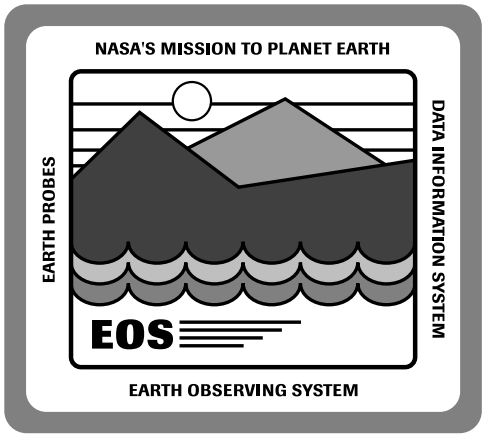
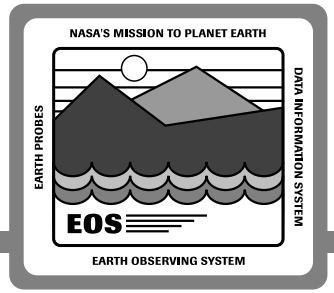


Building on Version 0

Judy Feldman

13 - 14 December 1993

Building on Version 0 Agenda



V0 Summary

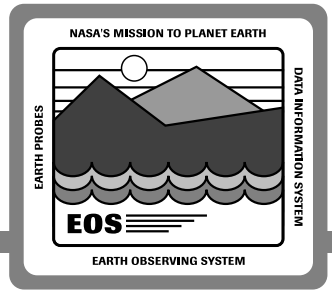
- **V0 Progress**
- **3 Representative V0 Architectures**
- **Synopsis of building on V0 system**

Building on Version 0 Components

- **Functional Analysis Matrix**
- **How Version 1 builds on Version 0**

Summary

Version 0



Working prototype with operating elements available to users in July 1994

System and DAAC activities

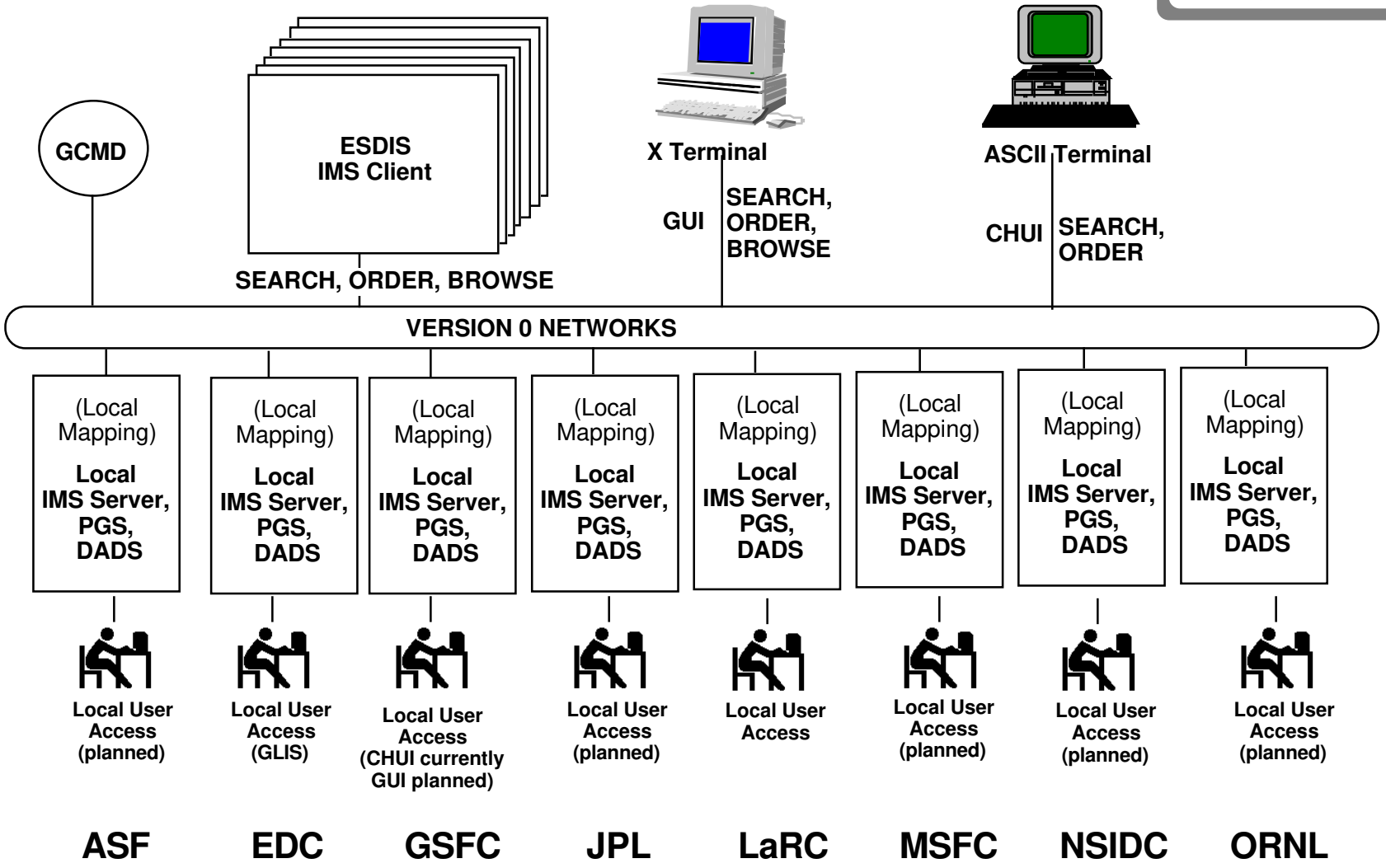
- **System development for IMS, data formats, network, user services**
- **DAAC unique activities for local IMS, PGS, DADS**

Has already been successful in achieving:

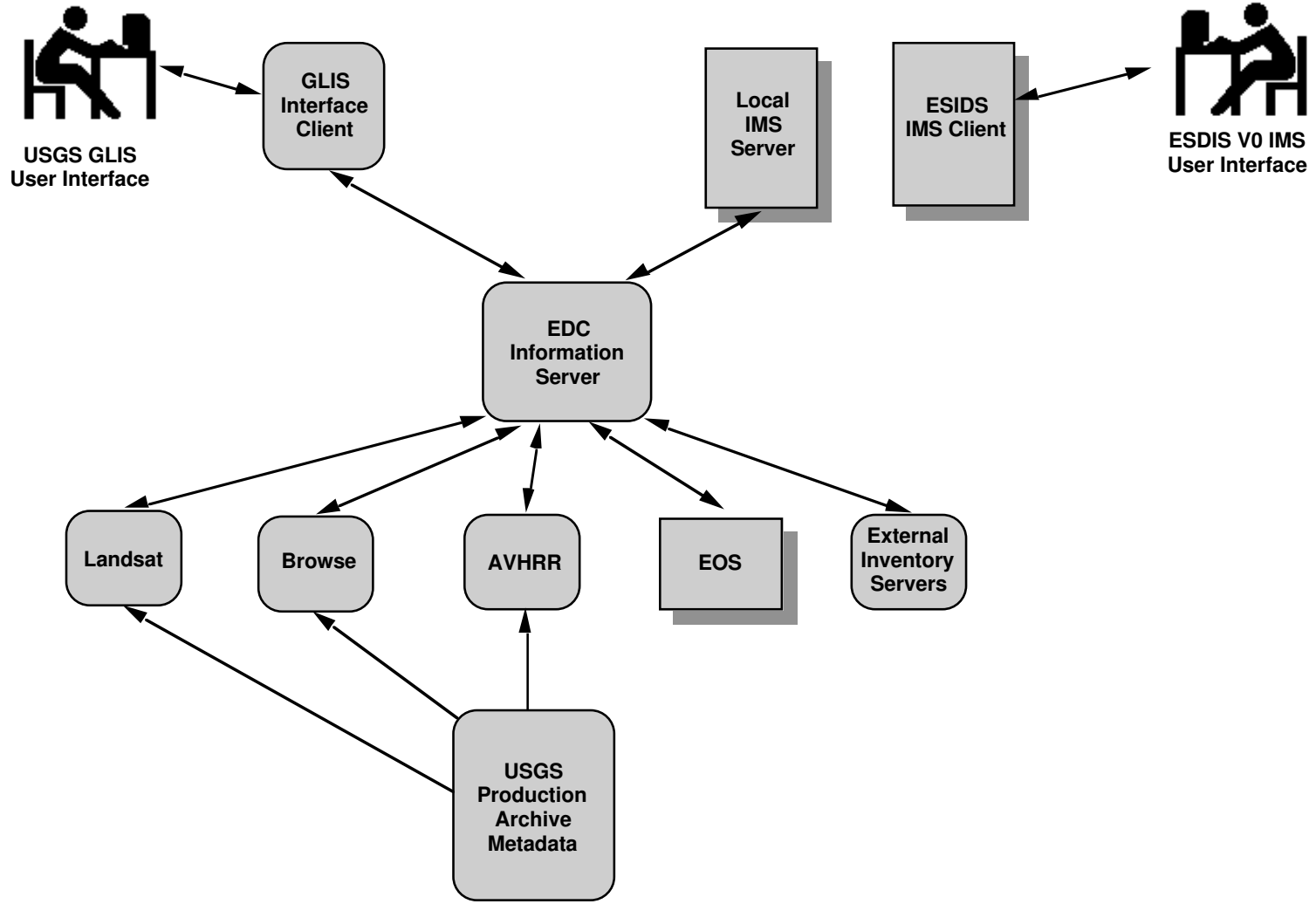
- **User involvement**
- **Interoperability among heterogeneous, distributed data systems**
- **cooperative development environment that leverages DAAC expertise and data system experience within a system level management**

Version 1 and beyond must build on Version 0 successes

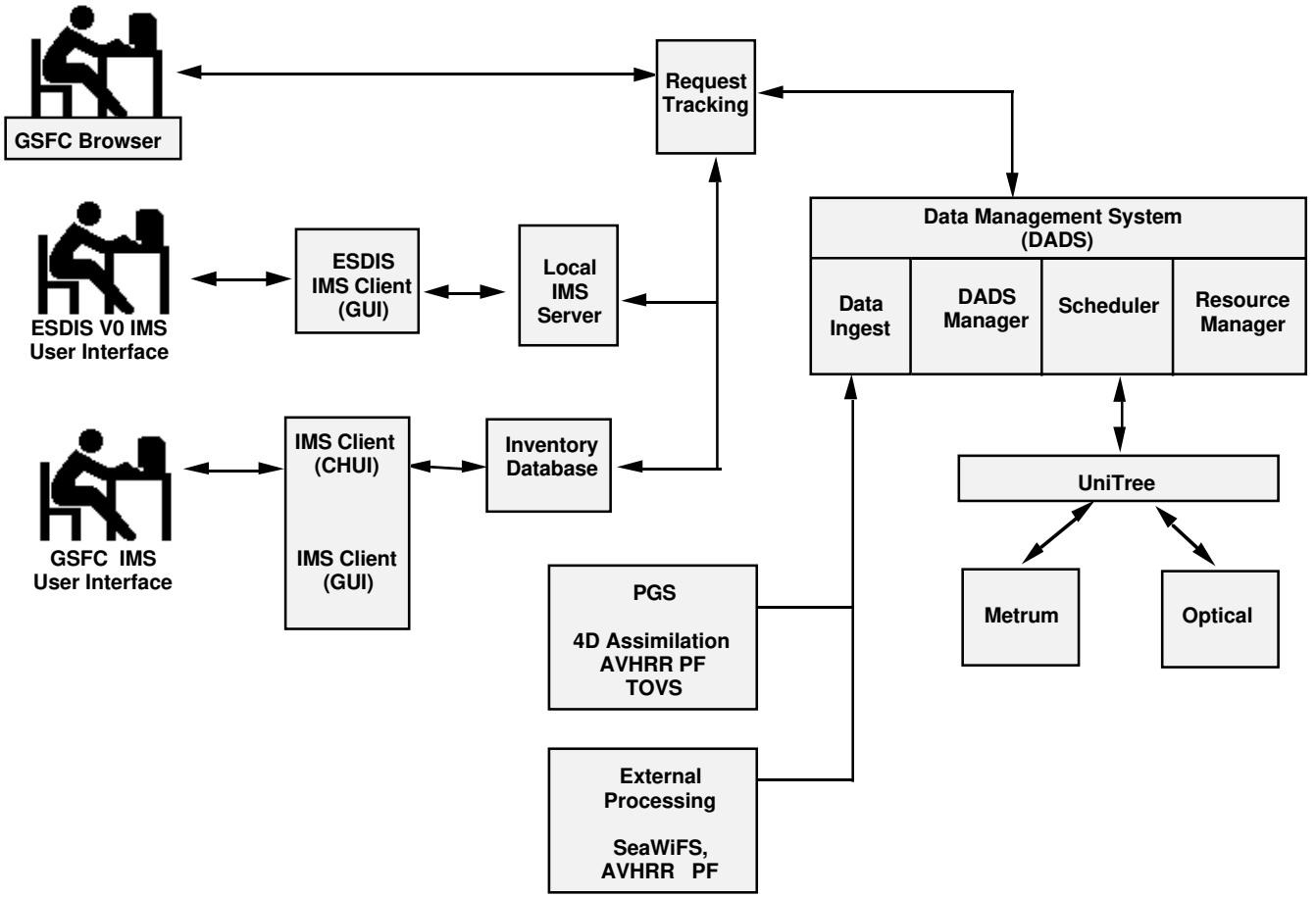
ESDIS (System Level) IMS Architecture



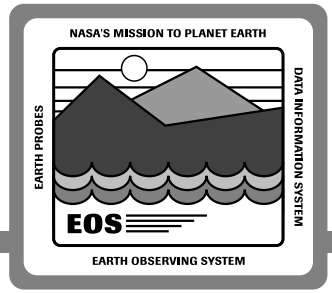
EDC Version 0 Architecture



GSFC Version 0 Architecture

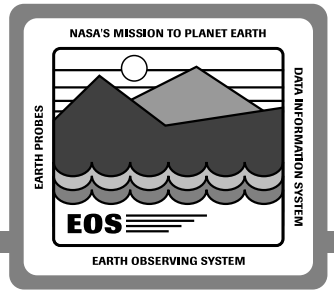


Version 0 - Version 1 Architecture Comparison



System Criteria	Version 0 Capability	Version 1 and beyond Capability
Distributed	DAAC autonomy	DAAC Autonomy
Architecture	DAAC heterogeneity	DAAC heterogeneity
	Multiple site query	Inter-site query
	-	automatic distribution of toolkits
Extensibility	Vertical(FSMS,DBMS)	Horizontal & vertical
	-	Object paradigm
	-	APIs for client and server
	-	Reuseable software infrastructure
Interoperability	Data dictionary task	Active data dictionary
	ODL	Schema resolution
Scalability	Add IMS easily	Add service providers
	DAAC unique funtionality	Add services
Data Paradigm	Metadata/data	“data are data”
Standards	TCP/IP	GOSIP
	ODL	DCE
	Z39.50	Z39.50
	-	CORBA
RMA	-	Strong RMA requirements

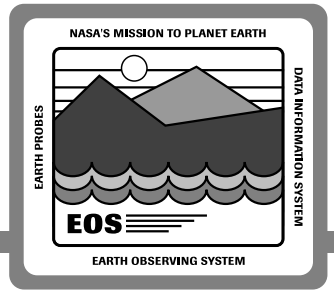
Building on Version 0



- Version 0 Lessons Learned Document was the "tip of the iceberg"
- Other documents (V0 DAAC proposals, DAAC design documents)
- DAAC trips
- Version 0 meetings (IMS team, USWG, UWG)
- Site liaisons
- Version 0 Analysis Study

Integration:
- process
- experience
- hardware
- software
- design

How to build on Version 0

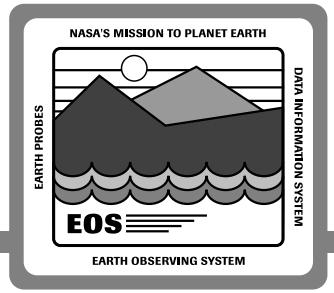


Enveloping Version 0 through selective integration of Version 0 components

Relationships with V0 Team:

- **V0 involved in collaboration**
  - **tirekickers, design reviews**
- **Prototype within Version 0 framework to help clarify ECS requirements**

Functional Analysis Matrix



Working Document of V0 Analysis

Compares V0 (and DAAC) functionality with ECS functionality

Compiled through local team and site liaison support

Information currently being validated at DAACs

Ongoing interaction with DAACs

ADDITIONS and MODIFICATIONS WELCOMED!!!

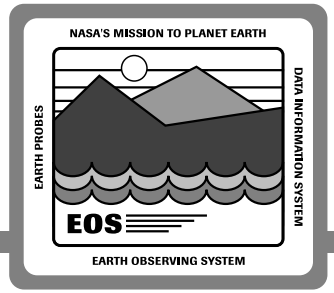
Functional Analysis Matrix (FAM)

	ASF	EDC	GSFC	JPL	LaRC	MSFC	NSIDC	System
Directory	Access Via ESDIS IMS	GLIS	Access Via ESDIS IMS	Access Via ESDIS IMS	Will have hypertext viewer	Will have hypertext access	Access Via ESDIS IMS	Directory searches
Inventory	SAR and GPS searches	coordinated with EDC information server	looking at coincident search	spatial and temporal subsetting to granule level	spatial subsetting for HDF files; timeline	"super granule" concept		
Guide	Will be available 7/94	Will be available 7/94	Developed widget that interfaces WWW	Will be				
Browse	looking at providing degraded SAR images	some HDF browse						
Accounting								
Standard Data Production	qu... metada... generation; derived produc...							
Alg. I&T	JPL creates algorithms	LAS ... TAE, CAS...						
Interoper-ability	With V0 ESDIS IMS	With V0 ESDIS IMS; looking at interop w/ NOAA	With V... IMS					
Distribution Media	CD-ROM sampler; 8mm; prints; 9trk	3480; 8mm; 4mm;prints; 9trk	ftp; 8mm; CD-ROM; 9trk	ftp; 8... ROM; 9trk				
Product QA	Visual Insptection; SAR proc. validation	QA flag in metadata	limited; manual QA of TO VS	QC of data sets; quality flag in pathfinder				

TITLE: ASF Accounting Procedures
RE: Carl Wheatley / Ellen Chilikas
DAAC: ASF

Details: # kinds of users of ASF data
-ESA users w/ data credits
- NASA users w/ data credits
- NASA users w/ $$
Additional information available descrbing how accound balances and budgets are kept available
Integration: Design Consideration
Review: ASF concerned that ECS hasn't properly planned for this
Recommendation: ECS system should be able to handle all ASF types of accounting
Resources: Investigate further as design develops

Building on System Engineering Lessons Learned (Examples)



Reuse of Version 0 development process and DAAC procedures

Development Approach

- Incremental development approach.
- Small development teams (LaRC and others)
- Tirekickers.

System Integration & Test

- Test Plans/Data for regression testing of Version 0 (EDC, GSFC, MSFC)
- Software Modification Request (SMR) discrepancy tracking system (GSFC)
- Use experience gained at all DAAC's in Integrating Version 0

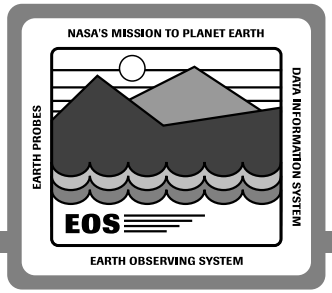
Data Migration

- Procedures for ingest of data (MSFC, GSFC)

Version 1 and Beyond:

- User Model
- Demographic study
- System Model (push and pull)
- Standardsstudy
- Independent testing
- Data Model
- Science Scenarion development
- Emerging technology study
- External andInternal Interface analysis
- Architecture trades

Building on V0 IMS
Lessons Learned (examples)



Guide (NSIDC, GSFC, ESDIS)

- Provides access to servers by non-EOSDIS clients
- Reuse of public domain and externally developed software

Search Algorithms (EDC)

- Object oriented approach to search engines

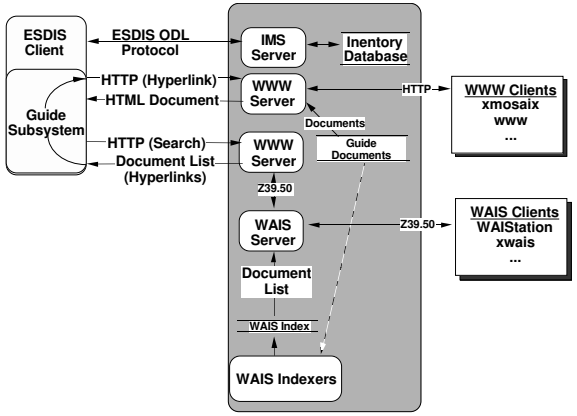
Data Dictionary (All DAACs, JPLand ESDIS lead)

- Lexicon of DAAC terminology

User Interface (LaRC, ESDIS)

- Development of ESDIS GUI style (based on LaRC)
- timeline

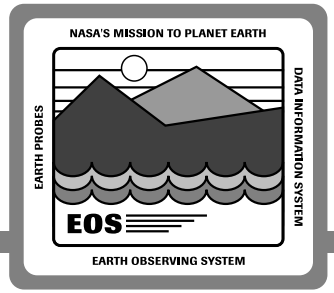
Feasibility/success of loosely coupled distributed server concept



Version 1 and Beyond:

- APIs (machine - machine,clients)
- Hypertext DIF population
- Logical distribution of inventories
- Incremental search
- Use of GUI style and timeline
- Map overlays & orbital models
- Expanded guide (subsetting, subsampling, transformation options.
- Dataset specific metadata with search and display results
- Integration of directory with knowledge base functions
- Coincident search with user specified tolerance
- Active data dictionary
- Movie loop browse

Building on DADS
Lessons Learned (examples)



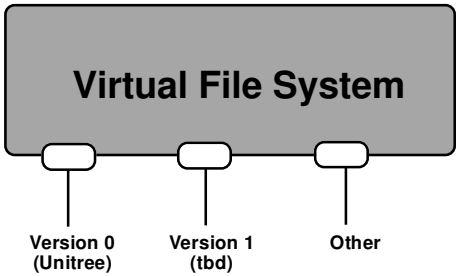
Handling large data volumes with current technology is difficult

Software Reuse Services

- Data conversion
- Data ingest

Unitree experience (GSFC, LaRC, Lewis, Unitree working group)

- do not want to be locked into a single product



Staging sizing and management

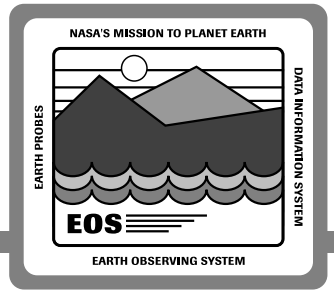
Anonymous ftp (LaRC, JPL, GSFC) being evaluated

Data structure analysis

Version 1 and Beyond:

- Integrated, heterogeneous HSMs
- Collaborative data servers
- Site resource load management
- Program interface access to data services
- Advanced cache management
- Heterogeneous data servers
- Data set specific subsetting
- API for search methods

Building on PGS
Lessons Learned (examples)



Potential Reuse identified:

Automatic Scheduling (SeaWiFS, GSFC, UARS, ERBE, CERES)

Automatic QA (NSIDC)

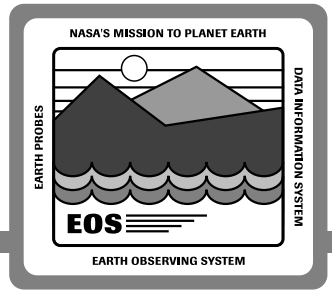
LAS (EDC)

HDF tools (NCSA)

Verrsion 1 and Beyond:

- Portable Algorithms
- Interoperability between data sets
- Common software library
- Consistent long term traceability
- On demand processing
- Interproduct dependencies
- Automatic scheduling at all DAACs
- Validate, reformat, interpolate, regrid, and granulize ancillary data
- Streamlined Alg. Integration & Test process
- Continuous ingest of NOAA ancillary data sets
- Automatic PGS/DADS/IMS scheduler

Building on CSMS
Lessons Learned (examples)



Version 0 Network Reuse:

Initial analysis indicates that reuse of V0 network would reduce risk for ECS, but possibly not cost

Circuit reuse would reduce lead time for PSCN installation, but upgrades to enhance bandwidth would be required

Primary routers reusable

V0 network performance and fault monitoring capabilities could be used in early increments

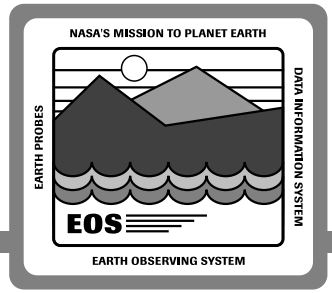
V0 experience and contacts at DAACs ease planning of interfaces

Additional HAIS labor required to support early transition

Most technology migration issues unchanged

Additional analysis will examine V0 and ECS constraints to cutover schedule

Building on CSMS
Lessons Learned (examples)



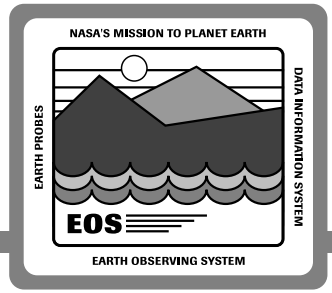
Other CSMS Functions:

- **Accounting Systems (ASF and EDC) should be accomodated in ECS design**
- **Bulletin boards (ESDIS, OMNET) being evaluated**

Version 1 and Beyond:

- **Multiventor interoperability**
- **Dynamic Invocation**
- **Multiple Language support**
- **Dynamic load balancing**
- **Server advertising/scaling**
- **Real-Time collaboration**
- **Internationalized security**
- **Legacy server integration**
- **Request brokering**

“Where do we go from here?”

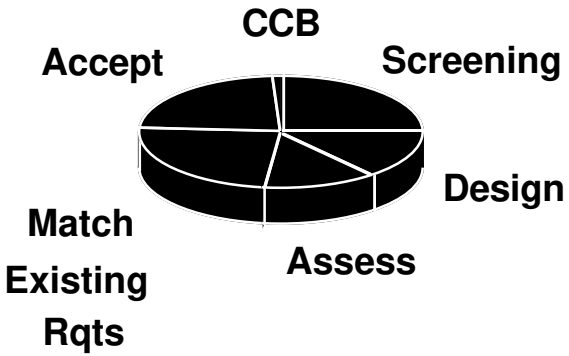


More complete perspective on Version 0

More areas identified for potential reuse

Working at developing stronger working relationships with the Version 0 team

"Version 0 not" list



Input From:
- Lessons Learned Document
- DAACs
- Tirekickers
- Project Office
- ECS Team

Sample Topic Areas

Sample Accepted entries:
- Investigator knowledge base
- Process for removal of data from archive
- Read software to be provided with data
- Movie loop browse
- Selection list
- Timeline
- Dataset specific metadata
- Save and retrieve query

Sample Assessment entries:
- Range of functionality for Coincident search
- Metadata in IMS for SCF holdings

Sample Design Consideration entries:
- APIs for common data structures
- Browse features
- GUI portability
- Control of query results display

RRDB Process

RECOMMENDATION

OPEN T

SCREENING N

ASSESSMENT

CCB

DESIGN ISSUES

MATCHES EXISTING REQ

T ACCEPTED

REJECTED T

KEY

STATUS

T THANK-YOU LETTER TO USER

N NEED MORE INFO LETTER TO USER

DIRECTION OF FLOW