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EOSDIS Core System Project

ECS Project Training Material Volume 1: Course Outline

March 1999

Raytheon Systems Company
Upper Marlboro, Maryland

ECS Project Training Material Volume 1: Course Outline

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Preface

This document is a contract deliverable with an approval code of 3. As such, it does not require formal Government approval. This document is delivered for information only, but is subject to approval as meeting contractual requirements.

Any questions should be addressed to:

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Abstract

This Training Course Outline provides a series of tasks that will be used to define a comprehensive course of instruction for Release 4 of ECS. The training addressed in this outline is related to the specific system design, components and operation of Release 4 and does not include training on management and personal development.

***Keywords**:* training, instructional design, courseware, just-in-time, OJT

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Introduction

Identification

Training Material Volume 1 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-6000).

Scope

Training Material Volume 1 defines the tasks required to operate ECS. The Operator Training course is designed to provide the operations staff with sufficient knowledge and information to configure and operate the system.

Purpose

The course outline provides a detailed path that forms the basis for curriculum development as well as course conduct. Lesson objectives will be formed using the course outline. The lesson objectives will serve as the basis for Student Guide and slide presentation material development. Once the course outline is completed, curriculum development can be completed and subsequent training courses can be conducted.

Status and Schedule

This lesson module provides detailed information about training for Release 4. Subsequent revisions will be submitted as needed.

Organization

This document is organized as follows:

Introduction:	The Introduction presents the document identification, scope, purpose, and organization.
Related Documentation:	Related Documentation identifies parent, applicable and information documents associated with this document.
Course Outline:	This section identifies and defines the lesson topics, duration and scope for the course.

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Related Documentation

Parent Document

The parent document is the document from which this ECS Training Material's scope and content are derived.

423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work

Applicable Documents

The following documents are referenced within this ECS Training Material, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this document:

423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS)
420-05-03	Goddard Space Flight Center, Earth Observing System (EOS) Performance Assurance Requirements for the EOSDIS Core System (ECS)

Information Documents

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 Training Material.

609-CD-003-003	Operations Tools Manual for the ECS Project
611-CD-004-004	Mission Operation Procedures for the ECS Project
535-TIP-CPT-001	Goddard Space Flight Center, Mission Operations and Data Systems Directorate (MO&DSD) Technical Information Program Networks Technical Training Facility, Contractor-Provided Training Specification

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 ECS Training Material.

220-TP-001	Operations Scenarios - ECS Release B.0 Impacts, Technical Paper for the ECS Project

305-CD-020	Release B SDPS/CSMS System Design Specification Overview for the ECS Project
305-CD-021	Release B SDPS Client Subsystem Design Specification for the ECS Project
305-CD-022	Release B SDPS Interoperability Subsystem Design Specification for the ECS Project
305-CD-023	Release B SDPS Data Management Subsystem Design Specification for the ECS Project
305-CD-024	Release B SDPS Data Server Subsystem Design Specification for the ECS Project
305-CD-025	Release B SDPS Ingest Subsystem Design Specification [for the ECS Project
305-CD-026	Release B SDPS Planning Subsystem Design Specification for the ECS Project
305-CD-027	Release B SDPS Data Processing Subsystem Design Specification for the ECS Project
305-CD-028	Release B CSMS Communications Subsystem Design Specification for the ECS Project
305-CD-029	Release B CSMS System Management Subsystem Design Specification for the ECS Project
305-CD-030	Release B GSFC DAAC Design Specification for the ECS Project
305-CD-031	Release B Langley DAAC Design Specification for the ECS Project
305-CD-033	Release B EDC DAAC Design Specification for the ECS Project
305-CD-034	Release B ASF DAAC Design Specification for the ECS Project
305-CD-035	Release B NSIDC DAAC Design Specification for the ECS Project
305-CD-036	Release B JPL PO.DAAC Design Specification for the ECS Project
305-CD-037	Release B ORNL DAAC Design Specification for the ECS Project
305-CD-038	Release B System Monitoring and Coordination Center Design Specification for the ECS Project
305-CD-039	Release B Data Dictionary Subsystem Design Specification 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-002	Operations Concept for the ECS Project: Part 2B -- ECS Release B

605-CD-002	Release B SDPS/CSMS Operations Scenarios for the ECS Project
607-CD-001	ECS Maintenance and Operations Position Descriptions
500-1002	Goddard Space Flight Center, Network and Mission Operations Support (NMOS) Certification Program, 1/90

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Course Outline

The Operator Training Course is grouped into modular lessons based on common task groupings and operational requirements. Each lesson outline will contain a lesson description, a list of recommended class attendees (by position), Commercial Off-the-Shelf (COTS) hardware (HW) and software (SW) requirements, duration (lab and lecture) and a list of sub-tasks required to satisfy the overall lesson objective. The course consists of the following lessons:

Volume 2: Not Used

Volume 2A: Introduction and Detailed System Overview; Science Data Processing Internal Training

Volume 2A provides an introduction and detailed system overview of the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Release 4 design and internal interfaces. It summarizes materials presented in a dynamic, animated visual presentation, and includes a copy of the visuals. The instruction briefly addresses the program context of ECS within NASA's Earth Science Enterprise, introduces the systems that make up ECS at a site, describes each subsystem and its Computer Software Configuration Items (CSCIs), including system elements and interfaces, and then describes system functioning in the context of operational scenarios. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

Attendees: All Distributed Active Archive Center (DAAC) ECS Operator and Support personnel, all System Monitoring and Coordination Center (SMC) ECS Operator and Support personnel, all Sustaining Engineer Organization (SEO) & Integrated Logistic Support (ILS) personnel, all Investigator support personnel and all Independent Verification and Validation (IV & V) contractor personnel.

Prerequisites: None.

Duration: 8 Hours Lecture

Sub-tasks:

1. Program Overview.
    a. ECS Mission.
2. Subsystem and Functions.
    a. Data Server.
    b. Ingest.
    c. Client.
    d. Data Management.
    e. Interoperability.
    f. Planning.
    g. Data Processing.

h. System Management Support.
i. Communication.

3. ECS Operational Functioning.
   a. ASTER DAR Support.
   b. ASTER Data Production and Chaining.
   c. ASTER Expedited Data.
   d. User Registration.
   e. Landsat Processing System Data Insertion.
   f. Landsat Data Access.

Practical Exercises: NA

Volume 3: Problem Management

Volume 3 provides a detailed description of the different tasks that are required in order to report a problem. The lesson includes a detailed review of the trouble ticket process.

Attendees: All DAAC ECS Operator and Support personnel, all SMC ECS Operator and Support personnel, all SEO & ILS personnel, all Investigator support personnel and all IV & V contractor personnel.

Prerequisites: Introduction and System Overview lesson.

Duration: 2 Hours (1 Lecture, 1 Lab)

Sub-tasks:

1. Trouble Ticket.
   a. Introduction.
   b. Writing a Trouble Ticket (TT).
   c. Documenting changes.
   d. Problem resolution.
   e. Preparing and processing a TT through the Failure Review Board.
   f. Making emergency fixes.

Practical Exercises: The student will perform the following hands-on training exercises:

1. Students will write a Trouble Ticket (TT).
2. Students will document TT changes.

Volume 4: System Administration

Volume 4 provides a detailed description of the different tasks that are required in order to perform system administration of ECS. The lesson includes a detailed review of the initial program loads for all system upgrades, mode management, performing COTS administration, performing system backups and restores, adding/modifying user accounts, assigning access privileges, server startup/shutdown and performing general security features.

Attendees: SMC System Administrators, DAAC System Administrators, DAAC Computer Operator and DAAC System Engineer.

Prerequisites: None.

Duration: 6 Hours (3 Lecture, 3 Lab)

Sub-tasks:

1. System startup and shutdown.
2. ECS Assistant.
   a. Subsystem server startup and shutdown.
   b. System monitoring.
   c. Open/view log files.
   d. Monitoring server status.
3. Hp Openview - Network Node Manager (NNM).
   a. Starting an NNM session.
   b. Exiting an NNM session.
4. Tape operations.
5. System backup and restore process.
   a. Performing incremental backup.
   b. Performing full backup.
   c. Performing file restore.
   d. Performing complete system restore.
6. System log maintenance.
7. User administration.
   a. Adding a user.
   b. Deleting a user.
   c. Changing a user account configuration.
   d. Changing a user access privileges.
   e. Changing a user password.
   f. Checking a file/directory access privilege status.
   g. Changing a file/directory access privilege.
   h. Checking a user account file access privilege.
   i. Changing a user account file access privilege.
   j. Moving a user's home directory.
8. COTS Administration.
   a. COTS installation.
   b. Log files.
   c. COTS configuration.
9. New Workstation Installation.
   a. Preparation.
   b. Installation.
   c. Testing and Verification.
10. DCE Configuration.
    a. Initial Cell.
    b. Configuring DTS Servers.
    c. Additional CDS Servers.
    d. DTS Clerks.
    e. CDS Servers.
    f. Creating a Security Server Replica.
    g. Unconfiguring DCE Client.

11. Security.
    a. Running security management log analysis program.
    b. Generating security reports.
    c. Reviewing user activity data.
    d. Monitoring user audit trail information.
    e. Reviewing and Verifying data encryption functionality.
    f. Reviewing and Verifying MSS site security management application service.
    g. Security Violations.
    h. Recovery of site security compromises.

Practical Exercises: The student will perform the following hands-on training exercises:

1. Students will perform a server startup and shutdown using ECS Assistant.
2. Students with shutdown and startup a server using HP Openview NNM.
3. Students will perform an incremental backup.
4. Students will perform a file restore.
5. Students will add a user account.
6. Students will change a user's access privileges.
7. Students will change a file/directory access privilege.
8. Students will change a user account file access privilege.
9. Students will generate security reports.
10. Students will access and review COTS log files.
11. Students will configure COTS subdirectories.
12. Students will install a new workstation.
13. Students will delete a user account.

Volume 5: Network Administration

Volume 5 provides a detailed description of the different tasks that are needed in order to monitor the performance of the network. The Network Administration lesson includes a review of the network configuration and topology, network performance monitoring, inter-DAAC network issues and network fault analysis.

Attendees: SMC System Administrator, SMC Network Analyst, DAAC System Administrator, DAAC Resource Manager, DAAC System Engineer.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 8 Hours (4 Lecture, 4 Lab)

Sub-tasks:

1. Network Administration.
    a. Network Node Manager (NNM).
    b. Starting and ending a NNM session.
    c. Reading NNM map and submaps.
    d. Defining network objects and symbols.
    e. Adding a segment object.
    f. Adding an IP interface object.
    g. Viewing current network and system configuration.

h. Viewing network address information.
i. Viewing how traffic is routed on a network.
j. Viewing the services available on a node.
k. System monitoring.

Practical Exercises: The student will perform the following hands-on training exercises:

1. Students will start a Network Node Manager session.
2. Students will add a network object, segment object, node object and IP interface object.
3. Students will view current network and system configuration, network address information, traffic routing and address information.

Volume 6: Production Planning and Processing

Volume 6 provides a detailed description of the process for creating, modifying, and implementing a production plan for a site, reviewing production rules, managing all planning-related data, monitoring the quality of the production data, implementing plans and recovery procedures and managing subscriptions.

Attendees: DAAC Production Monitor, DAAC Production Planner, DAAC Resource Planner, DAAC System Engineer, DAAC System Test Engineer, DAAC SW Maintenance Engineer, DAAC Science Coordinator, DAAC Science Software I&T Support Engineer and DAAC User Services Representative.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 16 Hours (8 Lecture, 8 Lab)

Sub-tasks:

1. Production Planning and Processing context.
2. Production requests.
3. Launching Production Planning applications.
4. Creating/updating/deleting a production request.
5. Reviewing/deleting data processing requests.
6. Submitting or withdrawing a subscription.
7. Launching planning workbench related applications.
8. Creating a new production plan.
9. Troubleshooting production planning problems.
10. Launching Production Processing applications.
11. Configuring Autosys screens/displays.
12. Reviewing hardware status, Data Processing Request (DPR) dependency, DPR production timeline, alarms, and job activities.
13. Modifying job priority.
14. Modifying job status.

15. Reviewing activity and job dependency logs.
16. Defining and running monitors/browsers.
17. Changing the database maintenance time.
18. Troubleshooting processing problems.
19. Launching the QA Monitor.
20. Performing science product quality assurance (QA).
21. Regenerating granules.

Practical Exercises: The student will perform the following hands-on training exercises:

1. Student will launch the Production Request Editor.
2. Students will create a new production request.
3. Students will edit/modify a production request.
4. Students will review data processing requests.
5. Students will delete a DPR.
6. Students will launch planning workbench related applications.
7. Students will define a product or strategy.
8. Students will create a new production plan.
9. Students will review a plan timeline.
10. Students will troubleshoot product or planning problems.
11. Students will launch production processing applications.
12. Students will configure Autosys routine options.
13. Students will configure hardware groups.
14. Students will review and change hardware status views.
15. Students will review DPR dependencies.
16. Students will review the DPR production timeline.
17. Students will review alarms and configure alarm selection.
18. Students will specify job selection criteria and review job activities.
18. Students will review job activities and job selection criteria.
19. Students will modify job priority.
20. Students will modify job status.
21. Students will review activity logs and job dependency logs.
22. Students will define and run monitors/browsers.
23. Students will change the database maintenance time.
24. Students will troubleshoot processing problems.
25. Students will launch the QA Monitor.
26. Students will perform science product quality assurance (QA).
27. Students will regenerate granules in response to loss of files from the archive.

Volume 7: Resource Planning

Volume 7 provides a detailed description of how to define production resources to the planning subsystem, integrate all resource reservation requests into a resource plan for a site review the resource timeline, and troubleshoot resource planning problems.

Attendees: SMC Resource Controller, SMC Fault Manager, DAAC Production Monitor, DAAC Resource Manager, DAAC Production Planner, DAAC Resource Planner, DAAC System Engineer, DAAC System Test Engineer, DAAC SW Maintenance Engineer, DAAC Science Coordinator, DAAC Science Software I&T Support Engineer and DAAC User Services Representative.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 4 Hours (2 Lecture, 2 Lab)

Sub-tasks:

1. Resource planning concepts.
   a. ECS context.
   b. Planning subsystem.
   c. Resource planning process.
2. Launching and shutting down resource planning applications.
   a. Launching resource planning applications.
   b. Shutting down resource planning applications.
3. Defining resources.
   a. Adding a resource.
   b. Modifying a resource.
   c. Deleting a resource.
   d. Synchronizing resource listings.
4. Creating a resource reservation request.
5. Editing a resource reservation request.
   a. Editing a resource reservation request.
   b. Validating or rejecting a resource reservation request.
   c. Approving a resource reservation request.
   d. Committing resource reservation requests.
   e. Deleting a resource reservation request.
6. Reviewing a resource timeline.
7. Troubleshooting resource planning problems.
   a. Trouble symptoms.
   b. Checking log files.

Practical Exercises: The student will perform the following hands-on training exercises:

1. Students will launching resource planning applications.
2. Students will shutting down resource planning applications.
3. Students will synchronizing resource listings.
4. Students will adding resources to the resource planning list.
5. Students will modify resources on the resource planning list.

6. Students will delete resources from the resource planning list.
7. Students will create a resource reservation request.
8. Students will editing/modify a resource reservation request.
9. Students will validate or reject a resource reservation request.
10. Students will approve resource reservation request.
11. Students will commit a resource reservation request.
12. Students will delete a resource reservation request.
13. Students will review a resource timeline.
14. Students will troubleshoot resource planning problems.

Volume 8: Ingest

Volume 8 provides a detailed description of the process for receiving and archiving data from external data providers. It includes methods for monitoring the performance of ingest requests, ingesting hard media, modifying ingest parameters, and troubleshooting ingest problems.

Attendees: DAAC Archive Manager, DAAC Ingest Distribution/Technician, DAAC System Engineer, DAAC System Test Engineer and DAAC User Services Representative.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 8 Hours (4 Lecture, 4 Lab)

Sub-tasks:

1. Ingest concepts.
2. Launching ingest applications.
3. Monitoring ingest status.
4. Performing hard media ingest.
5. Performing interactive ingest.
6. Scanning documents.
7. Modifying ingest tunable parameters and performing file transfers.
8. Troubleshooting ingest problems.
9. Recovering from a data ingest failure.

Practical Exercises: The student perform the following hands-on training exercises:

1. Students will launch the ingest GUI.
2. Students will monitor/control ingest requests.
3. Students will view the history log.
4. Students will verify the archiving of ingested data.
5. Students will clean the polling directories.
6. Students will perform media ingest (from 8mm and/or D3 tape).
7. Students will scan documents and gain access to scanned documents.
8. Students will modify external data provider/interactive user information.
9. Students will modify system parameters.
10. Students will perform file transfers.
11. Students will troubleshoot ingest problems.
12. Students will recover from a data ingest failure.

Volume 9: Data Distribution

Volume 9 provides information to support the operators in distributing ECS science data using various media. This lesson describes the process for distribution of products to the user community and data processing.

Attendees: DAAC Archive Manager, DAAC Ingest/Distribution Technician, DAAC System Engineer, DAAC System Test Engineer, DAAC SW Maintenance Engineer and DAAC User Services Representative.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 4 Hours (2 Lecture, 2 Lab)

Sub-tasks:

1. Distribution concepts.
2. Launching the data distribution applications.
3. Monitoring/controlling data distribution requests.
4. Performing hard (physical) media operations.
5. Troubleshooting data distribution problems.

Practical Exercises: The student perform the following hands-on training exercises:

1. Students will launch the data distribution GUI.
2. Students will monitor/control data distribution requests.
3. Students will unload/load 8mm tape cartridges.
4. Students will troubleshoot data distribution problems.

Volume 10: Archive

Volume 10 reviews the process for archiving data. This lesson includes a description of processing for monitoring the ingest/archival/distribution performance, maintaining configuration of peripherals and data servers, documenting archive errors, maintaining archive processing queue (both storing and retrieval), managing archive content and capacity, submitting new data archive requests to the Science Coordinator and providing archive status.

Attendees: DAAC Archive Manager, DAAC Ingest Distribution Technician, DAAC System Engineer, DAAC System Test Engineer, DAAC SW Maintenance Engineer and DAAC User Services Representative.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 6 Hours (3 Lecture, 3 Lab)

Sub-tasks:

1. Starting and shutting down AMASS.
2. Inserting data into the archive.
   a. Archive logical and physical organization.
3. Monitoring archive requests.
4. Retrieving data from the archive.
5. Deleting pull disk data.

6. Loading archive media.
7. Backup of Archive Data to offsite storage.
8. Restoring archive data from offsite storage.
9. Using the AMASS GUI.
10. Monitoring archive system and fault notification.
11. Monitoring temporary data storage of intermediate files.

Practical Exercises: The student perform the following hands-on training exercises:

1. Students will start and shut down the AMASS.
2. Students will monitor insertion of data into the archive.
3. Students will monitor an archive request.
4. Students will monitor retrieval of data from the archive.
5. Students will delete pull disk data.
6. Students will load archive media.
7. Students will prepare copies of archive data for offsite storage.
8. Students will restore archive data from offsite storage.
9. Students will monitor archive system and perform fault notification.
10. Students will monitor temporary data storage of intermediate files.

Volume 11: Database Administration

Volume 11 provides a functional overview of the ECS databases and detailed descriptions of the tasks required to maintain the database system including the operations interface to perform database administration, product installation and disk storage management, backup and recovery, managing SQL server login accounts and privileges, database tuning and performance monitoring, database security and auditing, database integrity monitoring, and database troubleshooting.

Attendees: DAAC Database Administrator, DAAC Science Data Specialist, DAAC System Engineer, DAAC System Test Engineer, DAAC SW Maintenance Engineer and DAAC User Services Representative.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 8 Hours (4 Lecture, 4 Lab)

Sub-tasks:

1. Database functions and descriptions.
2. Release 4 databases.
3. SQL server overview.
4. Database devices.
5. User databases.
6. Database segments.
7. Database objects.
8. Database administrator (DBA) functions.
9. Database security and auditing.
10. Integrity monitoring.
11. Troubleshooting.

Practical Exercises: The student will perform the following hands-on training exercises:

1. Students will start the server.
2. Students will create new database devices.
3. Students will create user databases.
4. Students will create database segments.
5. Students will perform database backup.
6. Students will perform database recovery.
7. Students will create a user account and assign account privileges.
8. Students will perform database tuning and performance monitoring.
9. Students will perform integrity monitoring.
10. Students will perform database security and auditing.
11. Students will delete user account.
12. Students will shutdown the server.

Volume 12: Configuration Management

Volume 12 provides a detailed description of the different tasks that need to be accomplished in order to: record and manage proposed and approved Configuration Change Requests (CCR); record, report, manage and distribute changes to custom ECS software, science software and database control files; record, report and maintain system-level changes to the as-built operational baseline; generate the Configuration Status Accounting Records (CSAR); manage, enter, maintain and update documents related to the operational baseline.

Attendees: SMC Configuration Management Administrator, DAAC Configuration Management Administrator and DAAC SW Maintenance Engineer.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 8 Hours (4 Lecture, 4 Lab)

Sub-tasks:

1. M&O role in ECS CM activities.
2. Configuration Control Board (CCB) process.
3. Configuration Change Requests (CCR) process.
4. Software baselines and changes.
5. Hardware baselines and changes.
6. Changes to the baseline.
    a. Physical asset management and monitoring.
    b. Baseline management.
    c. Inventory Logistic Maintenance (ILM) management.
7. Impact analysis.

Practical Exercises: The student will perform the following hands-on training exercises:

1. Students will generate a CCR for hardware upgrade.
2. Students will generate a CCR for a software change.
3. Students will generate a CCR to document hardware and software changes.
4. Students will prepare distribution lists for review of the proposed changes.
5. Students will use ClearCase to process the transfer and installation of a software patch.

6. Students will perform updates to the baseline manager for software change.
7. Students will perform updates to the inventory/logistical management system for a hardware change.

Volume 13: User Services

Volume 13 provides a detailed description of the different tasks that relate to providing support to the user community. The type of services reviewed in this lesson include user account management, processing an order, canceling an order, fulfilling subscriptions, cross-DAAC referral process, and cross-DAAC order tracking.

Attendees: DAAC User Services Representative, DAAC System Engineer, DAAC System Test Engineer and DAAC SW Maintenance Engineer.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 8 Hours (4 Lecture, 4 Lab)

Sub-tasks:

1. The User Services Role.
   a. Identify major user services responsibilities.
   b. Relate "super user" activities to user support.
2. ECS user account management.
   a. Retrieving a user account.
   b. Creating a user account.
   c. Creating an account from Uniform Resource Locator (URL) registration.
   d. Editing/Modifying an existing account.
   e. Deleting an ECS account.
   f. Canceling an ECS account.
   g. Changing an ECS user's password.
3. Processing an Order.
   a. Creating/Updating a user contact log record.
   b. Verifying an account with the User Profile screen.
   c. Data search and order.
   d. Update User Contact Log.
4. Canceling an order.
   a. ECS Order Tracking.
   b. Canceling the order.
5. Fulfilling a subscription.
   a. Fulfilling a one-time subscription.
   b. Fulfilling an open-ended subscription.
   c. Returning a list of subscriptions.
   d. Canceling a subscription.
6. Data dictionary maintenance.
   a. Update attribute/keyword mapping.
   b. Exporting valids.
   c. Importing valids.
7. Cross-DAAC referral processing.

a. Referral to another DAAC.
b. Receiving a referral from another DAAC.

8. Cross-DAAC order tracking.
   a. Tracking to another DAAC.
   b. Responding to a tracking request from another DAAC.
9. ASTER DAR creation and submission (EDC only).

Practical Exercises: The student will perform the following hands-on training exercises:

1. Students will list five major responsibilities of User Services.
2. Students will retrieve a user account.
3. Students will create a user account.
4. Students will creating a user contact log entry.
5. Students will retrieve user information.
6. Students will locate data via the search and order tool.
7. Students will order data.
8. Students will update the user contact log.
9. Students will cancel an order.
10. Students will fulfill a one-time subscription.
11. Students will fulfill an open ended subscription.
12. Students will return a list of subscriptions.
13. Students will cancel a subscription.
14. Students will update attribute/keyword mapping for ECS collections.
15. Students will create a valids export file.
16. Students will perform cross-DAAC order tracking.
17. Students will create and submit an ASTER DAR (EDC only).

Volume 14: Not Used

Volume 15: Not Used

Volume 16: Science Software Integration & Test

Volume 16 provides a detailed description of the process required to acquire an algorithm package, create Earth Science Data Types, check the science software, compile and link the science software, run a PGE in a simulated SCF environment, examine the PGE produced log files, perform file comparison, update the PDPS database and Science data server, integrate science software into the EOSDIS environment, test the new science software to verify its operability and advertise the availability of the PGE data using the Advertising Server.

Attendees: DAAC Science Software I&T Support Engineer, DAAC Science Data Specialist, DAAC System Engineer, DAAC Production Planner, DAAC Production Monitor, DAAC Resource Manager and DAAC SW Maintenance Engineer.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 40 Hours (20 Lecture, 20 Lab)

Sub-tasks:

1. Release 4 Architecture Overview of ECS as it applies to SSI&T.
2. The ECS Assistant.
   a. Using ECS Assistant to Start Up / Shut Down Servers.
   b. Using ECS to Perform System Monitoring.
   c. Using ECS Assistant to Open /View Log Files for a Selected Server.
3. Science Software Configuration Management
   a. Creating and using a view in ClearCase.
   b. Creating a new directory into ClearCase.
   c. Importing files into ClearCase.
   d. Checking out a file from ClearCase.
   e. Checking a modified element into ClearCase.
4. Science Software Integration and Test (SSI&T) Manager Graphical User Interface (GUI).
   a. SSIT Manager Overview.
   b. SSIT Manager GUI.
   c. General Set Up of the SSI&T Manager.
   d. SSIT Manager Tools and running of the SSI&T manager.
5. Acquiring and Unpacking the Delivered Algorithm Package (DAP).
   a. Acquiring the Algorithm Package via FTP.
   b. Unpacking a DAP SSIT Software.
   c. Subscribing to the DAP.
   d. Performing a DAP Insert Using SSIT Manager.
6. DAP Acquire.
   a. Performing a DAP Acquire Using SSIT Manager.
   b. An Alternative Way to Acquire a DAP.
7. Inserting a Science Software Archive Package (SSAP) and Updating a (SSAP).
8 Standards Checking of Science Software Overview.
   a. Checking FORTRAN 77 ESDIS Standards Compliance.
   b. Checking for ESDIS Standards Compliance in Fortran 90.
   c. Checking for ESDIS Standards Compliance in C.
   d. Checking for ESDIS Standards Compliance in Ada.
   e. Checking for ESDIS Standards Compliance in Ada: Verdix COTS.
   f. Checking for ESDIS Standards Compliance in Ada: GNU *gcc.*
   g. Prohibited Function Checker.
   h. Checking Process Control Files.
   i. Checking Process Control Files: Command-Line Version.
   j. Extracting Prologs.
9. Compiling and Linking Science Software.
   a. Updating the Process Control File (PCF).
   b. Setting up a SDP Toolkit Environment.
   c. Demonstrate compile procedures used to produce a PGE.exe.
   d. Demonstrate a PGE Executables Tar File Insertion Script.
   e. Compiling Status Message Facility (SMF) Files.
   f. Building Science Software with the SCF Version of the SDP Toolkit.
   g. Building Science Software with the DAAC Version of the SDP Toolkit.

10. Running a PGE in a Simulated SCF Environment.
    a. Setting Up the Environment for Running the PGE.
    b. Running and Profiling the PGE.
11. Preparing Earth Science Data Types (ESDT).
    a. Comparing granule level metadata.
    b. Using ECS Assist to Manage ESDTs
    c. Installing ESDTs/DLL's to the Storage Area.
    d. Installing/Removing (ESDT/DLL) using the Science Data Server Operator GUI.
    e. Add ESDTs through the ECS Assistant GUI.
    f. Validating Successful ESDT Installation.
    g. Removing ESDTs with ECS Assistant.
    h. Using ECS Assistant to View ECS Science Data Server Database.
    i. Using ECS Assistant to View Database.
    j. Browser to View ECS Science PDPS/IOS Database.
12. Review of Production Rules
    a. Purpose and Scope.
    b. Overview of Production Rules.
    c. Data Processing in ECS.
    d. Production Rule Definitions.
    e. Introduction.
    f. Input Data Specification Basic Temporal.
13. Alternate Inputs
    a. Inputs required to implement the Alternate Inputs rule.
    b. Tiling.
    c. Inputs required to implement the Tiling rule.
    d. Data Server Proxy (Subsetting/Subsampling).
    e. Inputs required to implement the Data Server Proxy rule.
    f. Level 0 to Level 1A.
    g. Conditional Activation.
    h. Intermittent Execution.
    i. Inputs required to implement the Intermittent Execution rule.
    j. Metadata-based Conditional Activation.
    k. Inputs required to implement the Metadata-based Conditional Activation rule.
    l. Mode-based Conditional Activation
    m. Error Handling
    n. Inputs required to implement the Automated Error Handling.
14. Combinations of Production Rules.
    a. Introduction Basic Temporal.
    b. Alternate Inputs and Metadata-Based Conditional Activation.
    c. Alternate Inputs and Data Server Proxy.
    d. Alternate Inputs and Tiling.
    e. Intermittent Execution.
    f. Changes to rules.
    g. Production Rules Technical Information.
    h. Production_Rules_Syntax.

15. DPREP
    a. Introduction.
    b. SSI&T Activity for DPREP.
    c. DPREP Processes and Procedures.
    d. Setups for DPREP.
16. PGE Registration and Test Data Preparation.
    a. PGE Registration.
    b. PGE ODL Preparation.
    c. ESDT ODL Preparation.
    d. AlternativeTool for SSIT Metadata Update.
    e. Operational Metadata.
    f. SSIT Operational Metadata Update GUI.
17. Test Data Preparation and Insertion of Data Granules.
    a. Generating a Metadata Configuration File (Source MCF).
    b. Creating a Target MCF (.met) for a Dynamic/Static Granule.
    c. Inserting Static Data Granules into the Data Server.
    d. Inserting Dynamic Data Granules to the Science Data Server.
18 Placing the Science Software Executable (SSEP) onto Science Data Server.
    a. Package onto Science Data Server.
19. PGE Planning Processing and Product Retrieval
    a. Using the Production Request Editor.
    b. Viewing Production Request.
    c. Defining a New Production Request.
    d. Viewing Data Processing Requests.
    e. Listing Data Processing Requests.
    f. Using the Production Planning Workbench.
    g. Creating and Activating a Production Request.
    h. Using the Planning Workbench to Run One PGE.
    i. Monitoring Production using Autosys.
    j. Using the Q/A Monitor.
20. Postprocessing and General Investigation.
    a. Examining PGE Log Files.
    b. Log Files From PGEs Run Outside of the PDPS.
    c. Production History Log Files From PGEs Run Within the PDPS.
    d. History Log Files From Failed PGEs Run Within the PDPS.
    e. Examining PDPS-Related Scripts and Message Files.
    f. Examining AutoSys JIL Scripts.
    g. Examining Application Log Files (ALOG).
21. File Comparison and Data Visualization.
    a. Using the GUI HDF File Comparison GUI.
    b. Using the hdiff HDF File Comparison Tool.
    c. Using the ASCII File Comparison Tool.
    d. Using the Binary File Difference Assistant.
    e. Data Visualization.
    f. Viewing Product Metadata with the EOSView Tool.
    g. Viewing HDF Image Objects.

h. Viewing HDF-EOS Grid Objects.
i. Viewing HDF-EOS Swath Objects.
j. Viewing HDF SDS Objects.
k. Viewing Product Data with the IDL Tool.
l. Creating an Image Display Using IDL.
m. Saving an Image Display Using IDL.
n. Setting axis titles for a plot
o. Saving a Plot Display Using IDL.
p. Raster Mapping Fundamentals.

22. Miscellaneous
    a. Setting Up Environment for Direct PDPS Database Access
23. Examples of PGE and ESDT ODL Files for Each Instrument Team
    a. Template ODL Files
24. Review Appendix A. Troubleshooting and General Investigation
    a. ESDT Installation Failure.
    b. Handling an ESDT Installation Failure.
    c. Insert File Failure.
    d. Handling an Insert Failure
    e. Acquire Failure.
    f. Handling DPR Generation Failures
    g. Handling a DPR Scheduling failure.
    h. Handling a Failures During Execution.

Practical Exercises: The Students will perform the following hands-on training exercises:

1. Students will use ECS Assistant to:
    a. Using ECS Assistant to Start Up / Shut Down Servers.
    b. Using ECS Assistant to Open/View Log Files for a Selected Server.
    c. Using ECS Assistant to Monitor Server Status.
2. Students will create a new directory using ClearCase.
3. Students will bring up and utilize the SSI&T Manager.
4. Students will FTP and unpack a DAP.
5. Students will import files into ClearCase.
6. Students will perform a DAP Insert using SSIT Manager.
7. Students will perform a DAP Acquire Using SSIT Manager.
8. Students will insert a Science Software Archive Package (SSAP).
9. Students will perform standards checking.
10. Students will check files using the Prohibited Function Checker.
11. Students will check process control files (PCF) Command Line Version.
12. Students will set up a SDP Toolkit Environment.
13. Students will carryout compile procedures used to produce a PGE.exe.
14. Students will register a PGE Tar File with an Insertion Script.
15. Students will Compile Status Message Facility (SMF) files.
16. Students will compile and link a PGE with SCF version of the SDP toolkit.
17. Students will compile and link a PGE with DAAC version of the SDP toolkit.
18. Students will set up the Environment for Running a PGE.
19. Students will run and Profile a PGE.
20. Students will Install/Remove an ESDT using the Science Data Server Operator GUI.

21. Students will install an ESDT using ECS Assistant.
22. Students will use ECS Assistant to View Database.
23. Students will use Browser to View ECS Science PDPS/IOS database.
24. Students will examine the Production Rules established for a selected PGE and see what changes to various files had to accompany a selected production rule.
25. Students will examine the DPREP files of an existing PGE and follow the production history to where the DPREP files are made ready for an Instrument PGE.
26. Students will perform PGE Registration and Test Data Preparation.
    a. Register a PGE.
    b. Perform PGE ODL Preparation.
    c. Perform ESDT ODL Preparation.
    d. Validate ESDT.odl files being established in ECS.
    e. Exercise AlternativeTool for SSIT Metadata Update.
    f. Produce a successful PDPS Science Metadata Update.
    g. Exercise the SSIT Operational Metadata Update GUI.
    h. Produce an Operational Metadata Update.
27. Students will perform Test Data Preparation and Insertion of Data Granules.
    a. Produce a Metadata Configuration File (Source MCF).
    b. Demonstate the successful installation of a Source MCF.
    c. Create a Target MCF (.met) for a Dynamic/Static Granule.
    d. Insert Static Data Granules into the Data Server.
    e. Insert Dynamic Data Granules into the Science Data Server.
    f. Provide an example of a successful insertion of a Dynamic Input Data Granule into the Data Servers.
28. Students will prepare a Science Software Executable (SSEP) Package for placement onto Science Data Server, additionally:
    a. Students will place a SSEP Package onto Science Data Server.
    b. Students will provide an example of a successful insertion of a SSEP EXE TAR.
29. Students will demonstrate PGE Planning Processing and Product Retrieval by:
    a. Using the Production Request Editor.
    b. Defining a New Production Request including Chains of DPRs within the PDPS.
    c. Viewing Production Requests.
    d. Viewing Data Processing Requests.
    e. Listing Data Processing Requests.
    f. Using the Production Planning Workbench.
    g. Creating and Activating a Production Plan.
    h. The plan is deactivated without activating another plan.
    i. Using the Planning Workbench to Run One PGE.
    j. Monitoring Production using Autosys.
    k. Using the Q/A Monitor.
30. Students will perform Postprocessing and General Investigation by:
    a. Examining PGE Log Files.
    b. Log Files From PGEs Run Outside of the PDPS .
    c. Production History Log Files From PGEs Run Within the PDPS.
    d. History Log Files From Failed PGEs Run Within the PDPS.
    e. The Production History.

f. Examining PDPS-Related Scripts and Message Files.
g. Examining AutoSys JIL Scripts.
h. Examining Application Log Files (ALOG).

31. Students will perform File Comparison and Data Visualization by:
    a. Using the GUI HDF File Comparison GUI.
    b. Using the hdiff HDF File Comparison Tool.
    c. Using the ASCII File Comparison Tool.
    d. Using the Binary File Difference Assistant.
    e. Data Visualization.
    f. Viewing Product Metadata with the EOSView Tool.
    g. Viewing HDF Image Objects.
    h. Viewing HDF-EOS Grid Objects.
    i. Viewing HDF-EOS Swath Objects.
    j. Viewing HDF SDS Objects.
32. Student will determine what information to report or forward on with a successful PGE execution.

Volume 17: System Troubleshooting

Volume 17 provides a detailed description of the different tasks that are required in order to perform system troubleshooting. The lesson includes a detailed review of the system monitoring capabilities, troubleshooting process and trouble ticket set-up and processing.

Attendees: SMC & DAAC Computer Operator, SMC & DAAC System Administrators, SMC Fault Manager, SMC & DAAC Maintenance Coordinator, DAAC System Engineer, DAAC System Test Engineer, DAAC SW Maintenance Engineer and DAAC User Services Representative.

Prerequisites: Introduction/System Overview and Problem Reporting lessons.

Duration: 8 Hours (2 Lecture, 6 Lab)

Sub-tasks:

1. System/Performance monitoring.
    a. Checking the health and status of the network.
        1) Looking at maps for color alerts.
        2) Looking at maps for new nodes.
        3) Creating special submaps for monitoring status.
        4) Checking for event notifications.
    b. Accessing the EOSDIS Backbone Network (Ebnet) Web Page.
2. Problem analysis/troubleshooting.
    a. Analysis/troubleshooting System.
    b. Specific ECS custom software troubleshooting.
    c. Analysis/troubleshooting COTS hardware.
        1) Documenting hardware problems with the ILM tool.
    d. Performing preventive maintenance.
3. Trouble Ticket (TT).
    a. Using remedy.

1) Adding Users to Remedy.
2) Changing Privileges in Remedy.
3) Changing Remedy Configuration.
4) Generating Trouble Ticket Reports.

b. Performing operational work-around.

4. Diagnosing network communications problems.
   a. Identifying network connectivity problems.
   b. Diagnosing network performance problems.
   c. Diagnosing network service problems.
   d. Viewing Historical Trends.

Practical Exercises: The student perform the following hands-on training exercises:

1. Students will perform system monitoring.
2. Students will perform a diagnostic check on the system.
3. Students will document a hardware using the ILM tool.
4. Students will add users to Remedy.
5. Students will change privileges in Remedy.
6. Students will change Remedy configuration.
7. Students will configure manager system via the network node manager on the server to monitor the network.

Release 4 Training Schedule

Course Duration

Table 1 provides a summary of the course duration. This summary is tied to the duration of each lesson and reflects the lecture to lab ratio for each lesson.

TABLE 1. COURSE DURATION SUMMARY

LESSON	DURATION (Hrs)	LECTURE/LAB (Hrs)
Introduction and Detailed System Overview	8	8/0
Problem Management	4	3/1
System Administration	6	3/3
Network Administration	6	3/3
Database Administration	6	4/2
Production Planning and Processing	16	8/8
Resource Planning	4	2/2
Ingest	8	4/4
Data Distribution	4	2/2
Archive	8	4/4
Configuration Management	8	4/4
User Services	8	4/4
Science Software I&T	40	20/20
System Troubleshooting	8	2/6
TOTAL	134	71/63

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Abbreviations and Acronyms

AM-1	EOS AM Mission spacecraft 1, morning spacecraft series—ASTER, CERES, MISR, MODIS and MOPITT instruments
API	Applications Program Interface
CBT	Computer Based Training
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CM	Configuration Management
COTS	Commercial Off-the-Shelf
CR	Classroom presentation equipment
CSCI	Computer Software Configuration Item
DAAC	Distributed Active Archive Center
DBA	Database Administration
DCN	Document Change Notice
DID	Data Item Description
ECS	EOSDIS Core System
EOC	EOS Operations Center
EOSDIS	Earth Observing System Data Information System
HW	Hardware
IDR	Interim Design Release
ILM	Inventory/Logistic Management
ILS	Integrated Logistics Support
IV&V	Independent Verification and Validation
LSM	Local System Management
M&O	Maintenance and Operations
MSS	Management Subsystem
NASA	National Aeronautics and Space Administration
NMOS	Network and Mission Operations Support

PDR	Preliminary Design Review
PI	Principle Investigator
QA	Quality Assurance
QO	Quality Office
S/C	Spacecraft
SCDO	Science and Communications Development Office
SE	Sustaining Engineering
SEO	Sustaining Engineering Organization
SMC	System Monitoring and Coordination Center
SME	Subject Matter Expert
SMO	System Management Office
SSI&T	Science Software Integration and Test
SW	Software
T^3	Train-the-Trainer