit** button.
- a. **AutoSys JAC Exit** GUI is displayed.
 - b. Subsequent procedure sections describe features that are accessible through the **Actions** and **Show** regions of the **Job Activity Console** (refer to Section 14.4).
 - c. Use and configuration of **Alarm** functions were described in previous sections.
- 21 **Single-click** on the appropriate button from the following selections:
- a. **OK** - to dismiss the **Job Activity Console (Ops Console)** GUI.
 1. AutoSys **Job Activity Console (Ops Console)** GUI is dismissed.
 - b. **Cancel** - to return to the **Job Activity Console (Ops Console)** GUI.
 1. AutoSys **Job Activity Console (Ops Console)** GUI is displayed.

Table 14.4-5. Send an Event to a Job from the Send Event GUI – Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	Specify job selection criteria for the Job Activity Console	Use procedure in Section 14.3.8
2	Review jobs in the Job List region	observe
3	Select a job row for which detailed information is to be displayed	single-click
4	Select Send Event	single-click
5	Select the Event Type to be sent to the job	single-click
6	Verify job name in the Job Name field	enter text if necessary
7	Select either Now or Future	single-click
8	Enter <date > if Future was selected	enter text if applicable
9	Enter <time> if Future was selected	enter text if applicable
10	Select either A.M. or P.M. if Future was selected	enter text if applicable
11	Enter <comment> if Comment was selected as the Event Type	enter text
12	Enter the <AUTOSERV Instance> if incorrect	enter text
13	Enter the <Global Name> if Set Global was selected as the Event Type	enter text
14	Enter the <Global Value> if Set Global was selected as the Event Type	enter text

**Table 14.4-5. Send an Event to a Job from the Send Event GUI –
Quick-Step Procedures (2 of 2)**

Step	What to Enter or Select	Action to Take
15	Enter <number of UNIX signal> in the Signal field if either Send Signal or Kill Job was selected as the Event Type	enter text
16	Select the <status> if Change Status was selected as the Event Type	single-click
17	Enter the <Queue Priority> if Change Priority was selected as the Event Type	enter number
18	Select the <send priority> if applicable	single-click
19	Select Execute	single-click
20	Select Yes	single-click
21	Select Exit if desired	single-click
22	Select OK if desired	single-click

Table 14.4-6. UNIX Signals (1 of 2)

NAME	VALUE	DEFAULT	EVENT
HUP	1	Exit	Hangup.
INT	2	Exit	Interrupt.
QUIT	3	Core	Quit.
ILL	4	Core	Illegal Instruction.
TRAP	5	Core	Trace/Breakpoint Trap.
ABRT	6	Core	Abort.
EMT	7	Core	Emulation Trap.
FPE	8	Core	Arithmetic Exception.
KILL	9	Exit	Killed.
BUS	10	Core	Bus Error.
SEGV	11	Core	Segmentation Fault.
SYS	12	Core	Bad System Call.
PIPE	13	Exit	Broken Pipe.
ALRM	14	Exit	Alarm Clock.
TERM	15	Exit	Terminated.
USR1	16	Exit	User Signal 1.
USR2	17	Exit	User Signal 2.
CHLD	18	Ignore	Child Status Changed.
PWR	19	Ignore	Power Fail/Restart.
WINCH	20	Ignore	Window Size Change
URG	21	Ignore	Urgent Socket Condition.
POLL	22	Exit	Pollable Event.
STOP	23	Stop	Stopped (signal).

Table 14.4-6. UNIX Signals (2 of 2)

NAME	VALUE	DEFAULT	EVENT
TSTP	24	Stop	Stopped (user).
CONT	25	Ignore	Continued.
TTIN	26	Stop	Stopped (tty input).
TTOU	27	Stop	Stopped (tty output).
VTALRM	28	Exit	Virtual Timer Expired
PROF	29	Exit	Profiling Timer Expired.
XCPU	30	Core	CPU time limit exceeded.
XFSZ	31	Core	File size limit exceeded.
WAITING	32	Ignore	Concurrency signal reserved by threads library
LWP	33	Ignore	Inter-LWP signal reserved by threads library.
FREEZE	34	Ignore	Check point Freeze
THAW	35	Ignore	Check point Thaw
CANCEL	36	Ignore	Cancellation signal reserved by threads library.
RTMIN	*	Exit	First real time signal
(RTMIN+1)	*	Exit	Second real time signal
(RTMAX-1)	*	Exit	Second-to-last real time signal.
RTMAX	*	Exit	Last real time signal

*The symbols RTMIN through RTMAX are evaluated dynamically in order to permit future configurability.

14.4.3 Cancel a Sent Event

Table 14.4-7 presents (in a condensed format) the steps required to cancel an event that was previously scheduled for *sometime in the future*. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 **Single-click** on the **Send Event** button in the **Actions** Region of the **Job Activity Console**.
 - a. **Send Event** GUI is displayed.
- 2 **Single-click** on the **Event Type** that was sent to the job and is to be cancelled.
 - a. Options are **Start Job, Job On Hold, Job Off Hold, Comment, Stop Demon, Force Start Job, Job On Ice, Job Off Ice, Kill Job, Change Status, Change Priority, Set Global, and Set Signal**.
- 3 **Single-click** on the **Cancel Previously Sent Event** radio button.
- 4 **Verify Job Name**.
 - a. **<Job Name>** appears in the **Job Name** field.
 - b. Enter the proper **<Job Name>** if incorrect.

- 5 **Single-click** on the **Execute** button.
 - a. A confirmation dialogue box is displayed requesting permission to proceed with canceling the event.

- 6 Click on the appropriate button from the following selections:
 - a. **yes** - to send the request to cancel the event.
 1. The event is cancelled.
 2. **Job Activity Console (Ops Console)** GUI is displayed.
 - b. **no** - to dismiss the dialogue box and return to the **Send Event** GUI without sending the request to cancel the event.

Table 14.4-7. Cancel a Sent Event - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Select the Send Event button	single-click
2	Select the Event Type that was sent to the job and is to be cancelled	single-click
3	Select the Cancel Previously Sent Event button	single-click
4	Verify job name in the Job Name field	enter text if necessary
5	Select Execute	single-click
6	Select yes	single-click

14.4.4 Perform Job Management Functions

The Job Management Client tool is a set of utility programs intended primarily for use by software developers. However, if necessary, it is possible to gain access to the following Job Management Client functions from AutoSys by clicking on the **Client Tool** button in the **Actions** region of the **Job Activity Console**:

- a. Create DPR Job.
- b. Release DPR Job.
- c. Cancel DPR Job.
- d. Change DPR ID.
- e. View Job Management DPR Queue.
- f. Create Ground Event Job.
- g. Cancel Ground Event Job.
- h. Change Max Jobs for Autosys Instance.

Table 14.4-8 presents (in a condensed format) the steps required to perform job management functions using the AutoSys **Job Activity Console**. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Verify that the job with the status to be modified is listed in the **Currently Selected Job** field of the **Job Activity Console (Ops Console)** .
 - a. **Single-click** on the job row in the **Job List** region of the **Job Activity Console** if necessary.
 1. Information concerning the selected job is displayed in the **Currently Selected Job** region of the **Job Activity Console**.

- 2 **Single-click** on the **Client Tool** button in the **Actions** Region of the **Job Activity Console**.
 - a. A confirmation dialogue box is displayed.

- 3 **Single-click yes**.
 - a. The dialogue box closes.
 - b. The **Jobs Activation User Interface** window is displayed.
 - c. The following menu options are displayed:
 - 0) **Exit**
 - 1) **Create Dpr Job**
 - 2) **Release Dpr Job**
 - 3) **Cancel Dpr Job**
 - 4) **Change Dpr Id**
 - 5) **View Job Management Dpr Queue**
 - 6) **Create Ground Event Job**
 - 7) **Cancel Ground Event Job**
 - 8) **Change Max Jobs for Autosys Instance**

- 4 Enter the number corresponding to the desired function at the **enter an option** prompt.

- 5 Enter responses to Job Management Client prompts.

- 6 To quit the Job Management Client enter **0** at the **enter an option** prompt.

Table 14.4-8. Perform Job Management Functions - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Verify job name in the Currently Selected Job field of the Job Activity Console (Ops Console)	single-click if necessary
2	Select the Client Tool button	single-click
3	Select yes	single-click
4	Enter the number corresponding to the desired function	enter number, press Enter
5	Enter responses to Job Management Client prompts	enter text, press Enter
6	Enter 0 at the enter an option prompt to quit the Job Management Client	enter text, press Enter

14.5 Reviewing Activity and Job Dependency Reports, and Defining and Running Monitors/Browsers

The following two types of useful reports can be generated using AutoSys commands:

- a. Activity Report.
- b. Job Dependency Report.

The AutoSys Activity Report provides the results of the execution of jobs as monitored by AutoSys. It is similar to the Summary Report that is accessible by clicking on the **Summary** button in the **Reports** region of the **Job Activity Console (Ops Console)** GUI.

The AutoSys Job Dependency Report reports information about the dependencies and conditions of jobs. It is accessible by clicking on the **Dependent Jobs** button in the **Show** region of the **Job Activity Console (Ops Console)** GUI as well as through the use of an AutoSys command.

Table 14.5-1 provides an Activity Checklist for activities related to Reviewing Activity and Job Dependency Reports, and Defining and Running Monitors/Browsers.

Table 14.5-1. Reviewing Activity and Job Dependency Reports, and Defining and Running Monitors/Browsers - Activity Checklist

Order	Role	Task	Section	Complete?
1	Production Monitor	Review a Job Activity Report	(P) 14.5.1	
2	Production Monitor	Review a Job Dependency Report	(P) 14.5.2	
3	Production Monitor	Define Monitors/Browsers	(P) 14.5.3	
4	Production Monitor	Run Monitor/Browser from the Monitor/Browser GUI	(P) 14.5.4	
5	Production Monitor	Run Monitor/Browser from the Command Shell	(P) 14.5.5	

14.5.1 Review a Job Activity Report

The process of reviewing an Activity Report begins with the Production Monitor running the AutoSys **autorep** command. The **autorep** command reports information about a job, jobs within boxes, machines, and machine status.

Table 14.5-2 presents (in a condensed format) the steps required to display and review the Activity Report using the AutoSys **autorep** command. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 At the UNIX command line prompt enter:
`/usr/ecs/<MODE>/COTS/autosys/bin/autorep -J ALL`
 - a. Directory path may vary with installation.
 - b. Activity Report is displayed on the UNIX standard output.

- c. Enter **<job name>** in place of **ALL** for a specific job.
 - d. Enter **-M <machine name>** for a Machine Report.
 - e. Enter **-s** for a summary report.
 - f. Enter **-d** for a Detailed Report.
 - g. Enter **-q** for a Query Report.
- 2 Add | **lp** to the preceding command line to print the document or add
> **/<path>/<filename>** to save the report in a file.
- a. Activity Report is printed or saved in a file as applicable.
- 3 Review the Activity Report to determine job states.
- a. Completed.
 - b. Currently running.
 - c. In the AutoSys queue.

Table 14.5-2. Review a Job Activity Report - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Enter /usr/ecs/<MODE>/COTS/autosys/bin/autorep -J ALL	enter text, press Enter
2	Review the Activity Report to determine job states	observe

14.5.2 Review a Job Dependency Report

The process of reviewing a Job Dependency Report begins with the Production Monitor running the AutoSys **job_depends** command. The **job_depends** command reports information about the dependencies and conditions of a job. The command can be used to determine the current state of a job, its job dependencies, the dependencies and nested hierarchies (for boxes) as specified in the job definition, and a forecast of what jobs will run during a given period of time.

Table 14.5-3 presents (in a condensed format) the steps required to display and review the Job Dependency Report using the AutoSys **job_depends** command. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 At the UNIX command line prompt enter:
- /usr/ecs/<MODE>/COTS/autosys/bin/job_depends -c -J <job name>**
- a. Directory path may vary with installation.
 - b. Job Dependency report is displayed.
 - c. Enter **-c** for current condition status.
 - d. Enter **-d** for dependencies only.
 - e. Enter **-t** for time dependencies.
 - f. Enter **-J <job name>** to indicate a specific job as the subject of the report. Use **ALL** for all jobs.

- 2 Add | **lp** to the preceding command line to print the document or add > /<**path**>/<**filename**> to save the report in a file.
 - a. Job Dependency report is printed or saved in a file as applicable.
- 3 Review the Job Dependency Report to determine job dependencies.

Table 14.5-3. Review a Job Dependency Report - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Enter /usr/ecs/<MODE>/COTS/autosys/bin/job_dependencies -c -J <job name>	enter text, press Enter
2	Review the Job Dependency Report to determine job dependencies	observe

14.5.3 Define Monitors/Browsers

The current edition of the *Release 6A Operations Tools Manual for the ECS Project* (609-CD-600-001) indicates that ECS does not support the AutoSys monitor/browser capabilities. However, they are functional and the Production Monitor can use them (with no expectation of ECS support if problems are encountered).

Although some Production Monitors may wish to monitor all events, it is more likely that they will prefer to limit monitoring to alarms and changes of job status (e.g., from “running” to “success” or “failure”). The browser function is particularly useful for determining the eventual status of jobs run during the preceding shift or day; for example, which jobs were successful, which jobs failed, and which jobs are still running.

Table 14.5-4 presents (in a condensed format) the steps required to define a monitor or browser. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **AutoSys GUI Control Panel** (refer to Section 14.1.1).
 - a. The **AutoSys GUI Control Panel** is displayed.
- 2 **Single-click** on the **Monitor/Browser** button on the **AutoSys GUI Control Panel**.
 - a. The **Monitor/Browser** GUI is displayed.
 - b. Monitor/Browser defaults are:
 1. **Monitor** for **Mode**.
 2. **ALL EVENTS** for **Types of Events**.
 3. **ALL Jobs** for **Job Selection Criteria**.
- 3 In the **Name** field enter:
<name>
- 4 Verify that the appropriate **Mode** button is selected.
 - a. The selected button is yellow.

- b. If necessary, **single-click** on the appropriate **Mode** button.
- c. Options are **Monitor** and **Browser**.
 - 1. If **Monitor** is selected, settings are defined for a monitor.
 - 2. If **Browser** is selected, settings are defined for a report.

- 5 To select “all events” for the types of events (in the **Monitor/Browse these Types of Events** area) verify that the **ALL EVENTS** toggle button has been selected.
- a. If necessary, **single-click** on the **ALL EVENTS** toggle button.
 - b. The button is yellow when it has been selected.

--- OR ---

To select **Alarms** and/or **All Job CHANGE-STATUS Events** and/or the available individual **Job Status Event(s)** **single-click** on the appropriate button(s).

- a. Job CHANGE_STATUS Event options are Running, Success, Failure, Terminated, Starting, ReStart.
 - b. The button(s) is/are yellow when selected.
- 6 **Single-click** on the appropriate button to select the desired **Job Selection Criteria**.
- a. Options are **All Jobs**, **Box with its Jobs**, or **Single Job**.
 - b. The selected button is yellow.
- 7 If **Single Job** is specified for **Job Selection Criteria**, in the **Job Name** field enter:
<job name>
- 8 If a monitor is being defined, verify that the desired **Monitor Options** are selected.
- c. If necessary, **single-click** on the appropriate toggle button(s).
 - 1. Options are Sound and Verification Required for Alarms.
 - 2. The button(s) is/are yellow when selected.
- 9 If a browser is being defined, verify that the desired **Browser Time Criteria** are selected.
- a. If necessary, **single-click** on the appropriate button to specify whether the report should concern the **Current Run Only**.
 - 1. Options are **Yes** and **No**.
 - 2. The selected button is yellow.
- 10 If **No** was selected for **Current Run Only**, in the **Events After Date/Time** field enter:
<MM/DD/YYYY hh:mm>
- 11 **Single-click** on the **Save** button.
- a. Monitor/browser definition is saved to the database.
 - b. You must **Save** the configuration first before monitor/browser can be viewed.
- 12 To run the monitor/browser that has just been defined **single-click** on the **Run MonBro** button.
- a. Monitor/browser is displayed in a separate window.
- 13 Review the monitor/browser results.
- 14 To exit from a browser or monitor, in the monitor/browser window enter:

Ctrl-C

a. Monitor/browser window is dismissed.

- 15** To exit from the **Monitor/Browser GUI** **single-click** on the **Exit** button
- a. The **Monitor/Browser GUI** is dismissed.

Table 14.5-4. Define Monitors/Browsers - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.1.1
2	Select the Monitor/Browser button	single-click
3	Enter monitor or browser <name> in the Name field	enter text
4	Select the Mode (Monitor or Browser)	single-click
5	Select the desired option(s) in the Monitor/Browse these Types of Events area	single-click
6	Select the desired option in the Job Selection Criteria area	single-click
7	Enter <job name> if Single Job was selected	enter text
8	Select the desired Monitor Options (if a monitor is being defined)	single-click
9	Select the desired Browser Time Criteria (if a browser is being defined)	single-click
10	Enter <MM/DD/YYYY hh:mm> in the Events After Date/Time field if No was selected for Current Run Only	enter text
11	Select the Save button	single-click
12	Select the Run MonBro button to run the monitor/browser that has just been defined	single-click
13	Review the monitor/browser results	observe
14	Enter Ctrl-C in the monitor/browser window to exit from the monitor/browser	enter text, press Enter
15	Select the Exit button to exit from the Monitor/Browser GUI	single-click

14.5.4 Run Monitor/Browser from the Monitor/Browser GUI

Table 14.5-5 presents (in a condensed format) the steps required to run a previously defined monitor or browser using the **Monitor/Browser GUI**. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1** Launch the **AutoSys GUI Control Panel** (refer to Section 14.1.1).
- a. The **AutoSys GUI Control Panel** is displayed.

- 2 **Single-click** on the **Monitor/Browser** button on the **AutoSys GUI Control Panel**.
 - a. The **Monitor/Browser** GUI page is displayed.
- 3 If the name of the monitor/browser is known, in the **Name** field enter:

<name>

 - a. Proceed to Step 7.
- 4 If the name of the monitor/browser is **not** known, in the **Name** field enter:

%

 - a. The percent sign is used as a wild card.
- 5 **Single-click** on the **Search** button.
 - a. A dialogue box containing a list of previously defined monitors/browsers is displayed.
- 6 **Double-click** on the name of the monitor/browser in the list displayed in the dialogue box to retrieve the desired monitor/browser.
- 7 **Single-click** on the **Run MonBro** button.
 - a. Monitor/browser is displayed in a separate window.
- 8 Review the monitor/browser results.
- 9 To exit from the **Monitor/Browser** GUI **single-click** on the **Exit** button
 - a. The **Monitor/Browser** GUI is dismissed.
- 10 To exit from a browser or monitor, in the monitor/browser window enter:

Ctrl-C

 - a. Monitor/browser window is dismissed.

Table 14.5-5. Run Monitor/Browser from the Monitor/Browser GUI - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the AutoSys GUI Control Panel	Use procedure in Section 14.1.1
2	Select the Monitor/Browser button	single-click
3	Enter monitor or browser <name> in the Name field	enter text
4	Select the Run MonBro button	single-click
5	Review the monitor/browser results	observe
6	Select the Exit button to exit from the Monitor/Browser GUI	single-click
7	Enter Ctrl-C to exit from a browser or monitor	enter text, press Enter

14.5.5 Run Monitor/Browser from the Command Shell

Table 14.5-6 presents (in a condensed format) the steps required to run a previously defined monitor or browser from the command shell. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.
- 2 In the terminal window, at the command line prompt, start the log-in to the Queuing Server by entering:
/tools/bin/ssh <hostname>
 - a. Examples of hostnames include **e0sps04**, **g0sps06**, **l0sps03**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.
- 3 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
 - a. Go to Step 5.
- 4 At the **<user@remotehost>'s password:** prompt enter:
<Password>
- 5 In the terminal window, at the command line, enter:
cd /usr/ecs/<MODE>/COTS/autosys/bin
 - a. **<MODE>** is current mode of operation.
 1. TS1 - Science Software Integration and Test (SSI&T)
 2. TS2 - New Version Checkout
 3. OPS - Normal Operations
 - b. The path may vary with the specific site installation.
 - c. The command shell prompt is displayed.
- 6 At the UNIX command line prompt enter:
monbro -N <name> &
 - a. Refer to the AutoSys Manual for all options and displays for **monbro** reports.

- b. The monitor/browser must have been previously defined using the **Monitor/Browser** GUI.
- 7 Review the monitor/browser results.
 - 8 Enter **Ctrl-C** to exit from a browser or monitor.

Table 14.5-6. Run Monitor/Browser from the Command Shell - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the ECS System using secure shell	Enter text, press Enter
2	Enter <code>cd /usr/ecs/<MODE>/COTS/autosys/bin</code>	enter text, press Enter
3	Enter <code>monbro -N <name> &</code>	enter text, press Enter
4	Review the monitor/browser results	observe
5	Enter Ctrl-C to exit from a browser or monitor	enter text, press Enter

14.6 Changing the Database Maintenance Time

Once a day, the Event Processor (also known as the AutoSys daemon) goes into an internal database maintenance cycle. During this time, the Event Processor does not process any events and waits for completion of the maintenance activities before resuming normal operations. The time of day that this maintenance cycle starts up is pre-set to 3:30 PM. If necessary to change the time at which it runs, it should be reset to a time of minimal activity. The time required for the database maintenance cycle is approximately one minute.

Table 14.6-1 provides an Activity Checklist for activities related to Changing the Database Maintenance Time.

Table 14.6-1. Changing the Database Maintenance Time - Activity Checklist

Order	Role	Task	Section	Complete?
1	Production Monitor Database Administrator	Change AutoSys Event Processor Database Maintenance Time	(P) 14.6.1	

14.6.1 Change AutoSys Event Processor Database Maintenance Time

Table 14.6-2 presents (in a condensed format) the steps required to modify the AutoSys Event Processor database maintenance time. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

- 2 In the terminal window, at the command line prompt, start the log-in to the Queuing Server by entering:
/tools/bin/ssh <hostname>
 - a. Examples of hostnames include **e0sps04, g0sps06, l0sps03**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.

- 3 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
 - a. Go to Step 5.

- 4 At the **<user@remotehost>'s password:** prompt enter:
<Password>

- 5 In the terminal window, at the command line, enter:
cd /usr/ecs/ <MODE>/COTS/autotree/autouser
 - a. **<MODE>** is current mode of operation.
 1. TS1 - Science Software Integration and Test (SSI&T)
 2. TS2 - New Version Checkout
 3. OPS - Normal Operations
 - b. “autouser” is the directory containing the AutoSys configuration files.
 - c. The path may vary with the specific site installation; e.g., the **autotree** directory may be identified as **autotreeb** at some sites.

- 6 At the UNIX command line prompt enter:
vi config.<AUTOSYSINSTANCE>
 - a. The configuration file is displayed by the vi text editor.
 - b. Although this procedure has been written for the vi command, any UNIX editor can be used to edit the configuration file.

- 7 Using vi editor commands find **DBMaintTime = <hh:mm>**.
 - a. **<hh:mm>** refers to the current database maintenance time.

- 8 Using vi editor commands replace the current database maintenance time with the desired time.
 - a. The time may already have been changed to some value other than 03:30 (e.g., **DBMaintTime=04:00**).
 - b. The following vi editor commands are useful:
 1. **h** (move cursor left).
 2. **j** (move cursor down).
 3. **k** (move cursor up).
 4. **l** (move cursor right).
 5. **a** (append text).
 6. **i** (insert text).
 7. **x** (delete a character).
 8. **u** (undo previous change).
 9. **Esc** (switch to command mode).

- 8 Press the **Esc** key.

- 9 To save the configuration file enter:

ZZ

 - a. New database maintenance time is entered and saved in the configuration file.
 - b. UNIX prompt is displayed.

Table 14.6-2. Change AutoSys Event Processor Database Maintenance Time - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the ECS System using secure shell	Enter text, press Enter
2	Enter <code>cd /usr/ecs/<MODE>/COTS/<autotree>/autouser</code>	Enter text, press Enter
3	Enter <code>vi config.<AUTOSERV_INSTANCE></code>	Enter text, press Enter
4	Use vi editor commands to find DBMaintTime = <hh:mm>	enter text
5	Use vi editor commands to replace <hh:mm>	enter text
6	Press Esc	enter text
7	Enter ZZ	enter text, press Enter

14.7 Tuning System Parameters

The values assigned to system parameters affect the functioning and performance of the system. When certain parameters are modified, the system operates differently. Changes to some other parameters may not appear to affect the system although there may in fact be subtle effects. In any case before system parameters are modified it is essential to understand what will happen to system functioning and performance.

Many system parameters may be subject to control by Configuration Management (CM). When making or requesting a change to system parameters, the CM process at the particular site must be followed (if applicable).

Values are assigned to Data Processing Subsystem and Planning Subsystem parameters in the following databases:

- a. PDPS database.
- b. Configuration Registry database.

In general the system parameters in the PDPS database are modified using the GUIs.

The Configuration Registry Server provides a single interface (via a Sybase server) for retrieving configuration attribute-value pairs for ECS servers from the Configuration Registry database. When ECS servers are started, they access the Configuration Registry Database to obtain needed configuration parameters.

The Database Administrator has access to a Configuration Registry GUI for viewing and editing configuration data in the database. Therefore, it is necessary to coordinate with the Database Administrator when changes to configuration parameters are needed. Also, as previously mentioned, changes to configuration-controlled parameters are subject to approval through the site CM process.

Default and adjusted values assigned to system parameters vary from site to site. For guidance concerning the assignment of values to parameters included in the Configuration Registry refer to document 910-TDA-022, Custom Configuration Parameters. The document is available at <http://cmdm.east.hitc.com/baseline/> under "Technical Documents."

The following parameters are examples of parameters whose values may be modified to enhance system functioning or performance:

- a. AppLogSize
 1. Maximum size of the application log (ALOG) file for a particular application.
- b. AppLogLevel
 1. Level of detail provided in the ALOG file for a particular application.
- c. DebugLevel
 1. Level of detail provided in the debug log file for a particular application.
- d. DpPr_MAX_RETRIES
 1. Number of retries to the Science Data Server for acquires/inserts before giving up.
- e. DpPr_WAIT_PERIOD
 1. Time (in seconds) to wait between retries to the Science Data Server.
- f. ListenThreads
 1. Number of listen threads assigned to a particular application.
- g. DpPrRM_MAX_RETRIES
 1. Number of retries when creating a Data Manager object (trying to allocate).
- h. DpPrRM_RETRY_PERIOD
 1. Amount of time (in seconds) between retries when creating a Data Manager object (trying to allocate).
- i. DpPrAutoSysInstances
 1. Lists the different AutoSys instances and/or the Job Management queues associated with AutoSys instances in the OPS mode.

2. The extensions "OD" and "RP" added to the identifier for an AutoSys instance indicate queues for on-demand processing and reprocessing respectively.
- j. DpPrAutoSysMaxJobs
 1. Maximum number of jobs in AutoSys for each instance listed for the DpPrAutoSysInstances parameter and/or the maximum number of jobs in AutoSys for each type of processing.
 2. Dividing a value assigned to DpPrAutoSysMaxJobs by four produces the number of PGEs that can be in the corresponding AutoSys instance or processing category at one time.
 3. Changing the value assigned to DpPrAutoSysMaxJobs affects the number of jobs (for the applicable mode) allowed in AutoSys at a time. The DpPrAutoSysMaxJobs parameter and number of CPUs assigned to the mode should be adjusted as necessary to ensure that all CPUs can be used but AutoSys is not overloaded with jobs waiting to be processed.
 4. Refer to Section 14.7.2 for further information.
- k. DpPrAutoSysLoadThreshold
 1. Shows the minimum number of AutoSys Jobs that must be freed up before any new job(s) can be loaded from the corresponding Job Management queue.
- l. DpPrAutoSysMaxJobs
 1. Maximum number of jobs in AutoSys at one time. Dividing the value assigned to DpPrAutoSysMaxJobs by four produces the number of PGEs that can be in AutoSys at one time.
 2. Changing the value assigned to DpPrAutoSysMaxJobs affects the number of jobs (for the applicable mode) allowed in AutoSys at a time. The DpPrAutoSysMaxJobs parameter and number of CPUs assigned to the mode should be adjusted as necessary to ensure that all CPUs can be used but AutoSys is not overloaded with jobs waiting to be processed.
- m. MaxSlippagePerc
 1. Percentage by which a granule can slip and still be considered a match.
- n. AcceptableCertainty
 1. Minimum overlap a granule must have.
- o. DBConnections
 1. Number of connections needed by a particular application. Subscription Manager maintains only **one** connection to the database.
- p. SleepDelayForFailures
 1. Amount of time (in seconds) to wait before reprocessing failed notifications. If the specified value is less than 60, a default value of 60 seconds would be assumed.
- q. SleepDelayForTimers
 1. Amount of time (in seconds) the Subscription Manager should sleep between checking for expired timers. It should be set to the minimum amount of time a timer will be set for at this DAAC. The minimum it can be set to is 60 seconds.

NOTE: When the value assigned to a parameter has been changed and saved in the Configuration Registry, the modified value does not take effect until the affected server has been restarted. For example, if the debug level for the Subscription Manager log has been changed from “2” to “3” in the Configuration Registry, the modification does not affect the recording of data in the log until after a warm restart of the Subscription Manager (at which time the server would read the parameters in the Configuration Registry).

Table 14.7-2, below, provides an Activity Checklist table of System Tuning activities.

Table 14.7-2. Tuning System Parameters - Activity Checklist

Order	Role	Task	Section	Complete?
1	Resource Planner/ Production Planner/ Production Monitor	Monitor the Load on Processing Resources	(P) 14.7.1	
2	Resource Planner/ Production Planner/ Production Monitor	Throttle the Processing Load by Modifying the Maximum Number of Jobs in AutoSys	(P) 14.7.2	

14.7.1 Monitor the Load on Processing Resources

The Production Planner and Production Monitor should work with the Resource Planner to make optimum use of processing resources. The Resource Planner allocates the disk partitions, CPUs, and RAM available for processing among the active modes (e.g., OPS, TS1, TS2). The Production Planner and Production Monitor monitor the load on the processing resources.

The Resource Planner assigns the bulk (typically 60% - 80%) of the processing resources to the OPS mode. The remainder of the processing assets are divided among the modes used for SSI&T and new version software checkout.

The Production Planner and Production Monitor monitor the load on the processing resources to identify whether the actual load is appropriately distributed among modes. They either inform the Resource Planner of under- or over-use of resources as allocated or have the DpPrAutoSysMaxJobs parameter values (for EcDpPrJobMgmt) adjusted in the Configuration Registry.

When monitoring the load on the processing resources, the Production Planner and Production Monitor should take the following considerations into account:

- a. Disk space allocated to OPS mode is likely to be used to capacity.
- b. Disk space assigned to the other two modes may not fill up.
- c. There is no one-to-one mapping of CPU allocation with actual CPUs on the science processor.
- d. The operating system (OS) takes care of true CPU and RAM allocation.
 1. Actual CPU usage during processing is limited by the OS.
 2. If ten CPUs have been specified for a particular mode, only ten Data Processing Requests (DPRs) can be running the Execute job at a given time.
 3. What is really being defined is the maximum number of DPRs that will execute at a given time.
- e. CPUs can be over-allocated or under-allocated as necessary to get the most out of the CPUs on each science processor.
- f. If monitoring indicates that the processor is underused when OPS mode is at full processing capacity, the number of CPUs allocated to OPS mode could probably be increased.
- g. If the science processor is at full capacity when OPS mode is at full processing capacity (and the processor may be overworked) the number of CPUs allocated to OPS mode should be reduced.

- h. Random-access memory (RAM) is subject to the same considerations as CPUs.
 - 1. RAM can be over-allocated or under-allocated as necessary to get the most out of the memory on each science processor.

14.7.2 Throttle the Processing Load by Modifying the Maximum Number of Jobs in AutoSys

Another consideration is the throttling of the processing load through the DpPrAutoSysMaxJobs parameter values.

- a. If the total of the values for all types of processing specified for DpPrAutoSysMaxJobs in OPS mode were set at 32 [allowing AutoSys to accommodate eight DPRs (consisting of four jobs each) simultaneously in OPS mode] and ten CPUs were defined for OPS, it would not be possible to utilize all ten CPUs.
- b. If the total of the values for all types of processing specified for DpPrAutoSysMaxJobs were increased to 64 (16 DPRs times 4 jobs/DPR), there might be times when the processing of some DPRs would be held up because only ten could be running the Execute job at a time.
 - 1. In such a case it might be possible to increase the number of CPUs allocated to the mode so that more than ten DPRs could be running the Execute job simultaneously.

The maximum number of jobs in AutoSys is modified by having the Database Administrator change the values assigned to the DpPrAutoSysMaxJobs parameter (for EcDpPrJobMgmt) in the Configuration Registry.

15. Quality Assurance

This section describes the tools available for science data Quality Assurance (QA) - the QA Monitor and the QA Metadata Update Tool (QAMUT) .

Operational Quality Assurance is performed by DAAC operations personnel authorized to modify the value of the Operational QA flag attribute value for a product generated at the DAAC. The operator has the capability to view the product through EOSView and retrieve production history files. Figure 15-1 provides an overview of the quality assurance process.

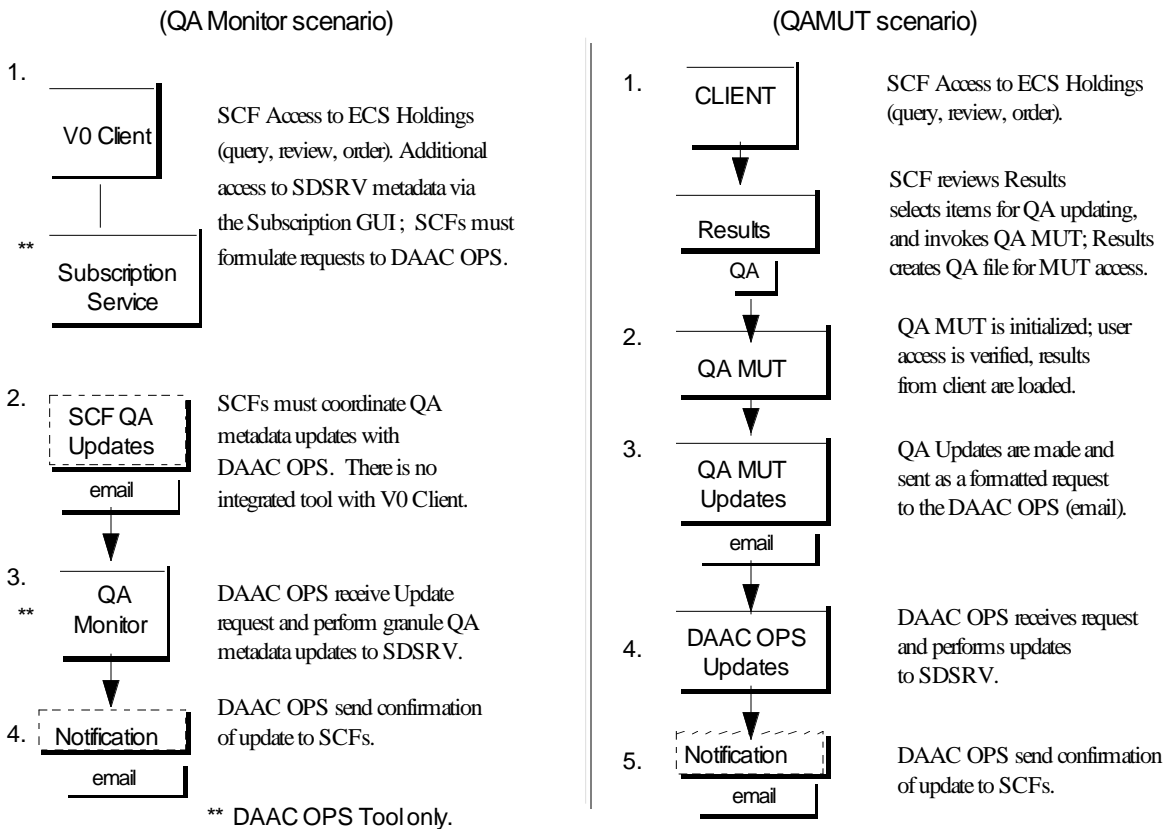


Figure 15-1. QA Metadata Update Process

15.1 QA Monitor

The purpose of the QA Monitor is to enable DAAC QA experts to modify ScienceQualityFlag and OperationalQualityFlag attributes of core metadata for a granule. SCFs send email requests

to the DAAC to update the ScienceQualityFlag attribute, until the QA Metadata Update Tool (Section 15.2) is available.

The QA Monitor can be used to request the Science Data Server to search for specific types of Data Granules; Query, Retrieve, and Update (QRU) Metadata; transfer Data Granules to the operator’s computer; and transfer Production History to the operator’s computer. It can also be used to update data granule metadata, view graphical images of data granules, and print/display lists of data granules and data types. Table 15.1-1 summarizes common operator functions performed with the QA Monitor. Table 15.1-2 describes the fields in the QA Monitor; Table 15.1-2 provides the usage for each of the pushbuttons.

The QA Monitor is launched by clicking on the Desktop Icon, or via Unix commands. The Unix commands are provided following Tables 15.1-1 through 15.1-3.

Table 15.1-1. Common Operator Functions Performed with the QA Monitor

Operator Function	Description	Purpose
Query Data Granules	Initiates a request to search the science archive for data granules	Find all archived data granules with the same data type which were inserted into the archive at a certain time (data interval)
Retrieve Data Granules	Initiates a request to get data granules from the science archive	Transfer data granule(s) from archive to local disk for visualization
Visualize Data (HDF files)	Display Visualize screen	View graphical image of data granules to assess quality
Update Metadata	Initiates a request to archive QA information about data granules	Update data granule QA information in the archive, based on DAAC QA activities encompassing use of the Visualize Data function.

Table 15.1-2. QA Monitor GUI Fields

Field Name	Data Type	Size	Entry	Description
Data Granule Insert Begin End	Date min max	1/2/1901 6/1/2036	Initial default value - can be changed by user	Search criteria for granule metadata beginning and end date
Data Types list	single selection	N/A	User selects a data type from the list displayed at startup	The list of all available data types at a specific DAAC
Data Granules list	multiple selection	N/A	User clicks data granule row(s) then clicks retrieve pushbutton	The list of all data granules in the date interval above for a particular selected data type are available for retrieval.
Status	text	N/A	Displays status messages only	Displays status messages

Table 15.1-3. QA Monitor GUI Pushbuttons

Button	Description
Query	Populates list of data granules on the bottom half of the GUI for a particular selected data type within a data interval
Find	(below the data types and data granules list) - allow the operator to perform a keyword search for information stored in those 2 lists.
Retrieve	Allows the operator to retrieve data granule(s) or production history tar file(s) from the DAAC's data archive and place on the local disk.
Update	Pops up a Granule Parameters screen Update Metadata Dialog

Launching the QA Monitor Using UNIX Commands

- 1 Access the command shell.
The command shell prompt is displayed.

NOTE: Commands in Steps 2 through 14 are typed at a UNIX system prompt.

- 2 Type **xhost** + then press the **Return/Enter** key on the keyboard.
- 3 Open another UNIX window.
- 4 Start the log-in to the Data Processing Subsystem host by typing either **telnet hostname** (e.g., **g0sps06**), **rlogin hostname**, or **rsh hostname** in the new window then press the **Return/Enter** key.

If you use the **telnet** command, a **Login:** prompt appears; continue with Step 5.
If you use either the **rlogin** or **rsh** command, the system uses the User ID currently in use; go to Step 6.
- 5 If a **Login:** prompt appears, log in as yourself by typing your **UserID** then pressing the **Return/Enter** key.
- 6 At the **Password:** prompt type your **Password** then press the **Return/Enter** key.
- 7 Start the log-in to DCE by typing **dce_login** then pressing the **Return/Enter** key.
- 8 At the **Enter Principal Name:** prompt type your **DCE UserID** then press the **Return/Enter** key.
- 9 At the **Enter Password:** prompt type your **DCE Password** then press the **Return/Enter** key.
- 10 Type **setenv DISPLAY clientname:0.0** then press the **Return/Enter** key.
Use either the terminal/workstation IP address or the machine-name for the **clientname**.
- 11 Type **setenv MODE mode** then press the **Return/Enter** key.
The **mode** will most likely be one of the following operating modes:
OPS (for normal operation).
TS1 (for SSI&T).
TS2 (new version checkout).

Note that the separate subdirectories under `/usr/ecs` apply to (describe) different operating modes.

- 12 Type **source /usr/ecs/*mode*/CUSTOM/utilities/EcCoEnvCsh** then press **Return/Enter**. The **source** command sets the environment variables identified in the specified file.
- 13 Type **cd /*path*** then press **Return/Enter**.
Change directory to the directory (e.g., `/usr/ecs/mode/CUSTOM/utilities`) containing the data processing start scripts (e.g., `EcDpPrStartQaMonitorGUI`).
- 14 Type **EcDpPrStartQaMonitorGUI *mode ApplicationID* &** then press **Return/Enter** to launch the **QA Monitor** GUI.
The **QA Monitor** GUI (Figure 15-2) is displayed.

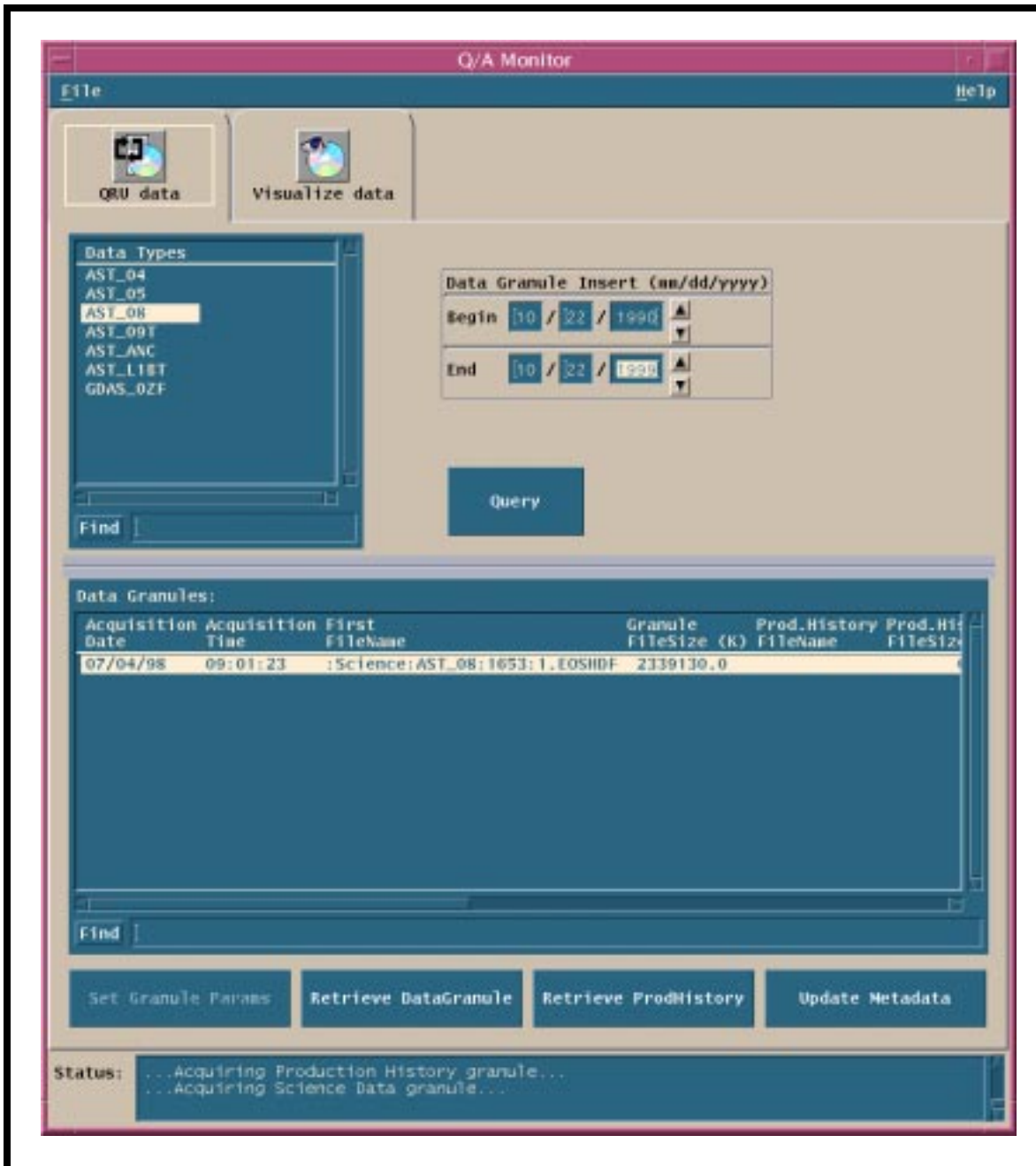


Figure 15-2. QA Monitor GUI - QRU Data Tab

15.1.1 DAAC Product QA with the QA Monitor

The Product QA process begins with the QA Monitor Application. The DAAC operations personnel will Query, Retrieve, and Update (QRU) the selected product. The operator will then

retrieve those specific products and perform a visual check of those products using the Visualize Data option of QA Monitor (Figure 15-3).

Retrieval and Viewing of Data Granules

- 1 Start up the QA Monitor
- 2 Select QRU Data tab.
- 3 From list of data types, select the ESDT or compose a query in query window and click on the **Query** button.
- 4 Select a data granule by filename from the list and click on the **Retrieve Data Granule** button.
Quit the QA Monitor GUI.
- 5 To visualize the data, select the data granule as described above and click on the **Visualize Data** button.
Displays EOS View GUI (Figure 15-3)
- 6 Open a HDF product file from which metadata is to be viewed, select the **File→ Open** button from the main menu bar.
A **File Selection Dialog** window will open and the user should be able to select the appropriate directory and file to open.
Once the desired product file has been opened, the specific types of HDF objects in the file will be listed in the **Contents** window.
- 7 From the **Contents** window double-click on a particular HDF Object (Vgroup, SDS, etc.).
The structure of the HDF object will appear in a dialog window with buttons on the bottom portion of the window to view the data of the object itself.
- 8 Display the science data values of this particular HDF object by selecting the **Table** button to display the table data of the object.
- 9 View the attribute values of this particular HDF object by selecting the **File-Attribute** button.
Metadata is referred to as **attribute data**.
Any metadata associated with the object will be displayed in another text window.
- 10 Quit when done by typing Q then press the **Enter** key.

Visualize Data

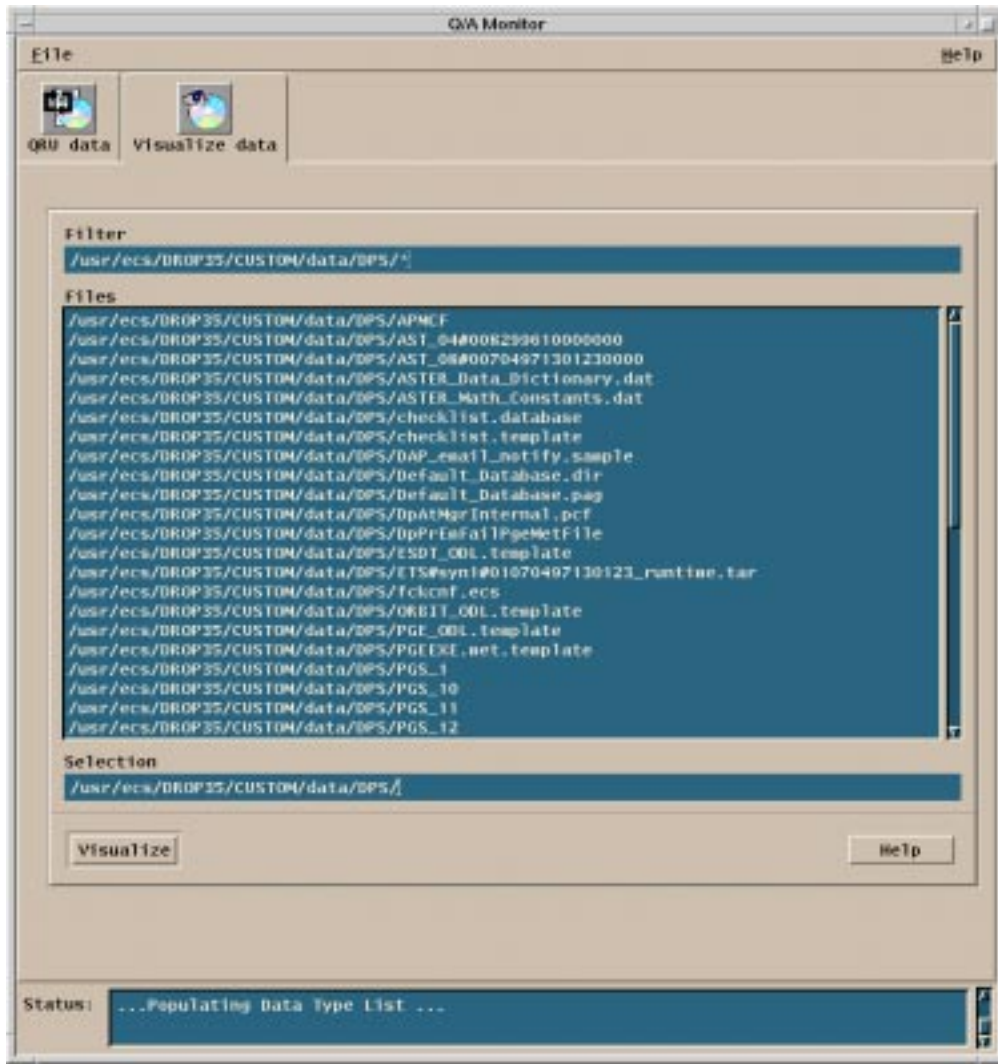


Figure 15-3. QA Monitor - Visualize Data

15.1.2 Updating QA Metadata

After the viewing, the operator will update the Operational QA flag for that specific product. The operator also updates the Science QA flags in response to an email request from SCF personnel, who have the responsibility for performing QA of their own products.

This procedure for updating QA metadata starts with the assumption that all applicable servers are currently running and the **QA Monitor GUI QRU data** tab (Figure 15-4) is being displayed.

Table 15.1-4 summarizes the QA metadata attributes and their descriptions.

Table 15.1-4. QA Metadata Attributes

Field Name	Data Type	Description
OperationalQualityFlag ScienceQualityFlag	character	DAAC and SCF quality status setting of a data granule parameter, selected by the user. The valid values are: - passed - failed - being investigated - not investigated - inferred passed - inferred failed
OperationalQualityFlagExplanation ScienceQualityFlagExplanation	character	Text describing quality status (less than 255 characters), input by user.
AutomaticQualityFlag	character	DAAC and SCF quality status setting of a data granule parameter, set during data processing.
AutomaticQualityFlagExplanation	character	Text describing quality status of a data granule parameter - set during data processing.

Updating Quality Assurance (QA) Metadata using the QA Monitor

- 1 In the **Data Types** field, click on the data type to be checked. It may be necessary to scroll through the **Data Types** list. The selected data type is highlighted. Only one data type can be selected at a time. Alternatively, the **Find** field and button can be used for specifying a data type.
 - The **Find** field is case-sensitive.
- 2 Click in the appropriate **Data Granule Insert** window field(s) and either type or use the up/down arrow buttons to enter the **Begin** date and **End** date in **MM/DD/YYYY** format. In the **Data Granule Insert** window it is necessary to specify the range of dates (between the **Begin** date and the **End** date) to formulate a query for searching for the desired granule(s) to be checked. Time is based upon day of insert into the data server. If no dates are entered, an error message is displayed. The up and down arrows next to the duration fields may be used for modifying entries in each field. The **Tab** key may be used to move from field to field.
- 3 Click on the **Query** button. Granules within the specified date range appear in the **Data Granules** field.
- 4 In the **Data Granules** field, click on the granule for which metadata is to be updated. It may be necessary to scroll through the list of granules. The selected granule is highlighted. Alternatively, the **Find** field and button may be used for specifying a data granule.
 - The **Find** field is case-sensitive.
- 5 Click on the **Update Metadata** button. The Update Metadata window is displayed. The Update Metadata window displays one line for each parameter for the selected granule.
- 6 Click on a parameter in the Update Metadata window. The selected parameter is highlighted. The Edit Parameter dialog box is displayed.

- 7 Click and hold on the **Operator Quality Flag** option button, move the mouse cursor to the desired selection (highlighting it), then release the mouse button.
The selected metadata flag is displayed on the **Operator Quality Flag** option button.
The following options are available:
 - **passed**
 - **failed**
 - **being investigated**
 - **not investigated**
 - **inferred passed**
 - **inferred failed**
- 8 Type an explanation for changing the QA flag value in the **Explanation** field.
- 9 Click and hold on the **SCF Quality Flag** option button, move the mouse cursor to the desired selection (highlighting it), then release the mouse button.
The selected metadata flag is displayed on the **SCF Quality Flag** option button.
The same options are available as those on the **Operator Quality Flag** option button.
- 10 Type an explanation of the QA flag selection in the **Explanation** field.
- 11 Click on the **OK** button to accept the QA flag settings.
The Edit Parameter dialog box is dismissed.
- 12 To verify that the QA flag settings have actually been applied to the granule, first repeat Steps 1 through 5 to retrieve the same granule.
The **Granule Parameters** window (Figure 15-4) is displayed.
The QA flag values and explanations entered using the Edit Parameter dialog box are displayed.
- 13 Repeat steps as necessary to review additional granules.

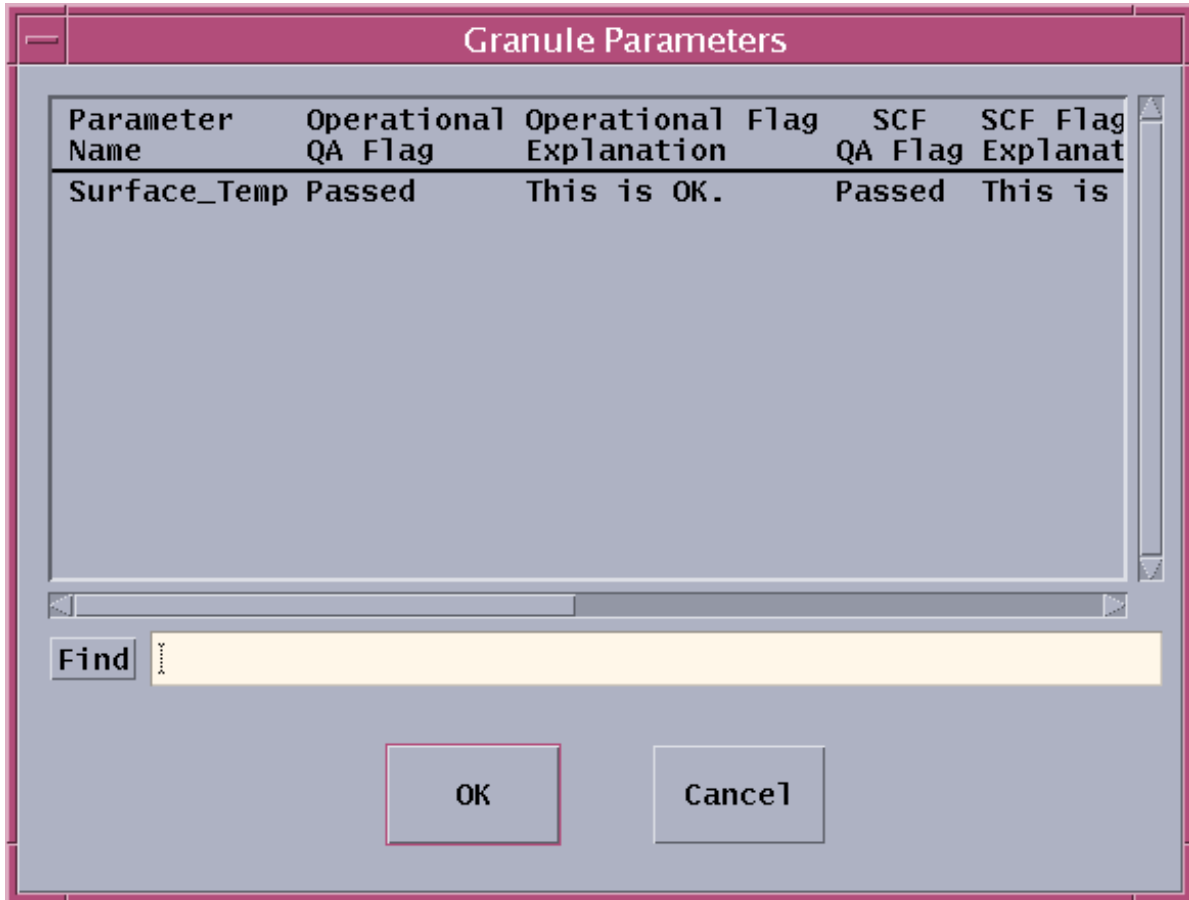


Figure 15-4. QA Monitor Granule Parameters Window

15.1.3 Production History

The Production History (PH) is created during PGE execution within the PDPS and then Inserted into the Data Server upon PGE completion. Included in the PH are the PGE log files. Accessing a Production History associated with a particular PGE run requires the DPR ID of the PGE run.

The Production History is retrieved using the QA Monitor GUI, using the following procedure.

Follow the procedures above for selecting a data granule.

- Select the **Retrieve ProdHistory** button and view the contents of the **Production History Log**.

15.2 QA Metadata Update Tool

The purpose of the QA Metadata Update Tool (QAMUT) is to enable Science Computing Facility (SCF) and Distributed Active Archive Center (DAAC) QA experts to modify values of their respective quality flags (i.e., ScienceQualityFlag and OperationalQualityFlag) on core

metadata, provided via a client, for multiple granules at a time in a batch mode (vs. one granule at a time using the QA Monitor).

The QA MUT and Logical ID/UR Report Generator Tool are being implemented as a DAAC Unique Extension to ECS per Engineering Support Directive #70. This work is not yet completed, but the reference version is available at the DAACs as explained below.

The QAMUT tool itself consists of two major components: The SCF component (for updating ScienceQualityFlags) and the DAAC component (for updating Operational Quality Flags). The procedures for using QAMUT are fully documented in the following text.

INSTRUCTIONS and GUIDE ON USING THE ECS DATABASE QA UPDATER 1.3

(by Richard H. Buss Jr. on May 1999 at GSFC. Revised: October 1999)
(GDAAC specific instructions are marked with "at GSFC" or "At GSFC")

1. PURPOSE of the DATABASE QA UPDATER TOOL

The Database QA Updater is designed to update the values of the Quality Assurance (QA) Flags in the ECS Inventory metadata within the Science Data Server. The QA Updater tool updates either Science or Operational metadata QA Flags, but not Automatic metadata QA Flags. The QA Updater sets QA values for a granule containing one or more Measured Parameters that have been examined by science or DAAC facility staff for Quality Assurance and that need to have their QA Flags values and associated QA Explanations updated.

During one run, the tool can update multiple granules at a time by assigning them distinct QA values for each Measured Parameter. This is the main purpose and strength of the tool: updating batches of various granules at a time. The granules can contain different Measured Parameters, and the QA Update Tool will still update each of the QA Flags in each Measured Parameter for all the granules listed in the input. Similar updates for the same granule but with different Measured Parameters should be grouped contiguously on separate lines in the Request so that all the updates for a granule can be done at the same time.

A uniformly formatted input request is expected to have arrived at the DAAC by email, containing an email header with the requester's return address, and containing a list of the granules to be updated, along with the new QA Flag values for the specified Measured Parameters. This list of Updates can then be passed to the Updater tool through UNIX standard input (file or terminal input). A useful but configurable Cshell script is also provided to automatically setup the UNIX environment and to run the Updater automatically to process multiple requests that reside in a single directory.

2. SCOPE

The program reads a list of granule URs (Universal References; i.e. database Identifiers), and their Measured Parameters, along with the new QA Flag values and associated QA Explanations. The QA tool records the date of the Update at the end of the Explanations and then updates the QA values in the Inventory metadata database (not Archive Metadata), for each granule Measured Parameter. The program accomplishes this by overwriting previous QA Flag values and previous QA Explanations with the new QA Flags and new QA Explanations for each specified Measured Parameter. Thus, the QA Updater writes new QA metadata values but does NOT append QA values to existing metadata. Instead, blank inputs for QA Flag and Explanation values will cause the tool to set metadata QA values to "NULL" in the database, effectively erasing previous QA metadata.

Also, if the input specifies "ALL" for the Measured Parameter of a single granule, the tool will update all the Measured Parameter QA Flags in that granule so that all the flags will have the same value and all the QA explanations will have another uniform value. IMPORTANT: The tool can not update granules that have no Measured Parameters. Also, if a Measured Parameter is incorrectly specified for one granule, the Updater tool will perform updates to all other granules in the request, but it will not update any of the QA Flags in any Measured Parameters for that erroneously specified granule.

After performing the updates, the Database QA Updater will write to disk a file logging 1) the initial request, 2) the old QA values, and 3) the new updated QA values. This QA Update log file is intended to be saved as an record of the updates. In addition, the program will write runtime diagnostic messages that can be viewed on the terminal or redirected to a runtime log file (UNIX standard out). Finally, the program writes a temporary file specifying the status of the requests, notifies the requester by emailing this file back to the remote return address, and then the program deletes the notice from the local disk. This completes the QA Update process. The program must be invoked again in order for another request to be processed. However, if multiple requests reside in a single directory, the companion Cshell script, QAupdate.csh, will process all the requests together by invoking the QA Updater Tool multiple times.

3. TO INSTALL the TOOL

The core of the tool is a UNIX C++ binary executable that must run with its ascii configuration file. For interactivity, there is an optional Graphical User Interface program in TCL language that can invoke the C++ executable. These components of the Database QA Updater are distributed as a package tar file and a README file.

a) Files

First, if needed, unpack the tar file on the ECS Science Data Server Machine (SDSRV) in your local QManagement directory with UNIX command:

```
tar -xvf packet_QA_UPDATER.tar .  
chmod u+x CIMuQaMetadataUpdate*  
more CIMuQaMetadataUpdate.CFG
```

The account containing this directory must be able to receive email or files that contain the QA Update Requests. Your directory should now have the following files:

Filename..... Purpose-

README_QA_Updater	The master usage guide to the QA Updater
CIMuQaMetadataUpdate.CFG	The text configuration file for use in ECS
CIMuQaMetadataUpdate	The binary executable that updates the QA
CIMuQaMetadataUpdate.tcl	A manual Graphical User Interface to the Updater
CIMuQaMetadataUpdate.C	The partial source C++ code of the main program
QAupdate.csh	Cshell script to setup and run Updater on multiple requests
Input_example_QA_Updater	A sample input file that the Updater can process
Log_example_QA_Updater	A sample output log file that the Updater writes
Runtime_example_QA_Updater	A sample runtime diagnostic to standard out
Output_example_QA_Updater	A sample email notice sent back to the requester

The approximate sizes in kbytes of the Update Tool files are:

README_QA_Updater	28
CIMuQaMetadataUpdate.CFG	0.8
CIMuQaMetadataUpdate	3679
CIMuQaMetadataUpdate.tcl	10.6
CIMuQaMetadataUpdate.C	27
QAupdate.csh	1.1
Input_example_QA_Updater	1.6
Log_example_QA_Updater	9
Runtime_example_QA_Updater	0.6
Output_example_QA_Updater	1.7

It is recommended that all the CIMuQaMetadataUpdate* files, including examples be kept together in one directory at all times. It is also recommended that the real input requests be placed in a separate directory and that the output log files be placed in yet other separate directories. This structure should help you manage separately the inputs, the tool, and the outputs. Directories at GSFC:

- \bin
- \requests
- \logs
- \archiveQAupdates

b) Platform

The Database QA Updater C++ source code was compiled with CC compiler 4.0 at Raytheon Landover, MD in the ECS build environment containing links to other source code libraries such as Roguewave. It therefore can not be compiled at your site. The version and other information is imbedded in the binary file. This info can be view by the unix command:

what CIMuQaMetadataUpdate | more

The QA Updater Version 1.3 was compiled on a UNIX machine:

SunOS starfire 5.5.1 Generic_103640-08 sun4m sparc SUNW,SPARCstation-20.

The source code of the main program is given to help you understand the actions of the program. The program was successfully repeatedly tested on a SunOS g0acs03 5.5.1 Generic_103640-20 sun4u sparc SUNW,Ultra-Enterprise at GSFC using input emails sent by UNIX mail, Netscape Messenger, Eudora, and Microsoft Outlook, all saved to disk with Netscape 4.0.7 Communicator.

****The average execution time is about 2 CPU seconds for each update.****

4. CONFIGURATION FILE

At the moment, the Database QA Updater is NOT formally integrated into ECS, so many lines in the configuration file are not yet used by ECS nor the tool.

There are, however, three required lines and one recommended one (Site) for you to specify correctly. At GSFC some entries from the CIMuQaMetadataUpdate.CFG file are:

```
EcDsScienceDataServerG1      = G1
Site                          = GSFC
Name                          = CIMuQaMetadataUpdate
STATUSFILEPATH                = /home/quality/archiveQAupdates/
```

These are the names of the DCE SDSRV Database Cell, the DAAC, the QA Updater program, and the path to where the QA Update log files will be saved (write permission required). In addition, the line

```
DataFileName      = /usr/ecs/TS2/CUSTOM/security/EcSeRandomDataFile
```

can apparently be used in the future for security. The major and minor versions in the config file should be kept current so that they reflect the version of the binary tool itself: e.g. 1.3 .

The directory of the executable QA update tool is the default directory that the tool uses in case the configuration file can not be found by the tool. However, a configuration file can be placed in and referenced to an arbitrary location (neither links nor cross-mounting recommended). At GSFC, the /tools/gdaac/\$MODE/bin/DSS and /tools/gdaac/\$MODE/cfg/DSS contain the QA Updater Tool and configuration file, respectively.

5. TO RUN the TOOL

SHORT METHOD:

- 1) edit the QAupdate.csh script to refer to your local directories

- 2) place QA request files with valid URs into the requests directory
- 3) setenv MODE <TS1/TS2/OPS> (one of the three! Default: OPS)
- 4) execute QAupdate.csh on the UNIX command line within the Cshell

The ESDTs for the granules must already have been loaded by system administration into the Science Data Server and the Science Data Server must already be running. If the tool becomes formally part of ECS, an initial dce_login will probably be required, too, before the tool can run. The QA Update Tool is known to interact with the ECS system by:

- A) updating the SDSRV database metadata,
- B) querying ESDTs installed in SDSRV, and
- C) fulfilling subscription events to metadata updates.

Since the QA updates are restricted to the SDSRV, the tool is simple to run and will work in parallel with other ECS activities such as INGEST.

All DAACs can run the Updater on their local file structure. (However, at GSFC, the DAAC Database QA Updater can be run on g0acs03 from the quality account (/home/quality/bin) with the Tool and configuration file in /tools/gdaac/\$MODE/bin/DSS and /tools/gdaac/\$MODE/cfg/DSS .)

LONG METHOD:

---First, set the MODE to one of the following three:
setenv MODE <TS1/TS2/OPS>

---Second, source the setup file
source /usr/ecs/\$MODE/CUSTOM/utilities/EcCoEnvCsh

IMPORTANT!!!!!!!If this file is missing, manually convert the EcCoEnvKsh file in that directory to EcCoEnvCsh and then source the converted file.

This step creates links to needed libraries through the LD_LIBRARY_PATH path. Some DSS and CSS subsystem libraries are probably both used by the tool. (In an emergency at GSFC, source EcCoEnvCshcopy in /home/quality/bin.)

---Third, invoke the Database QA Updater. The tool can be run two ways: by command or by GUI window.

1) From the command line, an example execution (at GSFC, tool is in /tools/gdaac/<MODE>/bin/DSS):
CiMuQaMetadataUpdate ConfigFile
CiMuQaMetadataUpdate.CFG ecs_mode \$MODE < QAupdate_emailrequest.txt

where the format is:
executable ConfigFile (Configuration filename) ecs_mode (MODE) < (input filename) > (output runtime log filename)

and where the "> output runtime log filename" is optional to save STDOUT. Note that absolute and relative path names can be used for the filenames on the command line. Note also that the

optional runtime log file is distinctly different from the mandatory QA update log filename specified in the configuration file; in the first case, program runtime information is saved or displayed; in the second case, the QA metadata values and Update Request are saved.

2) An operator can also invoke and use a graphical tool CIMuQaMetadataUpdate.tcl to perform QA updates with GUI buttons.

Example:

```
CIMuQaMetadataUpdate.tcl CIMuQaMetadataUpdate.CFG $MODE &
```

Limited online help for running the Updater is available in the GUI. STDOUT also is written in the GUI window but can only be saved manually to a file.

6. INPUT FILE FORMAT (Specifications)

Though the wrapper script QAupdate.csh can process multiple request files in one directory, the Updater tool itself processes one QA update request file at a time. The input file is constructed by the requester who has examined the granules for quality and has decided to update the QA Flags in the granules. The requester should have previously obtained a granule identifier (UR, Universal Reference) from ECS, for example, by the subscription notices that are emailed to the requester when data is transferred by ECS to the requester. (Alternately, to facilitate identification of data granules at GSFC, the UR is published together with the local granule ID in a lookup file. Note that the UR is NOT contained inside the granule itself nor in its metadata!) In any case, the Update Request must specify the granule by UR for the Updater tool to work.

The input QA Update request file must have four major items:

- email header
- begin line
- request line(s)
- end line

Sample Input File (Example):

```
Date: Wed, 25 Nov 1998 12:55:42 -0500
From: rbuss@gsfcsrvr4.gsfcmo.ecs.nasa.gov
Reply-To: Richard.Buss@gsfc.nasa.gov
Organization: EOS-DAAC GSFC
X-Mailer: Mozilla 4.07 [en] (X11; I; SunOS 5.5.1 sun4m)
MIME-Version: 1.0
To: quality@g0ins01u.ecs.nasa.gov
Subject: QA Update Request for ECS. This is a test of the DAAC Database QA Update Tool.
```

```
begin QAMetadataUpdate Science
UR:10:DsShESDTUR:UR:15:DsShSciServerUR:13:[GSF:DSSDSRV]:19:SC:AST_09T.001:19
88 GuruTej Passed test
```

```
UR:10:DsShESDTUR:UR:15:DsShSciServerUR:13:[GSF:DSSDSRV]:18:SC:AST_05.001:1990
GuruTej Passed test
end QAMetadataUpdate
```

This concludes the Example input file. Details on each item follow:

1) The email header **MUST** contain at least three lines in any order:

From:
Subject:
To:

The email header safely can contain many other fields such as Reply-To: or Received: or Date:, but it must contain at minimum, these three fields.

A) The Database QA Updater will email the return notice back to the sender at the Reply-To: address, if it exists before the end of the header, or alternatively, back to the From: address.

B) The Subject line is a valuable means of identifying the QA update Request, both for the requester and for the DAAC. At GSFC the subject line should begin with
Subject: QA Update Request for ECS.

and then followed on the same line by any other information that the requester wants to use to identify the request. The QA Updater will echo back this subject line in the return email notice sent to the requester. This will help identify which Update request was actually completed. The use of single quotes (') in the subject line is, however, strongly discouraged to avoid confusing email programs.

C) The To: address that receives the requests at GSFC is `quality@g0ins01u.ecs.nasa.gov` .

2) a begin line with either Science or Operational specified for the kind of update:

begin QAMetadataUpdate Science
or
begin QAMetadataUpdate Operational

The request must be for a single type of update; it can not contain both kinds of update at once.

3) one or more update entries, one entry to each line and four fields in each entry, each separated by tabs, not blanks nor commas, nor double quotes. The fields on one line are

A) Database ID name/number (UR) B) Parameter name C) QA Flag Value D) QA Flag Explanation.

FORMAT:

NAME:NUMBER<tab>PARAMATER<tab>QAFLAG<tab>Explanation

Example:

UR:10:DsShESDTUR:UR:15:DsShSciServerUR:13:[GSF:DSSDSRV]:18:SC:AST_05.001:1990
GuruTej Not Investigated An Explanation

The Updater has been successfully tested on a request with 63 update UR lines.

4) an end line with a return (new line) as the last character:

end QAMetadataUpdate

*Here are some **IMPORTANT** details to consider when the requester creates an input file:*

--When a cut and paste is used to send in a request, it often loses the crucial tab and line-wrap formattings. It is recommended that an editor be used to compose the Request, rather than pasting into an email messaging utility. The edited file can then be imported or read into the emailer rather than a dangerous cut and paste.

---The six valid QA flag values for both Science and Operational in the 1999 ECS Data Model are:

i) Not Investigated ii) Being Investigated iii) Passed iv) Failed v) Inferred Passed vi) Inferred Failed. No double quotes (") can be with the Flag or the request will fail.

---The Explanation field is free form, can be blank, and can contain special characters EXCEPT double quotes (") or tabs. The length of the Explanation can be up to 235 characters. An update date is always appended to the Explanation (for a maximum length of 255 characters) when the database is updated.

---The same granule can be updated twice within the same request, but the entry lines for that granule must immediately follow each other (be contiguous). Otherwise, the program will crash (bus error) when the granule is accessed for the second update attempt! This applies particularly to granules with several Measured Parameters.

---For a given update type (either Science or Operational), the requester can specify ALL as the parameter name in order for all Measured Parameters in the granule to be set with the same value and with the same explanations (but values and explanations separate from each other.)

7. OUTPUTS

Each time it runs, the QA Updater program creates several outputs:

- 1) New QA Metadata in the Science Data Server Database Table (DsMdMeasuredParamater).
- 2) An Update log file, named by current date and time, containing the
 - A) address of the requester, the request subject, and a copy of the request
 - B) QA Metadata values before and after the update
 - C) runtime status messages and success/fail summary
- 3) A return status notice that is emailed back to the requester. It contains:
 - A) a short summary, if the QA Updater was successful
 - B) a long description with error/warnings for most failures.
- 4) An output stream to Standard Out (STDOUT), listing the progress of the program.

(The QAupdate.csh wrapper script sends a few minor diagnostic messages to STDOUT (the screen).

8. CAPABILITIES OF the DATABASE QA UPDATER

The tool:

- 1) Updates Operational and Science QA metadata separately.
- 2) Reads a single request file containing an email header and one or more granule ID updates.
- 3) Successfully batch updates all specified QA metadata in those granules.
- 4) Updates together both the QA Flag and the QA Explanation.
- 5) Completely updates the QA metadata including those with null (blank) values.
- 6) Writes the date of the Update at the end of the QA Explanation.
- 7) Successfully processes one update request after another.
- 8) Works if multiple simultaneous QA update processes are invoked.
- 9) Accepts full path and current directory file names (known to work on 143 characters).
- 10) Updates other granules if Measured Parameter is incorrectly specified for some granules.
- 11) Successfully processes requests with blank lines or one line containing only tabs.
- 12) If requested, updates other Measured Parameters if one is incorrect for the same granule.
- 13) Will update the QA flag in all Measured Parameters in the granule if ALL option is specified.
- 14) Processes QA explanations with special characters such as @ and ' and one extra <tab>.
- 15) Sends return email to most REPLY-TO: addresses instead of FROM: address.
- 16) Writes various success, warning and error status messages to Standard Out (STDOUT).
- 17) Writes similar status messages to the Update log file and to the return notice.
- 18) Deletes the return notice from disk after it has been emailed back to the requester.
- 19) Can be used with a wrapper script QAupdate.csh to process multiple request files.

9. LIMITATIONS OF the DATABASE QA UPDATER

- 1) Issues warnings in the log file ("is invalid with respect to rule") that invalid metadata was requested, but still allows the values to be written into the database!
- 2) Allows further QA updates of the same granule in the same message only if the update request lines for that granule are contiguous (sequential) in the request file. Otherwise, if

the same granule is requested to be updated again in the same request file, and the update lines are separated in the file, then the program crashes!

3) Does not process QA Explanations nor Flags containing double quotes "

(error written in log: "Could not update metadata in catalog")

4) For safety reasons to the Database QA Metadata, requests that appear to be corrupted and do not follow the format, are not processed, other than to send error messages to the log file and back to the requester. NONE of the granules are updated for these format/content errors, which include:

A) extra entries (total >4) on any line ("Too many fields on line" message is written to the log)

B) a non-existent database ID name/number (UR) on any line, including a blank or misspelled UR

C) missing begin line

D) missing or incomplete email header

5) The program exits abruptly, without warning messages, if the specified configuration file is misspelled or nonexistent.

10. FUTURE

A more complex Cshell wrapper script is under development at GSFC DAAC. The script sorts the URs to prevent crashing caused by repeating URs, provides a configurable security limit of, say, 10,000 allowed updates per message, and checks metadata valids before the Updater is run. The wrapper script also tests for the presence of the configuration file and will exit with warning messages if the file is not found. It also will manage the requests by filing them into failed, passed, and partially successful categories, so that appropriate actions can be taken by the DAAC and the requester.

11. ACKNOWLEDGEMENTS

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If you notice any inconsistencies or errors in this guide to the Database QA Updater, you can email them to Richard.Buss@gsfc.nasa.gov or the GSFC DAAC Code 902.2 Greenbelt MD 20771 for corrections.

12. APPENDIX: ERROR AND WARNING MESSAGES

To access the status messages written by the program, read the Standard Out stream. This stream contains some status messages, as well as contains the name of the associated Updater log file (named with a date/time stamp). Print the log file to examine more status messages. The log file also contains the address of the requester and the subject of the request, which identify which log file corresponds to each processed request.

1) Operating system statuses

```
---Warning: Could not open message catalog "oodce.cat"
```

You can safely ignore this ECS warning message produced by the dce utility.

```
---ld.so.1: CIMuQaMetadataUpdate: fatal: libDscIsh.so: can't open file: errno=2  
Killed
```

This is a failure to link with the required libraries.
Make sure you are on the SDSRV machine, at GSFC g0acs03.
Try sourcing the EcCoEnvCsh setup file and re-running the Updater.

```
---ld.so.1: CIMuQaMetadataUpdate: fatal: relocation error: symbol not found:  
__0oPGIParameterBasectPCc: referenced in CIMuQaMetadataUpdate  
Killed
```

This is a failure to link with the required libraries probably because of a mismatch between the tool version and the ECS drop version. A new drop version of ECS installed at your site might have caused this error. The executable needs to be recompiled at Landover/Raytheon under a newly created clearcase view for that drop version.

```
---Permission denied
```

Try adding execute (chmod +x) to the file permissions for CIMuQaMetadataUpdate.

2) Standard Out messages

```
---SUCCESSFULLY updated all granules.  
Errcount = 0
```

```
---ERRORS occurred during processing the request. QA Update program is quitting.  
NO GRANULES WERE UPDATED FOR THIS REQUEST.
```

(Probably one or more UR granule IDs in the request are not in the database.)

```
---WARNING: Invalid metadata was entered in the Inventory.
```

(The requester misspelled the value of QA Flags. Process a revised request containing valid QAFlag values; otherwise, bad metadata will remain in the database!!)

---ERROR in updating QA: Email return address is missing from request.
NO QA updates were performed for this request.

(The email request was saved only partially to disk before the program ran.)

---ERROR: Update Request had invalid metadata values such as quotes.

(No double quotes are allowed in the QAFlag and QA Explanations in the request.)

---WARNING: A measured parameter did not initially have any QA Flag.

(Best to check that the database contains updated QA values. If, not, try processing the request again; it might work the second time.)

3) Updater program status messages:

---Error creating DsCIESDTRreference for granule
Failure to create ESDT Reference, QA Update program is quitting.
NO GRANULES WERE UPDATED FOR THIS REQUEST.

The database ID (UR) is missing or wrong for AT LEAST one entry in the input request.

This happens when:

- a) an ESDT specified in a request UR does not match the actual ESDT UR (database ID) for a particular granule. (E.g. the requested UR contains MOD01 when the actual granule is MOD07_L2 type.)
- b) a UR field is missing from any one line in the input request.
- c) one UR Database ID in the request is nonexistent in the SDSRV database. (E.g. 44790 when there are only 30000 granules in the database.)
- d) there are only blank lines between the begin and end lines in the request,

In these cases, NO updates on ANY granules have been done; a revised request for updating the same granules, but all with proper URs, will have to be submitted by the requester.

---*****MeasuredParameter <param> not found in granule metadata
Errors during update process. Updates not done for this granule UR.
An ERROR occurred during the update process for <granule>
**** This QA Update was not done for granule: <granule>
Other granules will be updated.

A line in the input request file has a wrong or missing parameter name. The program does not make any of the QA update for this granule. The program makes all other updates for the other granules, though. The program automatically by email notifies the requester of this error.

---UnnamedPL[(MeasuredParameter not found.) ErrorMessage(ESDT Execution failed)]
**** This QA Update was not done for granule: <granule>
Other granules will be updated.

The granule does not even have a Measured Parameter or QA Flag to be updated!
This granule should be deleted from the Update request because the metadata do not permit
updating or even setting the QA Flags.

---ESDTResults[(Could not update metadata in catalog) ErrorMessage(ESDT Execution failed)]
ESDTStatus(0)
CmdSuccess(1)]

The request line has double quotes in the explanation.

---Can't get status file path from config file.

Make sure that the directory path to the logfile, as specified in the configuration file, is spelled
correctly and has write permission.

---Unable to find a begin line or the email header is incomplete.
Input file does not have proper format: Subject, From, To, begin.
NO QA updates were performed for this request.

Check the email header to make sure all three required lines are present.
Check that the begin line has Science or Operational after the begin word.
The program should be run again on the corrected request.

--Too many fields on line
End of input requests
Errors occurred during processing, quitting.

There are extra fields on one input line (5 or more filled out fields separated by tabs).
The program does NOT process any of QA updates on ANY of the granules.
Notify requester that the request did not have the proper format.

---WARNING: end QAMetadataUpdate line not found.
Processing will continue, but lines may be missing.
End of input requests

Check that the input request file was not split or the latter part deleted, because the input file does not have an end line (or is missing a <return> after the end line). If the request was erroneous, notify the requester.

The program finishes and does all the updates listed in the processed request, but some of the updates in original request email might not have been processed because the request was inadvertently altered.

---ESDTResults[WARNING(Attribute
(INVENTORYMETADATA:MeasuredParameter:MeasuredParameterContainer:QAFlags:ScienceQualityFlag=Fail)

is invalid with respect to rule [Match(Passed,Failed,Being Investigated,Not Investigated,Inferred Passed,Inferred Failed)]
UR(UR:10:DsShESDTUR:UR:15:DsShSciServerUR:13:[GSF:DSSDSRV]:19:SC:AST_09T.00
1:1076]
ESDTStatus(1) CmdSuccess(1)]

The request updates QA flags with invalid new metadata values. The program processes all entries, finishes, but writes this warning.
In the log, both ESDTStatus(1) CmdSuccess(1) mean success; either ESDTStatus(0) or CmdSuccess(0) for a given request line means that the particular granule QA update failed.

---ESDTResults[WARNING(Missing parameter
INVENTORYMETADATA:MeasuredParameter:MeasuredParameterContainer:QAFlags:AutomaticQualityFlagExplanation
in group
INVENTORYMETADATA:MeasuredParameter:MeasuredParameterContainer:QAFlags.)

The metadata of this granule were initially incorrect before the QA Updater was even run.

The MCF file or the ESDT in the Inventory SDSRV database is not properly written to receive QA metadata updates. Before the QA update request can be processed, the MCF file or ESDT for the data product will have to be modified so that the PGE can write at least one QA metadata Flag (e.g. AutomaticQualityFlag) in the metadata.

---ERROR on begin QAMetadataUpdate line: expecting \"Science\" or \"Operational\"

The type of request is misspelled or missing on the begin line of the request.

13. APPENDIX: BUILD LINE

```
CC -I. -I./sun5.5 -I/tools/oodce/usr/include/oodce
-I/tools/oodce/usr/include/ -I/usr/include/dce -I/usr/include
-I/ecs/formal/CLS/include -I/ecs/formal/COMMON/include
-I/ecs/formal/COMMON/include/sun5.5 -I/ecs/formal/CSS/include
-I/ecs/formal/CSS/include/sun5.5 -I/ecs/formal/MSS/COTS/peer/src/include
-I/ecs/formal/MSS/include -I/ecs/formal/MSS/include/sun5.5
-I/ecs/formal/IOS/include -I/ecs/formal/IOS/include/sun5.5
-I/ecs/formal/DSS/include -I/ecs/formal/DSS/include/sun5.5 -g
-DSUNOS55X -ptrsun5.5/Templates/CIMuQaMetadataUpdate.o -mt
-I/ecs/formal/IOS/include/ -I/ecs/formal/IOS/include/sun5.5
-I/tools/rogue70_new -DRW_MULTI_THREAD -D_REENTRANT -DRWDEBUG=1
-I/tools/rogue70_new -DRW_MULTI_THREAD -D_REENTRANT -DRWDEBUG=1
-I/tools/sybOCv11.1.0//include -Dunix -DNIDL_PROTOTYPES -D_REENTRANT
-D_CMA_PROTO_ -DSYSV -I/tools/oodce/usr/include/oodce -I/usr/include/dce
-I/tools/oodce/usr/include/oodce -I/usr/include/dce -mt -c -o
sun5.5/CIMuQaMetadataUpdate.o CIMuQaMetadataUpdate.C
"/ecs/formal/CSS/include/EcPfClient.h", line 74: Warning:
EcPfClient::PfProcessEvent hides the virtual function
EcPfGenProcess::PfProcessEvent(EcAgEvent*, EcTAgLogType).
"CIMuQaMetadataUpdate.C", line 542: Warning (Anachronism): Undefined
character escape sequence "\-".
"CIMuQaMetadataUpdate.C", line 542: Note: Type "CC -migration" for more on
anachronisms.
"CIMuQaMetadataUpdate.C", line 542: Warning (Anachronism): Undefined
character escape sequence "\-".
3 Warning(s) detected.
/ecs/formal/COMMON/CSCI_Util/src/Build//cmAccess
/ecs/formal/CLS/bin/sun5.5/CIMuQaMetadataUpdate
/ecs/formal/COMMON/SysBuild/generate_EcsVersion_C
CIMuQaMetadataUpdate
CC -DSUNOS55X -c
/ecs/formal/COMMON/SysBuild/Versions/CIMuQaMetadataUpdate_EcsVersion.C -o
/ecs/formal/COMMON/SysBuild/Versions/CIMuQaMetadataUpdate_EcsVersion.o
CC -ptrsun5.5/Templates/Pr_CIMuQaMetadataUpdate
-ptrsun5.5/Templates/CIMuQaMetadataUpdate.o
-ptrsun5.5/Templates/CIMuQaMetadataUpdate.o -R
../lib/COM:../lib/CLS:../lib/DMS:../lib/CSS:../lib/DPS:../lib/DSS:../lib/INS:../lib/I
OS:../lib/MSS:../lib/PLS:../lib/V0_Client:../lib/COTS/rogue/lib:../lib/COTS/sybase/lib:../
lib/COTS/xaclient/lib:/ecs/formal/CLS/lib/sun5.5:/ecs/formal/COMMON/lib/sun5.5:/ecs/formal/
CSS/lib/sun5.5:/ecs/formal/MSS/lib/sun5.5:/ecs/formal/IOS/lib/sun5.5:/ecs/formal/DSS/lib/sun5.
5:/view/DROP5A_sun5.5/ecs/formal/COMMON/lib/sun5.5:/view/DROP5A_sun5.5/ecs/formal/
CSS/lib/sun5.5:/view/DROP5A_sun5.5/ecs/formal/MSS/lib/sun5.5:/view/DROP5A_sun5.5/ecs/f
ormal/IOS/lib/sun5.5:/view/DROP5A_sun5.5/ecs/formal/DSS/lib/sun5.5:/ecs/formal/IOS/lib/sun
5.5:/view/DROP5A_sun5.5/ecs/formal/IOS/lib/sun5.5:/tools/rogue70_jun99/lib:/tools/rogue70_j
un99/lib:/tools/rogue70_jun99/lib:/tools/sybOCv11.1.0/lib:/tools/oodce_jun99/usr/lib
-o /ecs/formal/CLS/bin/sun5.5/CIMuQaMetadataUpdate
sun5.5/CIMuQaMetadataUpdate.o -L/ecs/formal/CLS/lib/sun5.5
/ecs/formal/COMMON/SysBuild/Versions/CIMuQaMetadataUpdate_EcsVersion.o
-L/ecs/formal/CLS/lib/sun5.5 -L/ecs/formal/COMMON/lib/sun5.5
-L/ecs/formal/CSS/lib/sun5.5 -L/ecs/formal/MSS/lib/sun5.5
```

```

-L/ecs/formal/IOS/lib/sun5.5 -L/ecs/formal/DSS/lib/sun5.5
-L/view/DROP5A_sun5.5/ecs/formal/COMMON/lib/sun5.5
-L/view/DROP5A_sun5.5/ecs/formal/CSS/lib/sun5.5
-L/view/DROP5A_sun5.5/ecs/formal/MSS/lib/sun5.5
-L/view/DROP5A_sun5.5/ecs/formal/IOS/lib/sun5.5
-L/view/DROP5A_sun5.5/ecs/formal/DSS/lib/sun5.5 -lDsClSh -lDsCnSh
-lEcUtMiscSh -lDsShSh -lG1Sh -L/ecs/formal/IOS/lib/sun5.5
-L/view/DROP5A_sun5.5/ecs/formal/IOS/lib/sun5.5 -lIoAdSearchSh -lIoAdSubsSh
-lIoAdCoreSh -lIoAdServerSh -lIoAdProxySh -lEcPoSh -lEcPoDbRWSH -lDsCnSh
-lEcUtMiscSh -L/tools/rogue70_jun99/lib/ -lrwdbg_mt
-L/tools/rogue70_jun99/lib -lrwtoolg_mt -lG1Sh -lEcUtMiscSh -lEcDcNotifySh
-lEcDcMsgPng1 -lCsEmMailRelASh -lC -lEcNsServiceLocSh -lEcFhSh
-lEcNsServiceLocatorSh -lEcUrSh -lEcPfSh -lEcCfSh -lEcAgInstrm
-lagenteventSh -leventSh -lCsFtFTPSchedObjSh -lCsFtFTPRelASh -lexpect -ltcl
-lEcTiTimeSh -lEcSeSybSecurityStubbedSh -lEcSeUtilityCtStubbedSh
-lEcSeServerKeyMgmtSh -lEcSeCmiSh -lEcDcMsgPng1Sh -lEcDnDirSh -lEcUtSh
-lEcUtFactorySh -lEcPtSpecialLockSh -L/tools/rogue70_jun99/lib -lrwtoolg_mt
-Bstatic -L/tools/sybOCv11.1.0/lib /tools/sybOCv11.1.0/lib/libct_r.a
/tools/sybOCv11.1.0/lib/libcs_r.a /tools/sybOCv11.1.0/lib/libcomn_r.a
/tools/sybOCv11.1.0/lib/libintl_r.a /tools/sybOCv11.1.0/lib/libtcl_r.a
-Bdynamic /tools/sybOCv11.1.0/lib/libtli_r.so -L/tools/oodce_jun99/usr/lib
-loodce -lnsl -Bdynamic -ldce -lsocket -Bdynamic -lthread -lm -lresolv
/usr/lib/libintl.so -ldl -lm -mt

```

clearmake: Warning: Configuration record will not include objects accessed using view "DROP5A_sun5.5"

16. Ingest

This section describes the procedures the Data Ingest Technician (DIT) can use when performing and monitoring ingest of science data. The data ingest process is largely automated, however, the DIT will be required to support hard media operations, resolve problems, periodically monitor ingest operations, and coordinate with the appropriate internal and external entities to resolve resource conflicts. Section 16.1 describes the Ingest subsystem custom software items. Section 16.2 describes how to use the ECS GUI Ingest tool. Section 16.3 describes how to use the HTML Interactive Ingest tool. Section 16.4 describes the Ingest Polling process. Section 16.5 describes the process of recovering from Data Ingest Failures. Section 16.6 describes the Document Ingest process. Section 16.7 describes how to use the ECS Science Data Server Operator tool.

16.1 Ingest Custom Software Items

The Ingest custom software items supports the ingest of data into ECS repositories on a routine and ad hoc basis. The software supports a variety of data formats and structures. Ingest data processing and storage functions vary according to attributes of the ingested data such as data type, data format, and the level to which the ingested data has been processed.

The Ingest subsystem is capable of accepting data from a variety of sources including both electronic network interfaces and physical media. Data received is predefined within ECS with regard to expected metadata and metadata characteristics, data types, files, and formats, and means of delivery to ECS in accordance with approved ICDs with external organizations. The following list defines the ECS Ingest Subsystem custom software items:

1. EcInAuto - is the Automated Network Ingest Interface process that provides basic capability to ingest data electronically from an external source.
2. EcInPolling - is the Polling Ingest Client Interface process that creates polling request, detects new files in a specified external location, creates and submits ingest request.
3. EcInInter - is the Interactive Ingest Interface process that provides science users and ECS operators the capability for interactive request to ingest data available on the network.
4. EcInReqMgr - is the Ingest Request Manager process that manages ingest request traffic and processing.
5. EcInGran - is the Ingest Granule Server process that provides services for required preprocessing of data and subsequent insertion into the FSMS.
6. EcInGUI - is Ingest GUI Interface process that provides operators ability to perform ingest from physical media, monitor the status of on-going ingest requests, and modify Ingest configuration parameters.

7. Ingest Database - is a Sybase database that stores and provides access to Ingest Subsystem internal data.

16.2 ECS Ingest Tool

The **ECS Ingest** tool has five tab widgets; **Ingest Intro**, **History Log**, **Monitor/Control**, **Operator Tools**, and **Media Ingest**. The **Ingest Intro** screen can be used as a menu path to **Save** or **Print** screens, and **Exit** the Ingest tool. The **History Log** (Section 16.2.2 & Section 16.2.3) is a view only screen which allows the DIT the capability to view ingest activities that have already completed, and to create reports. The **Monitor/Control** (Section 16.2.4) screen provides the DIT the capability to view and update ongoing ingest activities in the system. The **Operator Tools** (Section 16.2.5) are used by the DIT to view and set ingest thresholds. The **Media Ingest** (Section 16.2.6) screen gives the DIT the capabilities to perform media ingest.

The Activity Checklist table that follows provides an overview of the Ingest tool and its functions. Column one (**Order**) shows the order in which tasks should be accomplished. Column two (**Role**) list the Role/Manager/Operator responsible for performing the task. Column three (**Task**) provides a brief explanation of the task. Column four (**Section**) provides the Procedure (**P**) section number or Instruction (**I**) section number where details for performing the task can be found.

Table 16.2-1. ECS Ingest Tool - Activity Checklist

Order	Role	Task	Section
1	DIT	Starting the Ingest GUI	(P)16.2.1
2	DIT	Viewing the Ingest History Log	(P)16.2.2
3	DIT	Ingest History Log Reports	(P)16.2.3
4	DIT	Monitoring/Controlling Ingest Requests	(P)16.2.4
5	DIT	Suspending Ingest Requests	(P)16.2.5
6	DIT	Resuming Ingest Requests	(P)16.2.6
5	DIT	Ingest Operator Tools	(P)16.2.7
6	DIT	Physical Media Ingest	(P)16.2.8

16.2.1 Starting the Ingest GUI

Starting the Ingest GUI in normal operations will be just a matter of clicking an icon that appears on your desktop. Because the desktop configurations have not been installed to date it will be necessary to follow the interim procedure described below. Starting the Ingest GUI assumes that the applicable servers are running and the DIT has logged in. If you are already familiar with the procedure, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, you should use the following detailed procedures:

- 1 Type **xhost +** at the command shell prompt and then press **Return**.

- 2- Bring up the Ingest GUI server. If the Ingest GUI has not already been brought up. From a SUN workstation or NCD X-Term terminal telnet into the Ingest Server. Enter **telnet <hostname>**. Example **telnet g0dis01**.
- 3- Log into the Ingest Operator workstation using your user identifier and password by typing **YourUserID**, and then press **Return**.
 - A password prompt is displayed.
- 4 Enter **YourPassword**, then press **Return**.
 - You are authenticated as yourself.
- 5- Set your terminal display environment using the following command:
setenv DISPLAY <hostname:0.0>
- 6- Create an xterm window for the Ingest GUI Ingest the following command:
xterm -n GUI_<mode> -sl 5000-sb &
- 7- Change directory to the directory containing the Ingest GUI command file:
cd /usr/ecs/<mode>/CUSTOM/utilities
- 8- Start the Ingest GUI using the following command:
EcInGUIStart <mode>
 - The **ECS Ingest** tool is opened.
 - The **Ingest Intro** screen is displayed.

Table 16.2-2. Starting Ingest Operator GUI - Quick-Steps

Step	What to Enter or Select	Action to Take
1	xhost +	press Return
2	telnet <hostname>	press Return
3	YourUserID	press Return
4	YourPassword	press Return
5	setenv DISPLAY <hostname:0.0>	press Return
6	xterm -n GUI_<mode> -sl 5000-sb &	press Return
7	cd /usr/ecs/<mode>/CUSTOM/utilities	press Return
8	EcInGUIStart <mode>	press Return

16.2.2 Viewing the Ingest History Log

The DIT can determine if an Ingest request has been completed by viewing the entries in the **ECS Ingest History Log**. An Ingest request is not logged into the **History Log** until the Ingest

process has been completed. There are four different search criteria that can be used to view **Ingest History Log** entries, the **Start and Stop Date/Time**, the **Data Provider ID**, the **Data Type**, and **Final Request Status**. The DIT must manually enter the **Start and Stop Date/Time** criteria, which displays all Ingest entries that were logged between the start date and time, and the stop date and time. The **Data Provider, Data Type, and Final Request Status** each have a drop down option menu in which to select the criteria. After the DIT enters the search criteria, he/she clicks on the **Display** button to display the log of completed Ingest entries that match the search criteria. The **History Log** displays the following:

Request ID Data Provider, Status, Ingest Type, Start Date, Start Time, End Date, End Time, Total Number of Granules, #Success Granules, Data Vol (MB), File Count, Time to Xfer (min.), Time Preproc (min.), Time to Archive (min.), and Priority Restart Flag.

The DIT can display the same information on the granule level by clicking on the desired entry.

The procedure that follows explains how to view Ingest Log entries using the **History Log**. This example will use the **Start and Stop date/time** filters to display a list of Ingest requests that were logged in the last twenty-four hour period. If you are already familiar with the procedure, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, you should use the following detailed procedures:

- 1** Click on the **ECS Ingest** icon. This assumes that the Ingest GUI is running, if the GUI is not up, then follow the steps for bringing up the Ingest GUI outlined in section 16.2.1.
 - The **ECS Ingest** tool is opened.
 - The **Ingest Intro** screen is displayed.
- 2** Click the **History Log** tab widget.
 - The History Log screen is displayed.
- 3** Click on the Start Date/Time field.
 - The cursor moves to the **month** field.
- 4** Enter the **month**, then press **Tab**.
 - The cursor moves to the **day** field.
- 5** Enter the **day** of the month, then press **Tab**.
 - The cursor moves to the **year** field.
- 6** Enter the **year**, then press **Tab**.
 - The cursor moves to the **hour** field.
- 7** Enter the **hour**, then press **Tab**.
 - The cursor moves to the **min** field.

- 8 Enter the **minute**, then press **Tab**.
 - The cursor moves to the **sec** field.
- 9 Enter the **seconds**, then press **Tab** or, bypass the **second's** field by pressing tab first.
 - The cursor moves to the **month** field for Stop Date/Time.
- 10 Repeat steps 4 through 9 for the **Stop** Date/Time field.
- 11 Select either **Detailed Report** or **Summary Report**.
 - Summary Report requires the operator to select either **Request Level** or **Granule level**.
- 12 Click on the **Display** button.
 - Each ingest request that was completed and logged between the start and end time and date are displayed.
 - Each entry displays the **Request ID, # of Success Granules, External Data Provider, Ingest Type, Processing Start and End Time, Data Volume, Number of Data Sets, and Number of Data Files**.
- 13 Click on an individual **Entry**.
 - The granule level of the selected entry is displayed.
- 14 Select another function by clicking on a GUI tab.
- 15 To exit the ECS Ingest tool, select menu path **File/Exit**.

Table 16.2-3. View Ingest History Log - Quick-Steps (1 of 2)

Step	What to Enter or Select	Action to take
1	ECS Ingest icon	single Click
2	History Log	press Return
3	Month (Start Month field)	single Click
4	Enter the Month	press Tab
5	Enter the Day	press Tab
6	Enter the Year	press Tab
7	Enter the Hour	press Tab
8	Enter the Minute	press Tab
9	Enter the Seconds	press Tab
10	Enter the Month	press Tab
11	Enter the Day	press Tab
12	Enter the Year	press Tab

Table 16.2-3. View Ingest History Log - Quick-Steps (2 of 2)

Step	What to Enter or Select	Action to take
13	Enter the Hour	press Tab
14	Enter the Minute	press Tab
15	Enter the Seconds	press Tab
16	Select Detailed Report or Summary Report	single Click
17	Display button	single Click
18	Individual Entry record	single Click
19	Select another function	single Click or,
20	File/Exit	single Click and drag

16.2.3 Ingest History Log Reports

The **History Log** can support four report formats, a request history log report, a data type history report, a request summary statistics report, and a data type summary statistics report. The reports can be generated for specified time periods and executed on a regular basis. There are two radio buttons above the display box, **Detailed Report** and **Summary Report**. Each report supplies the DIT and operations staff with a view of the ingest request completion performance. The **Detailed Report** gives detailed information about each completed ingest request. The **Summary Report** gives a summary, which includes the average and maximum time taken to perform each step in the ingest process.

The **Detailed Report** can be sorted by **Start and Stop Date & Time**, by **Data Provider**, and by **Data Type**. The default for the **Detailed Report** is DAAC and Start Time. The **Summary Report** should be sorted by **DAAC, Data Provider or Data Types**.

The following procedure will order a **Detailed Report** with the **Data Provider** as the sort criteria, then will clear the screen and order a **Summary Report** using the **Data Type** as the sort criteria. If you are already familiar with the procedure, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, you should use the following detailed procedures:

- 1 Click on the **ECS Ingest** icon. This assumes that the Ingest GUI is running, if the GUI is not up, then follow the steps for bringing up the Ingest GUI outlined in section 16.2.1.
 - The **ECS Ingest** tool is opened.
 - The **Ingest intro** screen is displayed.
- 2 Click on the **History Log** tab widget.
 - The **History Log** screen is displayed.
- 3 Click on the **Data Provider** field.
 - Cursor moves to the **Data Provider** field.

- 4- Enter the **Data Provider**, then press **Tab** or, a drop down option menu may also be used as follows:
 - a) Point the mouse on the arrow to the right of the **Data Provider** field.
 - b) While holding down on the mouse, **highlight** the required **Data Provider**.
 - c) **Release** the mouse button.
 - d) The **Data Provider** that was chosen is now displayed in the **Data Provider** field.
- 5 Click on the **Detailed Report** Radio box.
- 6 Click on the **Display** button.
 - The **Detailed Report** is now displayed.
 - The **Detailed Report** displays the following information; **Request ID, Data Provider, Start and End Time, Completion Status, Restart Flag, Processing Time** (minutes), **Transfer Time** (minutes), **Archive Time** (minutes), **Number of Files, Number of Granules, Number of Success Granules, Data volume** (MB), and **Ingest Type**.
- 7 Click on the **Clear All** button.
 - The display box and criteria fields are cleared.
- 8 Click on the **Data Type** field.
 - The cursor moves to the **Data Type** field.
- 9- Enter the **Data Type**, then press **Tab** or, a drop down option menu may also be used as shown below:
 - a) Point the mouse on the arrow to the right of the **Data Type** field.
 - b) While holding down on the mouse, **highlight** the required **Data Type**.
 - c) **Release** the mouse button. The **Data Type** that was chosen is now displayed in the **Data Type** field.
- 10 Click on the **Summary Report** radio box.
- 11 Click on the **Display** button.
 - The **Summary Report** is displayed.
 - The **Summary Report** displays the following information; **Data Provider, Data Type, Total Requests, Total Errors, Granules** (Avg/Max), **Files** (Avg/Max), **Size -MB** (Avg/Max), **Transfer Time- minutes** (Avg/Max), **Pre-Processing Time minutes** (Avg/Max), and **Archive Time-minutes** (Avg/Max).
- 12 Print the report by following menu path **File / Print**.
- 13 Select another function by clicking on a widget tab.
- 14 To exit the **ECS Ingest** tool, select menu path **File / Exit**.

Table 16.2-4. Ingest History Log Reports - Quick-Steps

Step	What to Enter or Select	Action to Take
1	ECS Ingest icon	single Click
2	History Log	press Return
3	Data Provider field	single Click
4	Enter the Data Provider	press Tab
5	Detailed Report Radio Box	single Click
6	Display button	single Click
7	Clear All button	single Click
8	Data Type field	single Click
9	Enter Data Type	press Tab
10	Summary Report Radio Box	single Click
11	Display button	single Click
12	File / Print	single Click and drag
13	Select another function	single Click or,
14	File/Exit	single Click and drag

16.2.4 Monitoring/Controlling Ingest Requests

The DIT can monitor and control ingest activities using the **Ingest Monitor/Control** tool. The DIT can view all or selective ingest requests in the system. A search can be filtered by using a sort criteria of **Request ID**, **Data Provider**, or **All Requests**. After the search criteria has been selected, the DIT has the option of displaying a **Graphical View** or a **Text View** of the ingest requests. The **Graphical View** displays the Request Id, the Time processing began, and the Percent of the ingest process that has been completed. The **Text View** displays the Request Id, State of Request, External Data Provider, Ingest Type, Request Priority, Start Date & Time, Expiration Date, Total Granules, and Completion Time.

The DIT has the capability of updating ongoing ingest activities in the system. The DIT can Suspend (inactive) Resume, Cancel, and change the Priority (inactive) of a request. To display a request on a granule level, the DIT will double click on the request.

The following procedure will display all requests currently in the system, select and view a request on the granule level, then cancel the request. If you are already familiar with the procedures, you may prefer to use the quick-step tables at the end of this procedure. If you are new to the system, or have not performed this task recently, you should use the detailed procedures that follow.

- 1 Click on the **ECS Ingest** icon. This assumes that the Ingest GUI is running, if the GUI is not up, then follow the steps for bringing up the Ingest GUI outlined in section 16.2.1.
 - The **ECS Ingest** tool is now open.
 - The **Ingest Intro** screen is displayed.

- 2 Click on the **Monitor/Control** tab widget.
 - The **Monitor/Control** screen is displayed.
- 3 Click on the **All Requests** button, in the radio box.
- 4 Click on the **Text View** button.
 - All ongoing ingest requests are displayed.
- 5 **Double Click on the desired request line.**
 - Text is displayed at the granule level.
- 7 Click on the **Cancel** button, from the toggle control box.
- 8 Click on the **OK** push button.
 - A confirmation dialog box pops up.
- 9 Click the **Yes** button in the confirmation dialog box.
 - Ingest request has been canceled.
- 10 Select another function by clicking on a widget tab.
- 11 To exit the **ECS Ingest** tool, select menu path **File / Exit**.

Table 16.2-5. Monitoring/Controlling Ingest Requests - Quick-Steps

Step	What to Enter or Select	Action to Take
1	ECS Ingest icon	single Click
2	Monitor/Control tab widget	single Click
3	All Requests button	single Click
4	Text View button	single Click
5	Highlight individual account	double Click
6	Cancel button	single Click
7	OK push button	single Click
8	Yes OK button in confirmation box	single Click
9	Select another function	single Click or
10	File / Exit	single Click and drag

16.2.6 Resuming Ingest Requests

After the matter that caused an ingest request to be suspended from processing has been taken care of, the processing can be resumed. If you are already familiar with the procedure to resume an ingest request, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, you should use the following detailed procedures. The procedure starts with the assumption that all applicable servers and the **ECS Ingest** GUI are currently running

and the ingest that was suspended by the system's automated process is being displayed on the **Monitor/Control** tab.

- ◆ In the Ingest GUI Monitor/Control screen
 - ◆ Select the ingest request which has request state of “Suspended”
 - ◆ Select the Resume button on the Ingest GUI
 - ◆ Select the OK button on the Ingest GUI
 - ◆ Confirm the resumption by clicking “Yes” button on the pop-up window
1. **Verify that the request is archived on the Ingest GUI Monitor/Control screen.**

Table 16.2-6. Resuming Ingest Requests - Quick-Steps

Step	What to Enter or Select	Action to Take
1	Highlight the request to be resumed	Single Click
2	Resume button	Single Click
3	OK button	Single Click
4	Yes button in the confirmation box	Single Ckick

16.2.7 Cancel Ingest Request

16.2.7.1 Cancel Ingest Request on the Request Level

In some cases it will be necessary to cancel an Ingest Request. If you are already familiar with the procedure to cancel an ingest request, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, you should use the following detailed procedures. The procedure starts with the assumption that all applicable servers and the **ECS Ingest** GUI are currently running and the ingest request to be canceled is being displayed on the **Monitor/Control** tab.

- ◆ In the Ingest GUI Monitor/Control screen
- ◆ select the ingest request on the screen
- ◆ Single click on the desired request to be cancelled
- ◆ Select the Cancel button on the screen
- ◆ Select the OK button the screen
- ◆ **Confirm the cancellation of the selected request by clicking “Yes” on the pop-up window**
- ◆ **Verify the cancellation of the selected request by viewing the Request state in the Monitor/Control display.**

16.2.7.2 Cancel Ingest Request on Granuel Level

- ◆ In the Ingest GUI Monitor/Control screen
- ◆ double click the request to display the granule information
- ◆ Single click to select the desired granule to be cancelled

- ◆ Select the Cancel button on the screen
- ◆ Select the OK button on the screen
- ◆ Confirm the cancellation of the selected granule by clicking “Yes” on the pop-up window
- ◆ Verify the cancellation of the selected granule by viewing the granule state in the Monitor/Control display.

Table 16.2-7. Running Cancel Ingest Requests - Quick-Steps

Step	What to Enter or Select	Action to Take
1	Highlight the request to be Cancelled	Single Click
2	Cancel button	Single Click
3	OK button	Single Click
4	Yes button in confirmation box	Single Click

16.2.8 Cancel Suspended Ingest Request

In some cases it will be necessary to cancel a suspended Ingest Request. If you are already familiar with the procedure to cancel a suspended ingest request, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, you should use the following detailed procedures. The procedure starts with the assumption that all applicable servers and the **ECS Ingest** GUI are currently showing (the Monitor/Control) the suspended ingest request to be canceled.

16.2.8.1 Ingest Cancel Suspended Request

- ◆ In the Ingest GUI Monitor/Control screen
- ◆ Select the ingest request which has request state of “Suspended”
- ◆ Select the Cancel button on the Ingest GUI
- ◆ Select the OK button on the Ingest GUI
- ◆ Confirm the cancellation by clicking “Yes” button on the pop-up window

16.2.8.2 Cancel Partially Suspended Ingest Request

1. Using Ingest GUI select Monitor/Control function to monitor Request processing
 - ◆ Select Monitor/Control
 - ◆ Select Text View

2. In the Ingest GUI Monitor/Control screen
 - ◆ Double click the request to display granule information

The granule state on the Ingest GUI Monitor/Control screen changes from “Transferring” to “Suspended”.

The request state on the Ingest GUI Monitor/Control screen changes from “Active” to Partially “Suspended”

3. In the Ingest GUI Monitor/Control screen
 - ◆ Select the ingest request which has request state of Partially “Suspended”
 - ◆ Select the cancel button on the Ingest GUI
 - ◆ Select the OK button on the Ingest GUI
 - ◆ Confirm the cancellation by clicking “Yes” button on the pop-up window

Table 16.2-8. Running Cancel Suspended and Partially Suspended Ingest Requests - Quick-Steps

Step	What to Enter or Select	Action to Take
1	Highlight the request to be Cancelled	Single Click
2	Cancel button	Single Click
3	OK button	Single Click
4	Yes button in confirmation box	Single Click

16.2.9 Ingest Operator Tools

The **Ingest Operator Tools** give the Production Monitor (PM) and/or DIT the capability to set and view ingest thresholds. The ingest thresholds are broken up into two groups: System-wide and Data Provider specific. To edit the Data Provider click on the **Modify External Data Provider/User Information tab stack** just below the tab widgets (Section 16.2.7.1). To make System-Wide edits click on the **Modify System Parameters tab stack** (Section 16.2.7.2). When a DIT reviews the previous day’s Ingest activity, he/she may discover that there is a backlog of requests for ingest. After reviewing the report he/she may invoke the **Ingest Operator Tool**, then increase the System or Data Provider volume threshold to support a catch-up mode. Another tool, **File Transfer** (Section 16.2.7.3), allows the DIT to transfer requested files to optional remote sites.

The Activity Checklist table that follows provides an overview of the Ingest Operator tool. Column one (Order) shows the order in which tasks should be accomplished. Column two (Role) list the Role/Manager/Operator responsible for performing the task. Column three (Task) provides a brief explanation of the task. Column four (Section) provides the Procedure (P) section number or Instruction (I) section number where details for performing the task can be found.

Table 16.2-9a. Ingest Operator Tools - Activity Checklist

Order	Role	Task	Section
1	PM/DIT	Modify External Data Provider/User Information	(P) 16.2.7.1
2	PM/DIT	Modify System Parameters	(P) 16.2.7.2
3	DIT	File Transfer	(P) 16.2.7.3

16.2.9.1 Modify External Data Provider User Information

The PM or DIT can edit the FTP User Name, FTP Password, Email Address, HTML Password, CDS Entry Name, Server Destination UUID, Volume Threshold, Request Threshold, Priority Level, and Notify Parameters when the **Modify External Data Provider User Information tab stack** is selected.

The **Volume Threshold** is the maximum data volume allowed to be ingested concurrently by the data provider in one day. The **Request Threshold** is the maximum number of requests allowed to be processed by the data provider in one day. One day is a 24 hour period beginning when the first request is received. Each Data Provider is given a data **Priority Level**, which can effect when the ingest data is processed. When the Data Providers thresholds have been reached, the system will no longer process ingest requests for that specific Data Provider until the following day. If the DIT determine that this specific Data Provider's data needs to be processed, he/she can change the thresholds to allow the system to accept the request.

The procedure that follows explains how to edit the Data Provider's **Email Address, Volume Threshold, Request Threshold** and **Priority Level**. If you are already familiar with the procedures, you may prefer to use the quick-step table at the end of this procedure. If you are new to the system, or have not performed this task recently, you should use the following detailed procedure.

- 1 Click on the **ECS Ingest** icon. This assumes that the Ingest GUI is running, if the GUI is not up, then follow the steps for bringing up the Ingest GUI outlined in section 16.2.1.
 - The **ECS Ingest** tool is opened.
 - The **Ingest Info** screen is displayed.
- 2 Click on the **Operator Tools** tab widget.
 - The **Operator Tool** is opened.
- 3 Click on the **Modify External Data Provider/User Information** tab.
 - The Data Provider screen is displayed.
- 4 Click on the **Data Provider** field.
 - Cursor moves to the **Data Provider** field.
- 5 Enter the **Data Provider** name, then press **Tab** or, a drop down option menu may also be used as follows:
 - a) Point the mouse on the arrow to the right of the **Data Provider** field.
 - b) While holding down the mouse, **highlight** the chosen **Data Provider**.
 - c) **Release** the mouse button. The **Data Provider** that was chosen is now displayed in the **Data Provider** field.
- 6 Click on the **Email Address** field.
 - Cursor moves to the **Email Address** field.

- 7 Enter the **Email Address**, then press **Tab**.
 - Cursor moves to the new **Volume Threshold** field.
- 8 Enter the **New Volume Threshold**, then press **Tab**.
 - Cursor moves to the new **Request Threshold** field.
- 9 Enter the **New Request Threshold**, then press **Tab**.
 - Cursor moves the new **Priority Level** field.
- 10- Enter the new **Priority Level**, then press **Tab** or, a drop down option menu may also be used as follows:
 - a) Point the mouse on the arrow to the right of the **New Priority Level** field.
 - b) While holding down the mouse, **highlight** the chosen **Priority Level**.
 - c) **Release** the mouse button. The **Priority Level** that was chosen is now displayed in the **Priority Level** field.
- 11 Click on the **OK** push button.
 - Invokes changes to the system.
- 12 Select another function by clicking on a widget tab.
- 13 To exit the **ECS Ingest** tool, select menu path **File / Exit**.

**Table 16.2-9b. Modify External Data Provider/
Interactive User Information - Quick-Steps**

Step	What to Enter or Select	Action to Take
1	ECS Ingest icon	Single Click
2	Operator Tools Tab widget	Single Click
3	Modify External Data Provider User Information tab	Single Click
4	Data Provider field	Single Click
5	Enter the Data Provider Name	Press Tab
6	Email Address field	Single Click
7	Enter the Email Address	Press Tab
8	Enter the New Volume Threshold	Press Tab
9	Enter the New Request Threshold	Press Tab
10	Enter the New Priority Level	Press Tab
11	OK push button	Single Click
12	Select another function/widget	Single Click
13	File / Exit	Single Click and drag

16.2.9.2 Modify System Parameters

The **Modify System Parameters** tool allows the PM or DIT to edit the System Volume Threshold, to set the maximum number of ingest requests allowed to be processed concurrently, to set the number of transfer retry attempts and the retry intervals when network failure occurs, to set the monitor time for a completed request, and the frequency of screen update.

In the following procedure the DIT will invoke the **ECS Ingest** tool then select the **Operator Tools** tab widget. From the **Operator Tools** display screen the DIT will click on the **Modify System Parameters** tab stack, then edit the **Volume Threshold, Request Threshold, Communication Retry Count, Communication Retry Interval, Monitor Time, and Screen Update Time** fields. If you are already familiar with the procedure, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, or have not performed this task recently you should use the following detailed procedure.

- 1 Click on the **ECS Ingest** icon. This assumes that the Ingest GUI is running, if the GUI is not up, then follow the steps for bringing up the Ingest GUI outlined in section 16.2.1.
 - The **ECS Ingest** tool is opened.
 - The **Ingest Intro** screen is displayed.
- 2 Click on the **Operator Tools** tab widget.
 - The **Operator Tool** is opened.
- 3 Click on the **Modify System Parameters** tab.
 - The **System Parameters** screen is displayed.
- 4 Click on the **New Volume Threshold** field.
 - The cursor moves to the **New Volume Threshold** field.
- 5 Enter the **New Volume Threshold**, then press **Tab**.
 - The Maximum data volume to be ingested concurrently is changed.
 - The cursor moves to the **New Request Threshold** field.
- 6 Enter the **New Request Threshold**, then press **Tab**.
 - The Maximum number of ingest requests to be processed concurrently is changed.
 - The cursor moves to the **New Communication Retry Count** field.
- 7 Enter the **New Communication Retry Count**, then press **Tab**.
 - The number of retries to perform when a communication failure is encountered with the external data provider is changed.
 - The cursor moves to the **New Communication Retry Interval** field.
- 8 Enter the **New Communication Retry Interval**, then press **Tab**.
 - The number of minutes to wait between retries when attempting to communicate with the External Data Provider.

- The cursor moves to the **Monitor Time** field.
- 9** Enter the **New Monitor Time**, then press **Tab**.
- The **Monitor Time** tells the system how often to monitor the network for ingest requests.
 - The cursor moves to the **Screen Update Time** field.
- 10** Enter the **New Screen Update Time**, then press **Tab**.
- The **Screen Update Time** tells the system how often to update the **Monitor/Control** screen, which shows the current ingest request activity.
- 11** Click on the **OK** push button.
- Implements the changes entered.
- 12** Select another function by clicking on a widget tab.
- 13** To exit the **ECS Ingest** tool, select menu path **File / Exit**.

Table 16.2-9c. Modify System Parameters - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	ECS Ingest icon	Single Click
2	Operator Tools Tab widget	Single Click
3	Modify System Parameters tab	Single Click
4	New Volume Threshold	Single Click
5	Enter the New Volume Threshold	Press Tab
6	Enter the New Request Threshold	Press Tab
7	Enter the New Communication Retry Count	Press Tab
8	Enter the New Communication Retry Interval	Press Tab
9	Enter the New Monitor Time	Press Tab
10	Enter the New Screen Update Time	Press Tab
11	OK push button	Single Click
12	Select another function/widget	Single Click
13	File / Exit	Single Click and drag

16.2.9.3 File Transfer

The **File Transfer** tool allows the DIT to transfer System Management Center (SMC) History and Generic files to the Science Community. The tool allows the DIT to build a SMC History File or select any file to be transferred from a specified source of origin to a destination desired by the user.

In the following procedure the DIT will invoke the **ECS Ingest** tool then select the **Operator Tools** tab widget. From the **Operator Tools** display screen the DIT will click on the **File Transfer** tab, then edit the **Volume Threshold, Request Threshold, Communication Retry**

Count, Communication Retry Interval, Monitor Time, and Screen Update Time fields. If you are already familiar with the procedure, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, or have not performed this task recently you should use the following detailed procedure.

- 1-** Click on the **ECS Ingest** icon. This assumes that the Ingest GUI is running, if the GUI is not up, then follow the steps for bringing up the Ingest GUI outlined in Section 16.2.1.
 - The **ECS Ingest** tool is opened.
 - The **Ingest Intro** screen is displayed.
- 2** Click on the **Operator Tools** tab widget.
 - The **Operator Tool** is opened.
- 3** Click on the **File Transfer** tab.
 - The **File Transfer** screen is displayed.
- 4** Click on **Build SMC History File** or the **Generic File Transfer** push button.
 - The **Build SMC History File** creates selected file for operator transfer.
 - The Generic File transfer allows any directory or file to be transferred.
- 5** Click on the **New Filter** field.
 - The Cursor moves enters the field.
- 6** Enter the **New Filter**, then press **Tab**.
 - The Cursor moves to **Directories** field.
- 7** At **Directories**, select desired table entry, then press **Tab**.
 - The directory is entered into the **Selection** field.
 - The Cursor moves to **Files** field.
- 8** At **Files**, select desired table entry, then press **Tab**.
 - The file is added to the path entered in the Selection field.
 - The Cursor moves to **Selection** field.
- 9** Click on the **OK** push Button in the **Transfer Origin Box**.
- 10** Enter the **New Transfer Destination** in the Transfer Destination field.
- 11** Click on the **OK** push button for **File Transfers** window.
- 12** Select another function by clicking on a widget tab.
- 13** To exit the **ECS Ingest** tool, select menu path **File / Exit**.

Table 16.2-9d. File Transfer- Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	ECS Ingest icon	single Click
2	Operator Tools Tab widget	single Click
3	File Transfer toggle tab	single Click
4	Click SMC Build History File or Generic File Transfer	single click
6	Click the New Filter , enter filter	press Tab
7	Enter the New Directories	press Tab
8	Enter the New Files	press Tab
9	OK push button in Transfer Origin	press Tab
10	Enter the New Transfer Destination	press Tab
11	OK push button for window	single Click
12	Select another function/widget	single Click
13	File/Exit	single Click and drag

16.2.10 Physical Media Ingest

When the Science Community sends a data ingest request, the DIT can ingest data from physical media into the DAAC using the **Media Ingest** tool. Table 16.2-10a identifies the different types of physical media used within the ECS system ingest process. Each cartridge is identified by means of a bar code label that shows the media number.

Table 16.2-10a. Physical Media Ingest Types

Media Type	Media Name	Media Purpose	Capacity
8mm	8 Millimeter cartridges	Ingest	160m 7Gb
D3	D3 Cartridge tape	Ingest (EDC Only)	50 Gigabyte

Activity Checklist Table 16.2-10b, provides an overview of **Physical Media Ingest** activities. Column one (**Order**) shows the order in which tasks should be accomplished. Column two (**Role**) list the Role/Manager/Operator responsible for performing the task. Column three (**Task**) provides a brief explanation of the task. Column four (**Section**) provides the Procedure (**P**) section number or Instruction (**I**) section number where details for performing the task can be found. Table 16.2-10b. Physical Media Ingest - Activity Checklist

Table 16.2-10b Activity CheckList

Order	Role	Task	Section
1	DIT	Performing Media Ingest from 8mm Media Tape	(P) 16.2.8.2
2	DIT	Performing Media Ingest from D3 Tape (EDC only)	(P) 16.2.8.3

16.2.10.1 Accessing D3/8mm/Tape Drives and Stackers

This section describes how to access the 8mm and D3 tapes and drives as used by Media Ingest. Both types of tapes can be used for physical media data requests for the Ingest system. The DIT can start the Ingest process by accessing the appropriate tape, utilizing the Ingest GUI Interface and the tape stacker units. Each 8mm stacker contains two tape drives and can store up to 10 tapes.

Note: While data is being read from tape the GUI will not allow another function to be selected until data transfer is complete

16.2.10.2 Performing Media Ingest from 8mm Tape

A **Delivery Record** file is required for **Media Ingest**. The **Delivery Record** file can either be embedded in the hard media or be made available electronically. If it is not embedded on the hard media, the **Delivery Record** must be in a specified network directory. The external data provider must ftp the **Delivery Record** file into the location prior to delivering the hard media. The **Delivery Record** identifies parameters such as data source, number of files, and location of data. The DIT will invoke the **ECS Ingest** tool, then click on the **Media Ingest** tab widget to display the screen.

In the following procedure the DIT will invoke the **ECS Ingest** tool then select the **Media Ingest** tab widget. A drop down menu can be used to select the 8mm Media Type. Enter Stacker ID and Stacker Slot ID for 8mm tape ingest. Another drop down menu can be used to select the Data Provider. Enter **Media Volume ID (Barcode)** in the the **Media Volume ID** field.

Note: Only one tape can be loaded and Ingested at a time.

The **Data Delivery Record File Location** can be selected by clicking on the **On Network**, or **Embedded in Media** buttons located in the radio box. The file name supplied by the Data Provider is entered in the **Data Delivery Record File Name** field. If you are already familiar with the procedure, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, or have not performed this task recently you should use the following detailed procedure.

- 1- Click on the **ECS Ingest** icon. This assumes that the Ingest GUI is running, if the GUI is not up, then follow the steps for bringing up the Ingest GUI outlined in section 16.2.1.
 - The **ECS Ingest** tool is opened.
 - The **Ingest Intro** screen is displayed.
- 2 Click on the **Media Ingest** tab widget.
 - The **Media Ingest** screen is displayed.
- 3 Click on the **Media Type** field.
 - Cursor moves to the **Media Type** field.
- 4 Choose the **Media Type**, then press **Tab**.
 - Cursor moves to the **Stacker ID** field.
- 5 Enter the stacker ID in the **Stacker ID** field, then press **Tab**.
 - Cursor moves to the **Stacker Slot ID** field.
- 6 Place the tape cartridge in a stacker slot.
- 7 Enter the stacker slot ID in the **Stacker Slot ID** field, then press **Tab**.
 - Cursor moves to the **Data Provider** field.
- 8 Enter the **Data Provider**, then press **Tab**.
 - A drop down option menu can also be used.
 - The cursor moves to the **Media Volume ID (Barcode)** field.
- 9 Enter the **Media Volume ID** number from the tape.
 - The **Media Volume ID** number is displayed in the display box below the **Media Volume ID** field.
8. Enter the **Data Delivery Record File Name** that is supplied by the Data Provider
- 10 Click on the **On Network** button located in the Radio Box.
 - This tells the system that the **Delivery Record** is located on the Network.
 - If the **Delivery Record** is embedded in the tape, select the **Embedded in Media** button.
- 11 **Click** on the **OK** button.
 - Data transfer is initiated.
- 12 Select another function by clicking on a widget tab.
- 13 To exit the **ECS Ingest** tool, select menu path **File / Exit**.

Table 16.2-10c. Performing Media Ingest from 8mm Tape - Quick Steps Procedures

Step	What to Enter or Select	Action to Take
1	ECS Ingest icon	Single Click
2	Media Ingest Tab widget	Single Click
3	Media Type field	Single Click
4	Enter the Media Type (8mm)	Press Tab
5	Enter the Stacker ID	Press Tab
6	Place the 8mm tape cartridge in a 8mm stacker slot	
7	Enter the Stacker Slot ID	Press Tab
8	Enter the Data Provider	Press Tab
9	Enter the Media Volume ID	Press Tab
10	On Network button	Single Click
11	OK push button	Single Click
12	Select another function/widget	Single Click
13	File / Exit	Single Click and drag

16.2.10.3 Performing Media Ingest from D3 Tape (EDC Only)

This section describes how to access the StorageTek Controller/Transport Redwood SD-3 for D3 tape processing as used by Media Ingest. The DIT can access the information stored on a D3 tape by utilizing the Ingest GUI Interface.

Once the extraction command has been executed the system will read the D3 tape from the header label then access the data needed for Ingest processing. Upon completion of the process the D3 tape will automatically rewind and eject itself from the tape drive.

If you are already familiar with the procedure, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, or have not performed this task recently you should use the following detailed procedure.

- 1** Compare the received medium to a media ingest readiness checklist to verify that everything needed for the media ingest is in order.
 - The media ingest readiness checklist includes the following types of checks:
 - PDR file is available, either placed on the network by the data provider or embedded in the medium.
 - Data provider has identified the PDR file name.
 - There is a unique Media Volume ID for each tape received.
 - An appropriate device (tape drive) is available to support the data transfer.

- 2** Verify that the display above the D3 tape unit indicates “*”.

- 3** Verify that there is **no** tape cartridge inserted in the D3 tape unit.
 - Remove the tape cartridge in the D3 tape unit (if applicable).

- 4- Verify that the **Ready** light is illuminated in the second row of the panel near the window of the D3 tape unit where the tape is inserted.
 - If the **Ready** light is not illuminated, push the **Ready** button.
- 5- Click on the **ECS Ingest** icon. This assumes that the Ingest GUI is running, if the GUI is not up, then follow the steps for bringing up the Ingest GUI outlined in section 16.2.1.
 - The **ECS Ingest** tool is opened.
 - The **Ingest Intro** screen is displayed.
- 6 Click on the **Media Ingest** tab widget.
 - The **Media Ingest** screen is displayed.
- 7 Click on the **Media Type** field.
 - Cursor moves to the **Media Type** field.
- 8 Enter the **Media Type**, then press **Tab**.
 - To enter the type of medium (i.e., **D3 Tape**) click and hold on the option button to the right of the **Media Type** field, move the mouse cursor to the desired selection (highlighting it), then release the mouse button.
 - The selected type of medium is displayed in the **Media Type** field.
 - Cursor moves to the **Data Provider** field.
- 9 Enter the **Data Provider**, then press **Tab**.
 - A drop down option menu can also be used.
 - To enter the data provider (e.g., **SCF**) click and hold on the option button to the right of the **Data Provider** field, move the mouse cursor to the desired selection (highlighting it), then release the mouse button.
 - The selected data provider is displayed in the **Data Provider** field.
 - The cursor moves to the **Media Volume ID** field.
- 10- Enter the **Media Volume ID** number from the tape in the **Media Volume Id (Barcode)** field.
- 11 Click on the **On Network** button located in the Radio Box.
 - This tells the system that the **Delivery Record** is located on the Network.
 - If the **Delivery Record** is embedded in the tape, select the **Embedded in Media** button.
- 12- Enter the data delivery record file name (e.g., **scf11a.PDR**) in the **Data Delivery Record File Name** field.
- 13 Click (**once only**) on the **OK** button at the bottom of the GUI.
 - The GUI **OK** button is sensitive to being clicked more than once. It is important to click it dead center once only or D3 ingest is likely to fail.

- 14** Insert the tape cartridge in the D3 tape drive.
- The tape cartridge must be inserted within one minute of clicking on the **OK** button on the Ingest GUI.
 - The message "Loading" should be displayed on the D3 tape drive unit panel.
 - Then the message "Ready" should be displayed on the D3 tape drive unit panel and the "ready" light should blink on and off for a while.
 - Avoid clicking the mouse on the Ingest GUI while the D3 tape unit is reading the tape.
 - Once the extraction command has been executed, the system reads the D3 tape from the header label, then accesses the data needed for Ingest processing.
- 15-** When the data transfer has been completed, wait for the message "Ingest Request Completed."
- The messages "Rewinding" then "Unloading" should be displayed on the D3 tape drive unit panel as the D3 tape drive unit rewinds and unloads after the data transfer.
 - Upon completion of the process the D3 tape automatically rewinds and ejects itself from the tape drive.
- 16** Remove the tape cartridge from the D3 tape drive.
- 17** Select another function by clicking on a widget tab.
- 18** To exit the **ECS Ingest** tool, select menu path **File / Exit**.

Table 16.2-10d. Performing Media Ingest from D3 Tape - Quick Steps Procedures

Step	What to Enter or Select	Action to Take
1	ECS Ingest icon	Single Click
2	Media Ingest Tab widget	Single click
3	Media Type field	Single Click
4	Enter the Media Type (D3)	Press Tab
5	Enter the Data Provider	Press Tab
6	Enter the Media Volume ID	Press Tab
7	On Network button	Single Click
8	Enter Data Delivery Record File Name	
9	OK push button	Single Click
10	Select another function/widget	Single Click
11	File / Exit	Single Click and drag

16.2.10.4 Ingest EDOS D3 (GDAAC)

1. After D3 tape(s) are received from EDOS, they must be manual placed into the ingest polling directory. Use the following steps to complete the operational task.
2. On g0drg01 log-on using the amass account and password. Once logged on vary drive 8 off-line, using the following command: `drivestat -i 8`

Note drive 8 is used as an example any drive could be used.
3. Insert the D3 EDOS tape into the archive using the following steps:

Log-on the g0drs04 system using the ACSLS account & password.

Enter the D3 media into the StorageTek archive. Using the *ACSL*S window type:
enter 0,0,0

Prior to this write down the *volume label* for reference. Note the D3 media must be inserted in the Upper most left corner of the input/output bin. Close the input/output door after the D3 media has been placed in to the bin. The media is now loaded into the Archive.

1. Move the media into Drive 8 using the following commands (note user is still on the g0drs04 box):

`mount volume label 0,0,1,3`

2. Read the tape contents using the following command (user now back on g0drg01 box): This process could take several iterations to read the complete tape.

`tar -tvf /dev/rmt/tps94d4nr`

3. Once the read completes. Extract the data from tape to a holding location large enough to store all the data on the tape. This will be some place on the L0_buffer (g0drg01). Again this could take several iterations. But it will be the same number of trys as in step 5. To Extract the data type:

`tar -xvf /dev/rmt/tps94d4nr /L0_buffer/predetermined location`

4. When the extract completes. The ingest data must be identified. Once the files to be ingested have been identified they must be transferred to *g0icg01* polling directory location: */usr/ecs/<MODE>/icl/a/data/pollEDOS..* Recommended transfer method: *dd if=data location/filename of=/usr/ecs/<MODE>/icl/a/data/pollEDOS/filename bs=4096*
5. Once all the files that make up a granule have been transferred to *g0icg01* 2 files must be created using the following utility:

/tools/share/bin/genPDRS5A <data type name> <first PDS file on the granule> <usr/ecs/<MODE>/icl/a/data/pollEDOS>

6. Have the ingest technician verify the transfer completes successfully. Repeat steps 7 & 8 until all granules have been ingested.

16.3 Ingest - ASTER On Demand Processing

ASTER On Demand Processing generally refers to the generation of products that are not included as part of the standard ASTER L1A and L1B products that are sent from ASTER GDS to ECS. These On Demand Products include, but may not be limited to: ASTER Digital Elevation Map (DEM), Higher Level ASTER Products, and other non-standard ASTER products that may be ordered from the user community. There are three items associated with On Demand Processing; (a) The production of Digital Elevation Maps; (b) Handling requests associated with non-standard L1B and (c) Handling requests associated Higher level(s) products L1B products.

(a) ON DEMAND PROCESSING - DIGITAL ELEVATION MAPS (DEM)

This type of On Demand Processing requires that the DAAC Operator produce the DEM manually at the DAAC. Using the On-Demand Form (ODFRM), the user submits the request to ECS. Upon receiving the request (the ODFRM and e-mail) to produce the DEM, the DAAC Operator takes the following action:

- 1.) From the granule information present on the ODFRM and in the e-mail, the DAAC Operator creates the DEM.
- 2.) Using the Ingest Sub-system, the DAAC Operator Ingests the DEM Product
- 3.) Using the Science Data Server, the DAAC Operator Archives the DEM product
- 4.) The DAAC Operator notifies ECS that the product is available.

(b) ON DEMAND PROCESSING - NON- STANDARD L1B

In this type of On Demand Processing, using the On-Demand Form (ODFRM) web page (CLS), the user selects a non-standard product and submits the request directly to ASTER GDS, Japan. The processing of non-standard L1B is conducted at ASTER GDS, Japan. Upon notification that the product is available, the DAAC Operator will Ingest and archive the product in the Science Data Server in accordance with section 16.2.8 of this document. Using the email process, the DAAC Operator will notify the user that the product is available.

(c) ON DEMAND PROCESSING OF HIGHER LEVEL(S) L1B PRODUCTS

is accomplished at ASTER GDS, Japan The product processing is accomplished Unlike the standard L1A and L1B products

16.3.1 Creating a Data Availability Notice (DAN) (descoped)

Before a Data Provider can ingest data into the ECS system a **Data Availability Notice (DAN)** must be sent to the Subsystem indicating that data is ready for transfer. The **DAN** specifies the parameters needed to identify what files are ready for pickup, the location, and how long it will be available in that location. The maximum message length allowed for a DAN is 1 megabyte. More than one DAN may be sent if needed.

Each DAN includes a Message Header, Exchange Data Unit (EDU) Label and Parameter Value Language (PVL) Statements. The Message Header and labels are in a contiguous string, followed by the PVL. The labels and PVL statements are in Standard Formatted Data Unit (SFDU) format. More information about SFDU and PVL can be found in the following documents: Consultative Committee for Space Data Systems (CCSDS), Standard Formatted Data Units--Structure and Construction Rules, Consultative Committee for Space Data Systems (CCSDS) and Parameter Value Language Specification (CCSD0006, blue book).

The system will log the receipt of the **DAN** and assign a request ID number. A summary of the **DAN** contents is placed in the event log. The Ingest subsystem generates a corresponding ingest request and stores the request on a prioritized list. A **Data Availability Acknowledgment (DAA)** is sent from Ingest to the Data Provider indicating readiness to ingest the data identified in the **DAN**.

The procedure that follows explains the information needed to create a **DAN**. This procedure will assume the Data Provider has already used an xterm or SUN to obtain the **DAN** template. If you are familiar with the procedure, you may prefer to use the quick-step table at the end of this procedure. If you are new to the system, or have not performed this task recently, you should use the detailed procedure that follows.

- 1 The **DAN Sequence Number** is system generated, therefore press **Tab**.
 - The cursor moves to the **Expiration Time** field.
- 2 Enter the **Expiration Time**, then press **Return**.
 - Time for data deletion from originating system.
 - The cursor moves to the **Originating System** field.
- 3 Enter the **Originating System**, then press **Return**.
 - The originator of the DAN.
 - The cursor moves to the **Aggregate Length** field.
- 4 Enter the **Aggregate Length**, then press **Return**.
 - Total number of bytes to transfer (Sum for all files).
 - The cursor moves to the **Total File Count** field.
- 5 Enter the **Total File Count**, then press **Return**.
 - Total number of files to transfer.
 - The Cursor moves to the **Object** field.

- 6 Enter the **Object**, then press **Return**.
 - The start of file group parameters (repeat for each group of files).
 - The cursor moves to the **Data Type** field.
- 7 Enter the **Data Type**, then press **Return**.
 - ECS Data Type.
 - Cursor moves to **Node Name** field.
- 8 Enter the **Node Name**, then press **Return**.
 - Name of the network node on which the file resides.
 - The cursor moves to the **Descriptor** field.
- 9 Enter the **Descriptor**, then press **Return**.
 - The string.
 - The cursor moves to the **Object** field.
- 10 Enter the **Object**, then press **Return**.
 - Start of Detached SFDU Header File Object, if appropriate.
 - The cursor moves to the **File ID** field.
- 11 Enter the **File ID**, then press **Return**.
 - The File Name.
 - The cursor moves to the **File Type** field.
- 12 Enter the **File Type**, then press **Return**.
 - The File Data Type.
 - The cursor moves to the **Directory ID** field.
- 13 Enter the **Directory ID**, then press **Return**.
 - The file directory name (i.e., path name).
 - The cursor moves to the **File Size** field.
- 14 Enter the **File Size**, then press **Return**.
 - The length of the file in bytes.
 - The cursor moves to the **End Object** field.
- 15 Enter the **End Object**, then press **Return**.
 - The End Detached SFDU Header File Object.

Table 16.3-2. Creating Data Availability Notice (DAN) - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	DAN Sequence Number (system generated)	press Tab
2	Enter the Expiration Time	press Return

Table 16.3-2. Creating Data Availability Notice (DAN) - Quick-Step Procedures (2 of 2)

Step	What to Enter or Select	Action to Take
3	Enter the Originating System	press Return
4	Enter the Aggregate Length	press Return
5	Enter the Total File Count	press Return
6	Enter the Object	press Return
7	Enter the Data Type	press Return
8	Enter the Node Type	press Return
9	Enter the Descriptor	press Return
10	Enter the Object	press Return
11	Enter the File ID	press Return
12	Enter the File Type	press Return
13	Enter the Directory ID	press Return
14	Enter the File Size	press Return
15	Enter the End Object	press Return

16.3.2 Submitting an Ingest Request (descoped)

The Science Data Provider can access the network ingest subsystem through **Netscape**. The following procedure describes the automated network ingest of data to ECS from data providers which will be accomplished without direct operator action. This procedure assumes that the DAN has already been created, which describes the location of the available data. The **Interactive Ingest Main Form** displays three options to the data provider; **Create DAN File**, **Submit Ingest Request**, and **Monitor On-Going Request Status**.

The following procedure will open the Interactive Ingest tool, then submit an ingest request. The Data Provider selects the files to be ingested from a list displayed on the **Submit Ingest Request** screen. If you are already familiar with the procedures, you may prefer to use the quick-step table at the end of this procedure. If you are new to the system, or have not performed this task recently, you should use the following detailed procedure.

- 1 Click on the **Netscape Navigator** icon.
- 2 Enter the **URL** of the **Ingest Home Page**, then press **Return**.
 - The Data Provider login page is displayed.
- 3 Enter the **Data Provider** name in the **ECS Data Provider** field, then press **Return**.
 - The cursor moves to the Data Provider Password field.
- 4- Enter the **Data Provider Password**, in the **ECS Data Provider Password** field, then press **Return**.
- 5 Click on the **Submit Ingest Request** radio button.

- 6 Click on the **Submit** push button.
 - The **Submit Ingest Request** screen is displayed.
 - A list of data files are displayed.
- 7 Click on the **Data File** to be ingested.
 - The data file number appears to the right of **Select Requests (s)**
 - More than one file can be selected at one time.
- 8 Click on the **Submit** push button.
 - The Ingest Request has been submitted.
- 9 Exit the **Interactive Ingest** system by following menu path **File** → **Quit**.

Table 16.3-3. Submitting an Ingest Request - Quick-Step Procedure

Step	What to Enter or Select	Action to Take
1	Netscape Navigator icon	single Click
2	Enter the URL of the Ingest Home Page	press Return
3	Enter Data Provider	press Return
4	Enter Data Provider Password	press Return
5	Submit Ingest Request radio button	single Click
6	Submit push button	single Click
7	Data File	single Click
8	Submit push button	single Click
9	File → Quit	single Click and drag

16.3.3 Monitoring On-Going Request Status (descoped)

The on-going status of submitted data requests can be viewed by invoking the **Interactive Ingest Main Form**, then entering the **Data Providers** name and selecting the **Monitor On-Going Request Status** radio button. The **Ingest Request On-Going Status** screen displays all the active requests for the **Data Provider**. The **Ingest Request On-Going Status** screen displays each data request, its **Request ID** number and the acceptance or rejection of the data request. To display more details on a specific data request click on the individual data request, which opens the **On-Going Status Monitor** screen. From the **On-Going Status Monitor** screen click on the data request to display the Granule Level status.

The following procedure will open the **Interactive Ingest Tool**, then view the status of a data request at the granule level. If you are already familiar with the procedure, you may prefer to use the quick-step table at the end of this procedure. If you are new to the system, or have not performed this task recently, you should use the following detailed procedure. If the **Interactive Ingest Main Form** has already been opened, skip steps 1 through 7, otherwise begin with step 1.

- 1 Click on the **Netscape Navigator** icon.

- 2 Enter the **URL** of the Ingest Home Page, then press **Return**
- 3 Enter the user **Password**, then press **Return**.
- 4 Enter the **Data Provider** name, then press **Return**.
- 5 Click on the **Monitor On-Going Request Status** radio button.
- 6 Click on the **Submit** push button.
 - The **Ingest Request On-Going Status** screen is displayed.
 - The following information is displayed for all active requests;
 - a. Data request file number
 - b. Acceptance or rejection of each request.
 - c. System Request Id number.
- 7 Click on a **Individual Ingest Request**.
 - The **On-Going Status Monitor** screen is opened, which displays:
 - The **Request ID**.
 - **State** of request .
 - **% Complete**
 - **Priority**
 - **Start Time**
 - **End Time**
- 8 Click on the **Request ID**.
 - The **Granule Level Status Monitor** screen for the selected Request ID is opened, displaying the following information:
 - The **Request ID** number.
 - The **Status**.
 - The **Percent Complete**.
 - The **Data Provider**.
 - The **Ingest Type**.
 - The **Priority**.
 - The **Process Start Time**.
 - The **Expiration Time**.
 - The **Granule Count**.
 - The **Data Volume**.
 - The **Data Type**.
 - The **Granule Volume**.
 - The **Granule State**.
- 9 Exit the **Interactive Ingest** system by following menu path **File** → **Quit**.

Table 16.3-4. Monitoring On-Going Request Status - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Netscape Navigator icon	single Click
2	Enter the URL of the Ingest Home Page	press Return
3	Enter Password	press Return
4	Enter the Data Provider	press Return
5	Monitor On-Going Request Status radio button	single Click
6	Submit push button	single Click
7	Individual ingest Request	single Click
8	Request ID	single Click
9	File → Quit	single Click and drag

16.4 Ingest Polling Process

The **ECS Ingest Subsystem** supports a transfer mechanism to acquire data from a supplier system (Data Provider). This process is called Polling. There are two Polling processes supported, **Polling Ingest with Product Delivery Record** (Section 16.4.1), and **Polling Ingest without Product Delivery Record** (Section 16.4.2). **Ingest Information Notifications** that are received from, and sent to the Data Provider, or any pre-defined e-mail address, during this process will be addressed in Section 16.4.3. Ingest Archive Verification is discussed in Section 16.4.4.

The Activity Checklist table that follows provides an overview of the **Ingest polling Subsystem** process. Column one (**Order**) shows the order in which tasks should be accomplished. Column two (**Role**) list the Role/Manager/Operator responsible for performing the task. Column three (**Task**) provides a brief explanation of the task. Column four (**Section**) provides the Procedure (P) section number or Instruction (I) section number where details for performing the task can be found.

Table 16.4-1. Ingest Polling - Activity Checklist

Order	Role	Task	Section
1	DIT	Polling Ingest With Product Delivery Record (PDR)	(I) 16.4.1
2	DIT	Polling Ingest Without (PDR)	(I) 16.4.2
3	DIT	Ingest Information Notifications	(P)16.4.3
4	DIT	Ingest Archive Verification	(P)16.4.4
5	DIT	Deleting Files from the Ingest Polling Directory	(P)16.4.5

16.4.1 Polling Ingest With Product Delivery Record

ECS periodically checks on an agreed-upon network location for a **Product Delivery Record (PDR)** file. The **PDR** file contains information identical to that in a **DAN**, see (Section 16.3.1). The Data Provider may have previously transferred the data to a working storage device within

ECS, otherwise an ftp “get” will be used to obtain the data from the Data Provider within a specified time window. The Data Provider and the ECS Ingest Subsystem are each equipped with a computer program that invokes an FTP daemon, which automatically polls the server supplying the data.

A periodic polling process detects and then acquires a **PDR**. The Ingest subsystem then validates the information contained in the **PDR**. If the system fails to validate the PDR or if validation of the PDR failed, a Product Delivery Record Discrepancy (PDRD) is sent to the Data Provider via ftp or email. . If the Ingest Subsystem is able to read the **PDR**, a request ID is assigned and the **PDR**, and its contents are placed in the **Event Log**. A **DAA** is sent to the Data Provider indicating readiness to ingest the data identified in the **PDR**. Ingest generates a corresponding ingest request and stores the request on a prioritized list. The Ingest function ensures that all required devices are allocated and schedules and performs the data transfer. After ECS has attempted to ingest and archive data, a Product Acceptance Notice (PAN) is automatically sent via email or ftp to the data provider. The Pan file announces the completion of data transfer and archive. The PAN file also identifies any error or problems that may have been encountered during the ingest process.

The DIT may monitor the status of any ingest request by using the **Monitor/Control** screen of the **ECS Ingest Tool** (Section 16.2.4). The Ingest process is automated, however there are several sequences in which errors can be encountered which will cause the process to stop, requiring Operator intervention (see Section 16.4.4). The Event log will be updated during each phase of the Ingest process, therefore the DIT can easily access the status of any request. If intervention is required, the Computer Operator and/or DIT can Suspend, Cancel or Resume the Ingest process by using the **Operator Tools** of the **ECS Ingest** subsystem (Section 16.2.5).

16.4.2 Polling Ingest Without Product Delivery Record

This mechanism is planned to be used for the transfer of certain ancillary products required for data processing. The ingest subsystem periodically polls an agreed-upon network location for the presence of data (no PDR is needed in polling W/O PDR). All data at the specified location are assumed to make up a collection of ingest data with one file per data granule. Note: Only the actual data will be placed in the specified location for polling W/O PDR. The ingest function automatically performs an ftp get from the Data Provider within a system tunable time interval . The data goes through the usual ingest verification process of format conversion and metadata extraction and validation, with status messages going to the event log. When the ingest process has been completed, a message is sent to the **History Log** (Section 16.2.3), the polling interval is reset, and the system enters a wait state.

16.4.3 Ingest Information Notifications

16.4.3.1 Polling With Delivery Record

During the Ingest process several Information Notices are sent to the Data Provider, the Ingest subsystem, and the event log. The first notice is from the Data Provider, informing the ingest subsystem that data is ready for transfer. This notice is called a **Data Availability Notice**

(**DAN**) or **Product Delivery Record (PDR)**. PDR h contains the information, such as data source, number of files, and location of data.

16.4.3.2 Auto Ingest Interface

In some cases an Auto Ingest is accomplished., for example LPS to Land Sat 7 GW. When the subsystem receives the **DAN** or **PDR** it sends a message back to the Data Provider to acknowledge the receipt of the **DAN** or **PDR**. The return message is called a **Data Availability Acknowledgment (DAA)**. The Ingest system automatically logs all of the messages into the event log, therefore the DIT can obtain the current status of an ingest request at any time. If an error occurs during the ingest process another **DAA** is sent to the Data Provider and to the event log explaining the problem. When the ingest process has been completed, the system generates a **DATA Delivery Notice (DDN)**, which is sent to the Data Provider. The Data Provider then returns a **Data Delivery Acknowledgment (DDA)** in response to the **DDN** and terminates the session. Ingest provides a status message to the **Ingest History Log** when the transaction is complete.

The following section describes the steps needed to view the information contained in the notices for a specific Data Provider. The DIT can view the contents of any notice through the **ECS Ingest tool**. If you are familiar with the procedure, you may prefer to use the quick-step table at the end of this procedure. If you are new to the system, or have not performed this task recently, you should use the detailed procedure that follows.

- 1 Click on the **ECS Ingest** icon. This assumes that the Ingest GUI is running, if the GUI is not up, then follow the steps for bringing up the Ingest GUI outlined in section 16.2.1.
 - The **ECS Ingest** tool is now open.
 - The **Ingest Introduction** screen is displayed.
- 2 Click on the **Monitor/Control** tab widget.
 - The **Monitor/Control** screen is displayed.
- 3 Click on the **Data Provider** button, in the radio box.
 - The cursor moves to the periodic box to the right of the Data Provider.
- 4 Enter the **Data Provider**, then press **Return**.
- 5 Click on the **Text view** button.
- 6 Click on the **OK** push button.
 - All ongoing ingest requests for the Data Provider are displayed, including the Informational Notices.
- 7 Highlight an individual request, then **double Click**.
 - Text is displayed at a granule level.

- 8- Exit the **ECS Ingest** tool by following menu path **File** → **Exit**.

Table 16.4-2. Ingest Information Notification - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	ECS Ingest icon	single Click
2	Monitor/Control tab widget	single Click
3	Data Provider radio button	single Click
4	Enter the Data Provider	press Return
5	Text view button	single Click
6	OK push button	single Click
7	Highlight individual request	double Click
8	Follow menu path	File → Exit

16.4.4 Ingest Archive Verification

In an effort to verify that the data ingested has been archived successfully, the following steps are used to verify whether data is present on the archive. This procedure makes it unnecessary to get into any archive software. This procedure is pretty straight forward and safe so don't worry about doing anything strange and wonderful to the system. Good luck. The aster, ceres, data, I7, and modis directories correspond directly to tape volumes in the system. The data is listed in the Amass data base and is actually on tape.

- 1 Log on to any workstation.
- 2 Type in your **login** and **password**.
- 3 Enter **telnet <hostname>**. Example **telnet g0drg01**.
- 4- Set your terminal display environment using the command:
setenv DISPLAY <hostname:0.0>
- 5 Type in your **login** and **password**.
- 6- Change directory to the directory containing the location of the archive data:
cd /dss_stk1
- 7 Enter **ls** to list the contents of the directory.
 - Should see OPS, TS1, TS2, and test mode directories

- 8- Change directory to the directory containing the mode used:
cd [OPS, TS1, TS2, test]

- 9 Enter **ls** to list the contents of the directory.
 - Should see aster, ceres, data, 17, and modis directories

- 10- Change directory to the directory containing the location of the type of data ingested:
cd [aster, ceres, data, 17, and modis]

- 11 Enter **ls** to list the contents of the directory.
 - Should see data listed on tape in the archive.

Table 16.4-3. Ingest Archive Verification - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Telnet <hostname>	press Return
2	UserId	press Return
3	Password	press Return
4	setenv DISPLAY <hostname:0.0>	press Return
5	cd /dss_stk1	press Return
6	cd [OPS, TS1, TS2, test]	press Return
7	cd [aster, ceres, data, 17, and modis]	press Return
8	ls	press Return

16.4.5 Deleting Files from the Ingest Polling Directory

The Ingest Polling Directory performs cleaned-up operations after a successful archive. At the present time this process is being done manually. The EcInPollClean script was delivered in Drop4PX to manually clean the EDOS polling directory, which is where the problem was first identified. The EcInPollClean script will clean all files in the specified directory (to include all files in subdirectories, if any) that are older than 48 hours. The script requires two inputs, the name of the path containing the files to be deleted, and the number of hours. If you are already familiar with the procedure, you may prefer to use the quick-step table at the end of the procedure. If you are new to the system, you should use the following detailed procedures:

- 1 Log in to any workstation using your user identifier and password by typing **YourUserID**, and then press **Return**.
 - A password prompt is displayed.

- 2 Enter *YourPassword*, then press **Return**.
 - You are authenticated as yourself.
- 3 Enter **telnet <hostname>**. Example **telnet g0drg01**.
- 4 Enter *YourUserID*, and then press **Return**.
 - A password prompt is displayed.
- 5 Enter *YourPassword*, then press **Return**.
 - You are authenticated as yourself.
- 6- Set your terminal display environment using the following command:
setenv DISPLAY <hostname:0.0>
- 7 Change directory to the directory containing the Ingest EcInPollClean script file:
cd /usr/ecs/<mode>/CUSTOM/utilities
- 8 Enter **ls** to list the contents of the directory:
- 9- Execute the EcInPollClean script using the following command:
EcInPollClean <path name> <number of day>

Table 16.4-4. Deleting Files From the Ingest Polling Directory - Quick-Steps

Step	What to Enter or Select	Action to Take
1	YourUserID	press Return
2	YourPassword	press Return
3	telnet <hostname>	press Return
4	YourUserID	press Return
5	YourPassword	press Return
6	setenv DISPLAY <hostname:0.0>	press Return
7	cd /usr/ecs/<mode>/CUSTOM/utilities	press Return
8	Ls	press Return
9	EcInPollClean <path name> <number of day>	press Return

16.5 Recovery from a Data Ingest Failure

When an ingest fault (error) occurs, there may be a requirement for action to recover from the error. Recovery actions may be made necessary by invalid DAN contents or other errors that result in data ingest failure. When a fault (error) occurs, the following actions occur:

- The processing of the ingest request stops.

- A message is sent to the Ingest/Distribution Technician and the data provider with a brief description of the problem.

The Ingest/Distribution Technician may use the Ingest GUI Monitor/Control screen, the Ingest History Log (refer to the section on Ingest Status Monitoring) and/or the following log files (in the /usr/ecs/*mode*/CUSTOM/logs directory on the ingest host machine) to review the failure event:

- EcInReqMgr.ALOG (ingest request manager log).
- EcInAuto.ALOG (automated ingest log).
- EcInPolling.ALOG (polling ingest log).
- EcInGran.ALOG (granule server log).
- EcInGUI.ALOG (Ingest GUI log).

In addition, it is possible to check the ECS Event Log (for events related to ingest failure) using the ECS Event Log Browser tab on the Management Data Access (MDA) GUI.

This section contains some examples of faults that are likely to occur, describes the notifications provided, and proposes operator actions in response to each fault situation. The specific recovery actions may vary due to operator preference or local DAAC policy.

The Activity Checklist table that follows provides an overview of the Recovery from a Data Ingest failure process. Column one (**Order**) shows the order in which tasks should be accomplished. Column two (**Role**) list the Role/Manager/Operator responsible for performing the task. Column three (**Task**) provides a brief explanation of the task. Column four (**Section**) provides the Procedure (**P**) section number or Instruction (**I**) section number where details for performing the task can be found.

Table 16.5-1. Recovery from a Data Ingest Failure - Activity Checklist

Order	Role	Task	Section
1	DIT	Troubleshooting a Data Ingest Failure	(P)16.5.1
2	DIT	Recovering from a Faulty DAN	(P)16.5.2
3	DIT	Recovering from Exceeding the Volume Threshold	(P)16.5.3
4	DIT	Recovering from Exceeding the Maximum Number of Concurrent Requests	(P)16.5.4
5	DIT	Recovering from Insufficient Disk Space	(I) 16.5.5
6	DIT	Recovering from Exceeding the Expiration Date/Time Period	(P)16.5.6
7	DIT	Recovering from File Transfer (ftp) Error	(P)16.5.7
8	DIT	Recovering from Processing Errors	(P)16.5.8

16.5.1 Troubleshooting a Data Ingest Failure

When troubleshooting a data ingest failure, use the procedure that follows. The procedure starts with the assumption that all applicable servers and the Ingest GUI are currently running and the **Monitor/Control (All Requests)** screen is being displayed.

Upon receipt of the operator alert, use the **Monitor/Control** screen scroll bars as necessary to identify the faulty ingest request.

- When there is a data ingest failure, the system provides the following three responses:
 - Logs the error.
 - Alerts the Ingest/Distribution Technician.
 - Returns a DDN to the data provider indicating the nature of the failure.

Review the information concerning the faulty ingest request.

If additional information is needed, open and read the appropriate log file in the **/usr/ecs/mode/CUSTOM/logs** directory on the ingest host machine.

- **EcInReqMgr.ALOG** (ingest request manager log).
- **EcInAuto.ALOG** (automated ingest log).
- **EcInPolling.ALOG** (polling ingest log).
- **EcInGran.ALOG** (granule server log).
- **EcInGUIL.ALOG** (Ingest GUI log).

Perform the appropriate recovery procedure depending on the nature of the problem:

- **Recovering from a Faulty DAN.**
- **Recovering from Exceeding the Volume Threshold.**
- **Recovering from Exceeding the Maximum Number of Concurrent Requests.**
- **Recovering from Insufficient Disk Space.**
- **Recovering from Exceeding the Expiration Date/Time Period.**
- **Recovering from File Transfer (ftp) Error.**
- **Recovering from Processing Errors.**

16.5.2 Recovering from a Faulty DAN

If the DAN/PDR is invalid, the data provider must submit a new DAN. The DIT should respond to the error by contacting the data provider to give an alert that the ingest failure has occurred, provide as much information as possible about why the failure occurred, and determine whether the data ingest request will be re-initiated. When working to recover from an invalid DAN/PDR, use the procedure that follows. The procedure starts with the following assumption that the Ingest GUI **Monitor/Control (All Requests)** screen is being displayed.

- 1- Upon receipt of the operator alert, use the **Monitor/Control** screen scroll bars as necessary to identify the faulty ingest request.
- 2 Review the information concerning the faulty ingest request.
- 3- If additional information is needed, open and read the appropriate log file in the **/usr/ecs/mode/CUSTOM/logs** directory on the ingest host machine.
- 4 Contact (by telephone or e-mail) the data provider to discuss the following issues:
 - Report the ingest failure.
 - Discuss what has been discovered from reviewing the failure event data.
 - Determine whether the data provider will re-initiate the data ingest request with a new DAN.

- 5- If the data ingest request is to be re-initiated, monitor the subsequent ingest as described in the procedure for **Monitoring Ingest Requests**.

16.5.3 Recovering from Exceeding the Volume Threshold

Data Ingest may fail for reasons other than invalid DAN/PDR contents. For example, if the specified system volume threshold has been exceeded, the system sends a DDN to the Data Provider indicating that the system is full and an attempt should be retried again later. If a data provider's volume threshold has been exceeded, use the procedure that follows. The procedure starts with the following assumption that the Ingest GUI **Monitor/Control (All Requests)** screen is being displayed.

- 1- Upon receipt of the operator alert, use the **Monitor/Control** screen scroll bars as necessary to identify the faulty ingest request.
- 2 Review the information concerning the faulty ingest request.
- 3- If additional information is needed, open and read the appropriate log file in the `/usr/ecs/mode/CUSTOM/logs` directory on the ingest host machine.
- 4- If it is decided to increase the system volume threshold, first click on the **Operator Tools** tab.
 - The **Operator Tools** screen is displayed.
- 5 Click on the **Modify System Parameters** tab.
 - The **Modify System Parameters** screen is displayed.
- 6- Click in the **New:** field corresponding to **Volume Threshold**, then type the numerical value for the new volume threshold.
 - The *current* value of the volume threshold is printed on the corresponding line for reference purposes.
- 7- Click on the **OK** button at the bottom of the **Operator Tools: Modify System Parameters** tab to save the changes to system parameters.
 - The changes are invoked.
- 8 Click on the **Monitor/Control** tab.
 - The **Monitor/Control** screen is displayed.
- 9 Click on the **All Requests** button.
 - Alternatively, either a particular **Data Provider** or **Request ID** may be specified as described in the procedure for **Monitoring Ingest Requests**.
- 10 Click on the **Text View** button.

- 11- If the data ingest request is to be re-initiated, monitor the subsequent ingest as described in the procedure for **Monitoring Ingest Requests**.

16.5.4 Recovering from Exceeding the Maximum Number of Concurrent Requests

If the specified system request threshold has been exceeded, the system sends a DDN to the Data Provider indicating that the system is full and an attempt should be retried again later. If a data provider's request threshold has been exceeded, use the procedure that follows to increase the system request threshold. The procedure starts with the following assumptions that the Ingest GUI **Monitor/Control (All Requests)** screen is being displayed.

- 1- Upon receipt of the operator alert, use the **Monitor/Control** screen scroll bars as necessary to identify the faulty ingest request.
- 2 Review the information concerning the faulty ingest request.
- 3 If additional information is needed, open and read the appropriate log file in the */usr/ecs/mode/CUSTOM/logs* directory on the ingest host machine.
- 4
- 5 If it is decided to increase the system request threshold, first click on the **Operator Tools** tab.
 - The **Operator Tools** screen is displayed.
- 5 Click on the **Modify System Parameters** tab.
 - The **Modify System Parameters** screen is displayed.
- 6- Click in the **New:** field corresponding to **Request Threshold**, then type the numerical value for the new volume threshold.
 - The *current* value of the request threshold is printed on the corresponding line for reference purposes.
- 7- Click on the **OK** button at the bottom of the **Operator Tools: Modify System Parameters** tab to save the changes to system parameters.
 - The changes are invoked.
- 8 Click on the **Monitor/Control** tab.
 - The **Monitor/Control** screen is displayed.
- 9 Click on the **All Requests** button.
 - Alternatively, either a particular **Data Provider** or **Request ID** may be specified as described in the procedure for **Monitoring Ingest Requests**.
- 10 Click on the **Text View** button.
- 11- If the data ingest request is to be re-initiated, monitor the subsequent ingest as described in the procedure for **Monitoring Ingest Requests**.

16.5.5 Recovering from Insufficient Disk Space

After the receipt of the DAN, a disk space allocation is requested from the Data Server, and a time-out timer for the disk allocation is set. In the event that the Data Server has insufficient disk space, the time-out timer will expire. The Ingest Subsystem notifies the operator that the ingest request is waiting for Data Server disk allocation. At present the Ingest/Distribution Technician has no real option for responding to the problem except perhaps to discuss the situation with the system administrator.

16.5.6 Recovering from Exceeding the Expiration Date/Time Period

If data are unavailable but the time period during which that data were to have been made available has expired, the error is logged in the event log, and a DDN is sent to the Data Provider indicating expiration date/time exceeded. The Ingest/Distribution Technician receives an alert on his/her screen, then contacts the data provider to resolve the problem. If a data provider's expiration date/time period has been exceeded, use the procedure that follows. The procedure starts with the assumption that the Ingest GUI **Monitor/Control (All Requests)** screen is being displayed.

- 1- Upon receipt of the operator alert, use the **Monitor/Control** screen scroll bars as necessary to identify the faulty ingest request.

Review the information concerning the faulty ingest request.

- 2- If additional information is needed, open and read the appropriate log file in the **/usr/ecs/mode/CUSTOM/logs** directory on the ingest host machine.
- 3 Contact (by telephone or e-mail) the data provider to discuss the following issues:
 - Report the ingest failure.
 - Discuss what has been discovered from reviewing the failure event data.
 - Determine whether the data provider will re-initiate the data ingest request.

If the data ingest request is to be re-initiated, monitor the subsequent ingest as described in the procedure for **Monitoring Ingest Requests**.

16.5.7 Recovering from File Transfer (ftp) Error

After numerous unsuccessful data transfer retries, an error is logged into the event log, the Ingest/Distribution Technician is notified and a DDN is sent to the Data Provider indicating ftp failure. The Ingest/Distribution Technician reviews all current ingest requests using the **Operator Tool** of the **ECS Ingest** GUI to determine whether other communication-related failures have occurred and may consult with the data provider(s) to resolve the problem. If it is necessary to recover from a file transfer error, use the procedure that follows. The procedure starts with the assumption that the Ingest GUI **Monitor/Control (All Requests)** screen is being displayed.

- 1- Upon receipt of the operator alert, use the **Monitor/Control** screen scroll bars as necessary to identify the faulty ingest request.

- 2 Review the information concerning the faulty ingest request.
- 3- If additional information is needed, open and read the appropriate log file in the `/usr/ecs/mode/CUSTOM/logs` directory on the ingest host machine.
- 4 Click on the Ingest GUI **Operator Tools** tab.
 - The **Operator Tools** screen is displayed.
- 5 Click on the **Modify System Parameters** tab.
 - The **Modify System Parameters** screen is displayed.
- 6 Review the current value for **Communication Retry Count**.
- 7- If it is decided to increase the communication retry count, follow the procedure for **Modifying System Parameters**.
- 8- If the data ingest request is to be re-initiated, monitor the subsequent ingest as described in the procedure for **Monitoring Ingest Requests**.

16.5.8 Recovering from Processing Errors

Ingest processing errors may require Ingest/Distribution Technician intervention. The following problems are examples of processing errors.

- **Missing Required Metadata.**
- **Unknown Data Type.**
- **Template Out of Synchronization (Sync).**
- **Unavailable File Type.**
- **Metadata Validation Error.**
- **Missing Optional Data Files.**

If it is necessary to recover from a processing error, use the procedure that follows. The procedure starts with the assumption that the Ingest GUI **Monitor/Control (All Requests)** screen is being displayed.

- 1- Upon receipt of the operator alert, use the **Monitor/Control** screen scroll bars as necessary to identify the faulty ingest request.
- 2 Review the information concerning the faulty ingest request.
- 3- If additional information is needed, open and read the appropriate log file in the `/usr/ecs/mode/CUSTOM/logs` directory on the ingest host machine.
- 4- If the processing error involves missing required metadata or an unknown data type, contact (by telephone or e-mail) the data provider to request the data provider to make the necessary corrections and re-initiate ingest.

- 5- If the processing error involves an out-of-sync template or an unavailable file type, submit a trouble ticket in accordance with the trouble ticketing procedures.
- 6- If the processing error involves a metadata validation error or missing optional data files and if the processing template instructions indicate to continue inserting the data, contact (by telephone or e-mail) the data provider to provide notification that the data have been flagged as bad.
 - If the processing template instructions indicate to continue inserting the data, the following events occur:
 - The error is logged in the event log,
 - The data are flagged as bad.
 - A preprocessing failure alert for each data granule appears on the Ingest/Distribution Technician's screen.
 - A Metadata Problem Report is generated.
- 7- If the processing error involves a metadata validation error or missing optional data files and if the processing template instructions require the rejection of the data, contact (by telephone or e-mail) the data provider to request the data provider to make the necessary corrections and re-initiate ingest.
 - If the template instructions require the rejection of the data, the normal notices and alerts are sent, including a DDN to the external data provider indicating the preprocessing failure.
- 8- If the data ingest request is to be re-initiated, monitor the subsequent ingest as described in the procedure for **Monitoring Ingest Requests**.

16.6 Document Ingest

The Ingest subsystem will not include any capabilities for document ingest in B.0. All ingest will be done manually by operators via ftp pull. Operators are notified of the need to pull a document by phone or e-mail.

The ingest format will remain as originally planned, i.e., it will follow the established document ingest formats. That is, the document submitter must prepare a set of document files in one of the approved ECS formats, an accompanying valid metadata file, and a valid DAN.

The document data server (DDSRV) host will include a directory to keep B.0 ingest requests. The directory name is **TBS**. By operational procedures, operators are expected to create a subdirectory in that directory for each ingest and deposit the files as ingested into that subdirectory. The purpose of the subdirectory is to retain ingested material for subsequent "real" ingest into ECS once the DDSRV and the document ingest functions are implemented. The naming conventions for these subdirectories are **TBS**.

The documents will be placed by operational procedure into directories on the DDSRV Netscape Server host. The directory names must be in compliance with B.0 directory naming conventions, but are otherwise at the discretion of DAAC Ops. DAAC Ops will be responsible for creating

web pages on the DDSRV Netscape host which point to these documents, and provide links to these web pages from relevant other ECS web pages.

16.6.1 Document Inserts From Within ECS

Documents generated automatically within ECS will be associated with fixed pathnames on the DDSRV host (if the DDSRV will store always only one occurrence of the document), or fixed directories on the DDSRV host (if there will be multiple instances of the document kept on the DDSRV).

Documents which are planned for insertion into the DDSRV from within ECS (e.g., algorithm documentation) by manual procedure, will have their procedure changed to provide ingest documentation, generate a DAN, have the document placed into an "archive" directory, and then have the document placed into a DDSRV directory.

The providers of documents generated automatically by ECS or inserted manually, are responsible for having web pages produced and stored on the DDSRV Netscape server host pointing to the documents. The web pages must be compliant with the ECS HTML guidelines. DAAC operations are free to add links to them in other ECS web pages.

DAAC Ops will maintain and update any web pages needed to support access to the documents on the B.0 DDSRV web server. The web pages are placed into directories named in accordance with the Release B.0 directory naming conventions, but the names are otherwise at the discretion of DAAC Ops

There is no guarantee that the B.0 URLs for DDSRV documents will be valid for these documents in B.1.

If documents are updated, the updated versions need to go through the manual ingest procedure to ensure that they can be ingested into B.1.

DDSRV is responsible for any configuration tailoring of the DDSRV Netscape Server.

SSI&T will need to produce and save a DAN for the documents which are part of a DAP/SSAP.

16.6.2 Scanning Documents

This procedure will take you step by step in operating the **HP Jetscan Scanner** to create a temporary file for data to be downloaded to the system for archiving documents. If you are new to the system, or have not performed this task recently, you should use the following detailed procedure;

- 1** Click on the **Start** button.
- 2** Select **Programs**.

- 3- Select **TexBridge Pro 96** to access the TexBridge software for scanning documents consisting of both text and tables.
 - Select **TexBridge Pro 96** once again within the second column.
 - When the **TexBridge Pro 96** screen appears insure that the following 5 options are listed as follows.

Page Quality / Page Orientation / Original Document Layout / Document Recomposition / Brightness



- 4 Select **Save Image Defer OCR** this is the 8th icon to far right of the screen.
- 5 Load documents into HP ScanJet feeder.
- 6 Click **Go** this will start the scanning process.
- 7 When the document has been scanned, save the document with a valid file name.

This process will require a filename to be created “**when saving**” the data before the data information can be accessed in the system for verification.

Table 16.6-1. Scanning Documents - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Select Start from the Windows 95 menu bar	single Click
2	Select Programs	single Click
3	Select TexBridge Pro 96	single Click
4	If scanning both text and table select Save Image Defer OCR	single Click
5	Load documents into HP ScanJet feeder	
6	Click Go	single Click

16.6.3 Accessing Scanned Documents

After a document has been scanned, it should be checked to ensure that it has been properly scanned and saved. The procedure for accessing scanned documents starts with the assumption that the Ingest/Distribution Technician has logged in to Windows 95 on the applicable personal computer (PC). Upon completion of the above procedure follow the step to access the scanned files you’ve just created.

- 1 Select **Start** from the Windows 95 menu bar.

- 2 Select **Programs**
- 3 Select **Windows Explorer** from the file menu.
- 4 Click **Program files** under this option
- 5 Select **TexBridge Pro 96**
- 6 Click folder called **Tiffs**
- 7 Select the filename/s you created from the documents you've just scanned.

Table 16.6-2. Opening Tiffs File - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Select Start from the Windows 95 menu bar	single Click
2	Select Programs	single Click
3	Select Windows Explorer	single Click
4	Select Program Files	single Click
5	Select TexBridge Pro 96	single Click
6	Click Tiffs file	single Click
7	Select the file you created	single Click