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EOS

EOSDIS Status
MODIS Science Team

October 23, 1997

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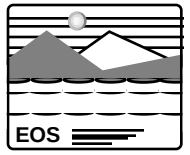
Outline



- ECS Incremental Development Strategy
  - At-launch capabilities
  - Future capabilities
- Current Status
  - August Demo results
  - System performance
- Schedule
  - DAAC deployment
  - Science software integration and test support
  - Risks and mitigation

ESDIS EOSDIS Core System Development Strategy

Planning for an incremental approach to EOSDIS Core System (ECS) releases:

- Re-prioritize functionality in response to feedback from DAACs, ITs, and end users, based on operational experience after launch
- Provide earlier access to high-priority functions through more frequent incremental releases
- Provide for evolving community needs

Release B.0', B.0, B.1 series replaced by Version 2.0, 2.1, 2.3, 2.4

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Version 2 Key Milestones

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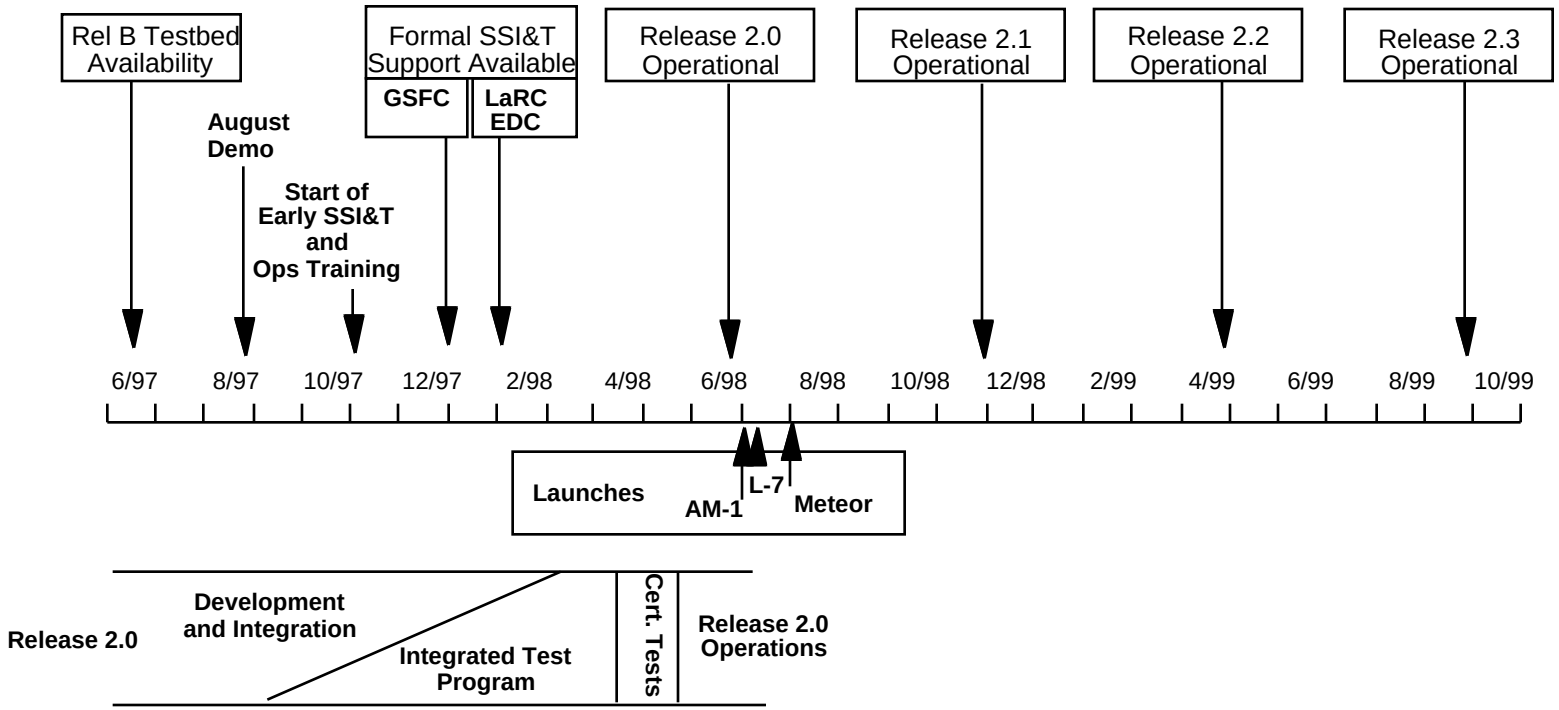

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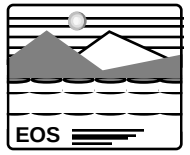
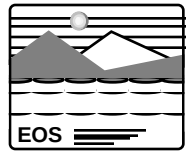
ECS Incremental Development Plan



Jan. 1997 Plan	Strawman Incremental Plan
V2-B.0' At-launch	Version 2.0 At-launch (June '98) Exceeds B.0' with: · Enhanced DSWG 1-13 support, including automated on-demand requests · Enhanced user access via Web · Enhanced production support, including Flight Dynamics data, additional rules, error handling and basic reprocessing
V2-B.0 L+2 mos. (Sept. '98)	Version 2.1 L+5 mos. (Nov. '98) Exceeds B.0 with: · Enhanced DSWG 1-14 support, including subsetting for cross-DAAC production and data access · Enhanced user access, including subsetting and standing orders · Enhanced production support, including subsetting and versions · Two-way interoperability with Version 0 and ASTER GDS
	Version 2.2 L+10 mos. (April '99) Exceeds B.0 with: · Enhanced user access, including granule packages · Enhanced production support, including advanced subsetting
V2-B.1 L+12 mos. (July '99)	Version 2.3 L+15 mos. (Sept. '99) · Full DSWG 1-17 support

ESDIS Data Systems Working Group (DSWG) Priorities



Launch Critical

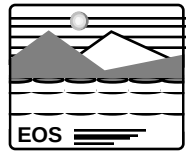
1. Spacecraft and instrument operations
2. Capture data
3. Ingest and archive source data at assigned DAACs
4. Backup source and ancillary data
5. Catalog data
6. Retrieval of source data by Instrument Teams and approved users
7. Execute science software to produce test data products from individual instruments
8. Retrieval of single-instrument test data products by Instrument Teams
9. Execute science software to produce test data products from multiple instruments
10. Retrieval of multiple instrument test data products
11. Partial production processing of standard data products within single DAAC (limited capacity allocated by Instrument Team)
12. Unsubsetted data retrieval by all users

ESDIS Data Systems Working Group (DSWG) Priorities (cont'd)

Mission Essential (Post Launch)

13. Partial production processing using data from other DAAC(s)
14. Subsetted data retrieval by all users
15. Full production processing
16. Enhance data retrieval tools
    - Coincident search (e.g. co-located observations from different instruments/spacecraft)
    - Advertising service (e.g. advertise availability of research products)
17. Support reuse of ECS components by other providers

ESDIS Release 2.0 Capabilities (June '98)



- √ External interfaces for EDOS Ingest, Landsat-7 LPS and IAS ingest, ASTER DAR and ASTER ingest
- \+ *Ingest of repaired orbit data from EOC*
- \+ *Ingest and preprocessing of attitude data from FDD*
- √ Ingest of SCF-provided data
- √ Archive and retrieval of AM-1 and Landsat 7 0R products
- √ Support for B.0 data model
- √ Expedited data using EDOS protocols
- √ Automated, on-the-fly ESDT insertion
- √ AM-1and Sage III science software integration and test tools
- √ Planning and Scheduling tools
- √ Production of AM-1 products using basic production rules
- \+ *Production using Tiling Production Rule*
- √ Basic cross-DAAC production with unsubsetted data
- \+ *Basic Ad hoc reprocessing*
- √ Science QA from SCF
- \+ *Large order mgmt thru threshold checks*
- √ User registration, including DAR user support
- √ Advertisement of data products & services
- \+ *Cross-DAAC search and order via Web-based interface, including user submission of on-demand processing requests*
- \+ *Infrastructure needed to provide Web-based user login and authorization checks*
- √ Request-level order tracking, including standing orders
- √ Media (8mm) and electronic (FTP pull and push) data distribution
- √ Landsat 7 scene-based subsetting and CPF dist.
- • *Landsat-7 distribution format*
- • *Landsat billing and accounting workaround*
- √ Standing orders via operator-assisted subscriptions
- • *Server failure recovery*
- √ Core infrastructure and systems management (e.g., fault/error detection, event logging, distributed object services)
- • *ASTER L0 expedited data*

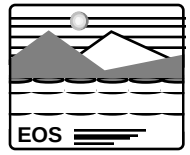
√ = Basic functionality exists

• = *B.0' Functionality under development/test*

\+ = *Functionality under development (exceeds B.0')*

ESDIS Strawman Release 2.1 Capabilities (Nov. '98)

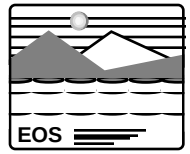
(+ indicates item that exceeds B.0)



+ User and DAAC priority capabilities and changes
+ Basic two-way V0 interoperability
+ Basic ASTER two-way interoperability
• Update of production history metadata
+ Subsetting for all basic data types (point, grid, swath)
+ Granule versioning
• Integrated browse
+ Enhanced client that supports subsetting, subscriptions, and DAR status
+ Infrastructure to support end-user access to advanced services (e.g., advanced search and order, subsetting and subscriptions) across all DAACs
+ Large order management through order partitioning
• Data distribution on 4mm, CD-ROM and 9-Track formats
• Data distribution with compression
+ Full on-demand processing

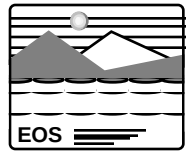
ESDIS Strawman Release 2.2 Capabilities (April '99)

(+ indicates item that exceeds B.0)



+ User and DAAC priority capabilities and changes
- Production capacity up to 4,000 PGEs/day at each DAAC
+ Complete subsetting capabilities for standard formatted products, and enhanced production subsetting (geographic masking and swath narrowing)
- Optimized archive performance through frequency-based cache management, data compression and peripheral scheduling
- Optimized data distribution through pull cache management
+ Combined product distribution, i.e., granule packages
- User authorization checks to determine the services available to a user
- Increased site autonomy using DCE multi-cell capabilities
+ Landsat 7 floating scene subsetting
+ Landsat Level 1 processing

ESDIS Strawman Release 2.3 Capabilities (Sept. '99)



- User and DAAC priority capabilities and changes
- External Interfaces for L7 MOC engineering data
- ASTER and NASDA two-way interoperability
- Full production capacity for planned AM-1 processing
- Inter-DAAC planning and enhanced inter-DAAC processing
- Job-box consolidation (allows management of more PGE executions)
- Full reprocessing support
- Enhanced archive management (e.g., media re-fresh, error monitoring)
- Document Data Server
- Enhanced client including coincident search
- Package/Granule-level order tracking for both operators and end-users
- Order segmentation
- Billing and accounting for all products

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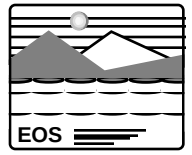
ECS August Demo



- A Demonstration of ECS critical functionality was successfully conducted (as scheduled) on August 28th:
  - Demo included end-to-end demonstrations of all planned ECS science processing, archiving and distribution functions.
  - Functionality was demonstrated using IT and Flight Project-provided data and software.
  - Original demo criteria consisted of 46 functions. Of these, 3 involved production rules which were not exercised by the available PGEs. One additional function (multiple runs of same PGEs) was not scheduled for completion until after the demo.
  - The demonstration successfully executed the remaining 42 functions for ingest of AM-1 and Landsat-7 data, processing of MODIS and ASTER products, and data archive and distribution. Comments were received on 4, and will be addressed in the ECS Test plan.
  - Audience included representatives of Instrument Teams, Distributed Active Archive Centers (DAACs), NOAA, and the broader science community.

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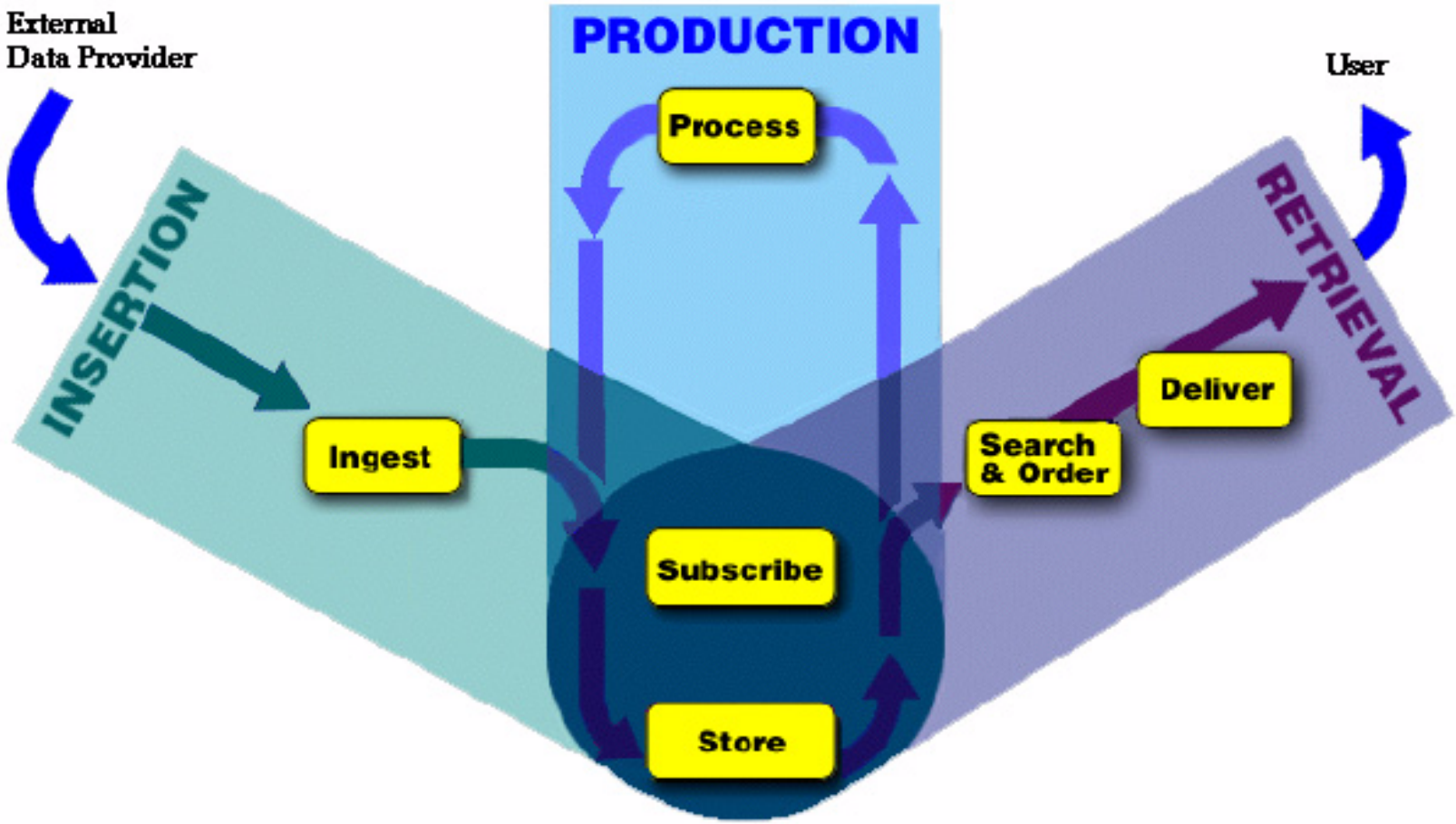
Critical ECS Functionality and Flows Demonstrated at the August Demo

EOS



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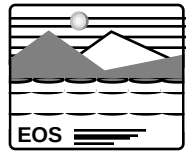
August Demo - MODIS Scenario



- Ingest simulated Level 0 data in EDOS format at 50% at-launch rate (achieved 100%)
- Activated PGE execution from archived Level 0 data
- Demonstrated Advanced Temporal production rule (PGE 02)
- Demonstrate boundary and period specifications production rule
- Demonstrate output of one PGE used as input to another PGE (PGE01-PGE02-PGE08)
- System response to failed PGE execution
- Demonstrate data archiving, cataloguing, and retrieval
- Data search, browse, order, and distribution

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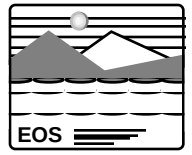
August Demo Results



- All planned functional criteria were demonstrated. Two criteria were completed after August 28:
  - Processing of simultaneous requests from multiple users
  - Concurrent execution of MODIS and ASTER science software
- Ingest-to-archive performance demonstrated at mission data rates. (Criterion was to demonstrate at 50% of mission rate.)
- Although demonstrated criteria did not include performance of remaining functions, there was concern over system response
  - Significant improvement has been made since August demo
  - Plan is in place to tune performance to meet mission rates
- Gained confidence in system's capabilities to meet AM-1 and Landsat-7 mission requirements.
- Strengthened cooperation between Project, ECS, Instrument Teams, and DAACs by focusing effort on early system integration

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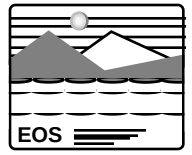
ECS System Performance



- Exceeded Ingest-to-Archive goal and demonstrated mission data rates
- Improved performance in several bottlenecks found in August Demo:
  - Storage Management destaging rates improved from 0.7 MBytes/sec to 3.5 MBytes/sec
  - Improved ASTER tape ingest from 1 MBytes/sec to 5 MBytes/sec
  - Eliminated receiving delay in user search query interface to Data Base Management System
- Developed plan identifying current performance vs required at-launch performance, specific tuning adjustments, and expected improvements
  - Plan shows path to meet at-launch requirement
  - Additional work needed to meet expected launch-plus-one-year data distribution rate

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Planned Performance Changes and Projected Performance Improvements for Critical Threads (as of 10/7/97)

EOS

	Ingest to Archive	Archive to Production	Production to Archive	Archive to Distribution
Current Measure	2.3	2.2	3.5	0.4
Planned Changes				
1) launch HW vs. development HW	1	5	5	3
2) archive to production on HIPPI		8		
3) eliminate extra data copies on transfers			3	
4) concurrent data transfers	2	5	5	2
5) use more efficient data transfer protocols (e.g., FTP vs. NFS)	2			
6) AMASS buffer flush fix	S		S	
7) higher performance device drivers				2
8) tune RAID		5	5	2
9) adjust block sizes				3
10) tune HIPPI		3	3	
Projected Total Performance	7.3	28.2	24.5	12.4
Requirement @ Launch	3.3 (EDC)	7.1 (EDC)	7.2 (EDC)	8.3 (EDC)
Requirement @ Launch + 12 months	3.3 (EDC)	14.2 (EDC)	14.4 (EDC)	15.4 (EDC)

S = allows sustained performance under concurrent load

All numbers are in MBytes/sec.

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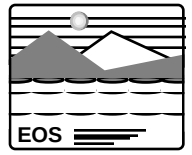
ECS Near Term Activities



- Deploy SSI&T Checkout Version to Goddard DAAC for their use and remote access by other DAACs/ITs. This interim system contains approximately 800K source lines of code (SLOC) and provides:
  - External Interfaces needed for Ingest of Level 0 and 1 data
  - Major SSI&T support capabilities, including:
    - Ingest and management of Science Software Algorithm Packages (SSAPs) (includes source code, documentation, scripts, test data) and Science Software executables
    - Science Software Checkout
    - Capability to update SSAPs
    - Capabilities to integrate Science Software into production system
  - Core production support (e.g., basic production rules, scheduler, planning system)
  - Key data management and archive functions
  - Basic data access
  - Support for Multiple modes of operation (allows simultaneous, independent activities on same hardware)
  - Scripted start-up and shutdown

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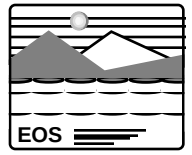
ECS Near Term Activities



- Continue development and integration of remaining Version 2.0 capabilities (estimate between 50K to 75K additional SLOC), including:
  - External interfaces for Ingest of additional data types
  - Enhanced SSI&T support
  - Additional production rules
  - Remaining Operations Graphical User Interfaces (GUIs)
  - Automated system start-up, monitoring and shutdown
  - Failure recovery for core capabilities
  - Performance tuned capabilities
  - Java-based Client and associated Data Management and Infrastructure

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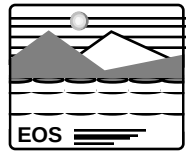
ECS Version 2.0 Intermediate Milestones

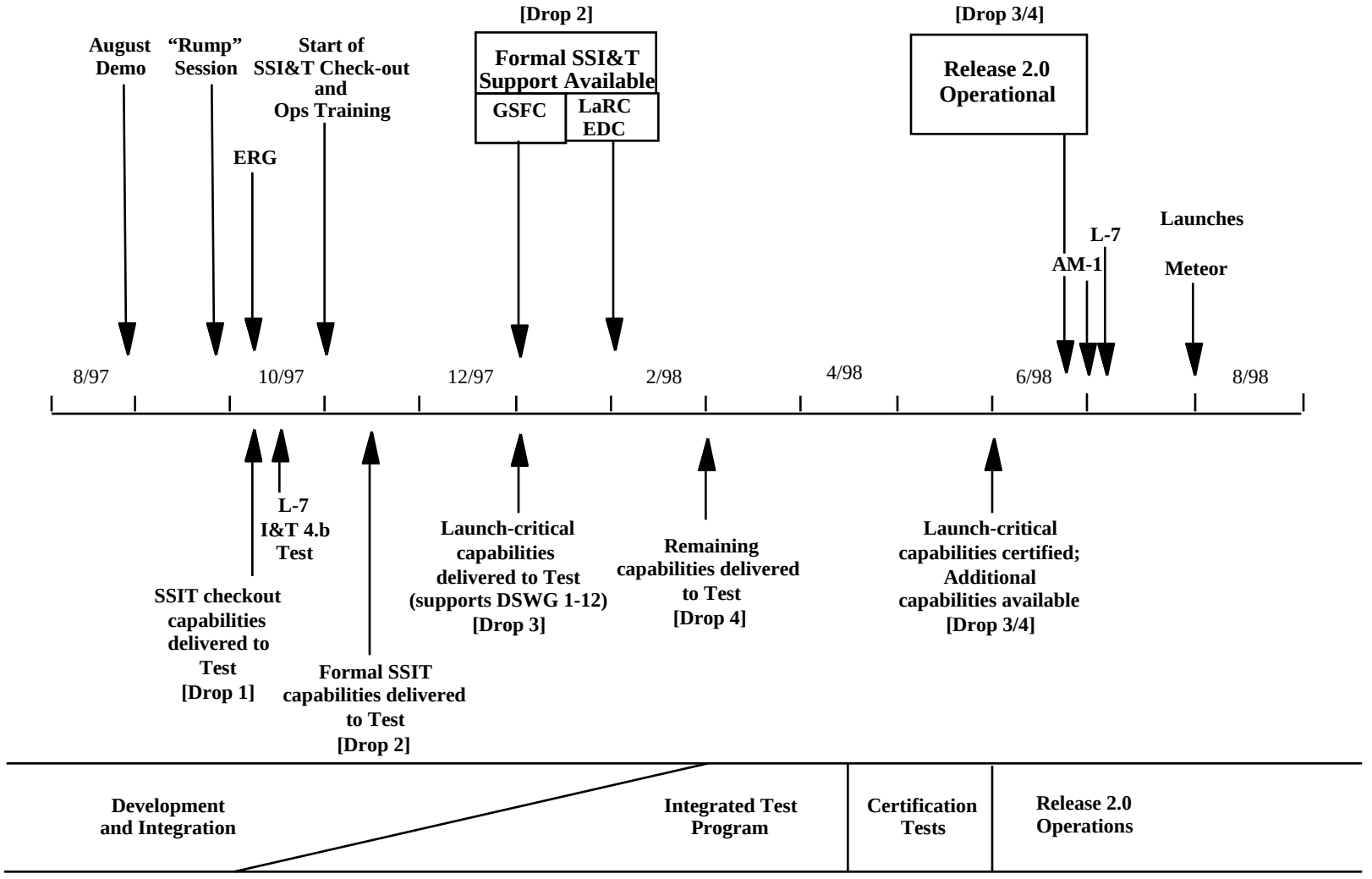


- SSI&T Checkout Capability [Drop 1]
  - Available at Goddard DAAC 10/31/97
  - Provides early exposure to ECS for Instrument Teams and DAAC Ops team (local Goddard team and remote access by other DAACs/ITs)
  - Means to exercise and debug System prior to delivery of formal SSI&T capability
  - Environment for SSI&T teams to get an early start on integration of Science algorithms with ECS
- Formal SSI&T/Critical Interfaces Capability [Drop 2]
  - Available at Goddard DAAC 12/23/97; EDC DAAC 2/2/98
  - Provides environment for SSI&T while formal testing of ECS continues
- Version 2.0 Basic Capabilities [Drop 3]
  - Operational version available

    for transition of SSI&T: GSFC 2/12/98 LaRC 2/17/98

    EDC 3/13/98 NSIDC 3/17/98
- Version 2.0 + Capabilities (March 98) [Drop 4]
  - Additional capabilities (e.g., Java-based Client; additional production rules needed for higher levels of processing) that are not critical for launch and can be deployed with minimum regression testing.

Preliminary Release 2.0 Milestones



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Production Rules vs PGE and ECS "Drop"

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Production Rules for PGEs	Level	Product	Basic Temporal	Advanced Temporal	Orbit-based Activation	Period Specification	Optional Inputs	Alternate Inputs	Spatial Query	Land Tiling	Zonal Tiling	Data Day	Metadata-Based Query	Minimum No. of Granules	Optional DPRs	Most Recent Granule	Runtime Parameter Flag	Start_of_(8,16,32)_Days	"Smart" Start_of_Year	Orbit Path Number	Intermittent Activation	# of Rules
MODIS																						
PGE1	1A	1A/Geoloc	•	•																		**2**
PGE2	1B	1B	•	•			•															**3**
PGE3	2	Masks/Profiles	•					•														**2**
PGE4	2	Atmosphere	•					•					•									**3**
PGE5	3	Land Aerosol			•																	**1**
PGE7	2	Snow	•										•									**2**
PGE9	2,3	Ocean Color	•	•				•					•									**4**
PGE10	2,3	SST	•	•				•					•									**4**
PGE11	2	Reflectance/Fire			•			•														**2**
PGE12	2G	Pointers				•				•							•					**3**
PGE13	2G	Reflectance/Fire				•				•							•					**3**
PGE20	3	Oceans Daily		•		•						•	•	•								**5**
PGE21	3	Surface Reflectance				•								•								**2**
PGE25	3	VI-16 day												•				•				**2**
PGE29	3	Fire-8 Day						•						•				•				**3**
PGE49	3	Oceans Int. Weekly				•						•	•	•								**4**
PGE50	3	Oceans Reference		•		•						•	•									**4**
PGE53	3	Oceans Daily				•						•										**2**
		DROP	**1**	**1**	**1**	**1**	**1**	**1**	**3**	**3,4**	**4**	**4**	**3,4**	**4**	**4**	**4**	**3**	**4**	**4**	**3**	**1**	

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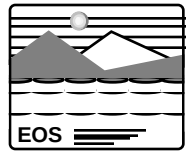
Schedule Risks and Mitigation



- High degree of parallel activity in integration acceptance test, and DAAC deployment
  - One-on-one meetings being held with Instrument Teams and DAACs to prioritize functions, focus work on first PGE deliveries, and identify opportunities to build on existing capabilities
  - MODIS and GSFC DAAC meetings held. EDC on 10/23. NSIDC to be scheduled
  - Focus on capabilities needed to be fully tested pre-launch. Provide flexibility for adding functions and PGEs after formal testing
  - Continue to fund Instrument Team/DAAC Back-up at planned level
  - Adding hardware to GSFC and EDC DAACs to reduce contention for resources during parallel ECS testing and science software integration activities.
  - Conducting early interface tests with external interfaces (e.g., EDOS, Landsat-7 processing systems) to identify and resolve problems.

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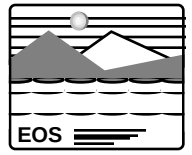
Active Issues



- Land tiling
  - Basic capability to gather granules within a tile will be in pre-launch operationally-tested “Drop 3”
  - Capability to cluster tiles to make best use of resources will be integrated around launch in “Drop 4”
- Day/Night Flag in meta-data
  - MODIS software using to indicate instrument mode
  - “Operation Mode” flag intended for this purpose. “Day/Night” flag intended to indicate sun illumination
  - If MODIS instrument is operated in Day mode during darkness or vice versa, users of data searching on Day/Night flag will retrieve wrong results
- B.0 to B.1 Data Model Transition
  - Data model to be expanded to provide additional metadata fields
  - Transition plan to be completed in first quarter of 1998. Objective is to make changes transparent to existing Instrument Team software
  - Proposed changes will be reviewed with Instrument Teams prior to decision to implement.

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Back-Up Charts

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MODIS PGEs Demonstrated

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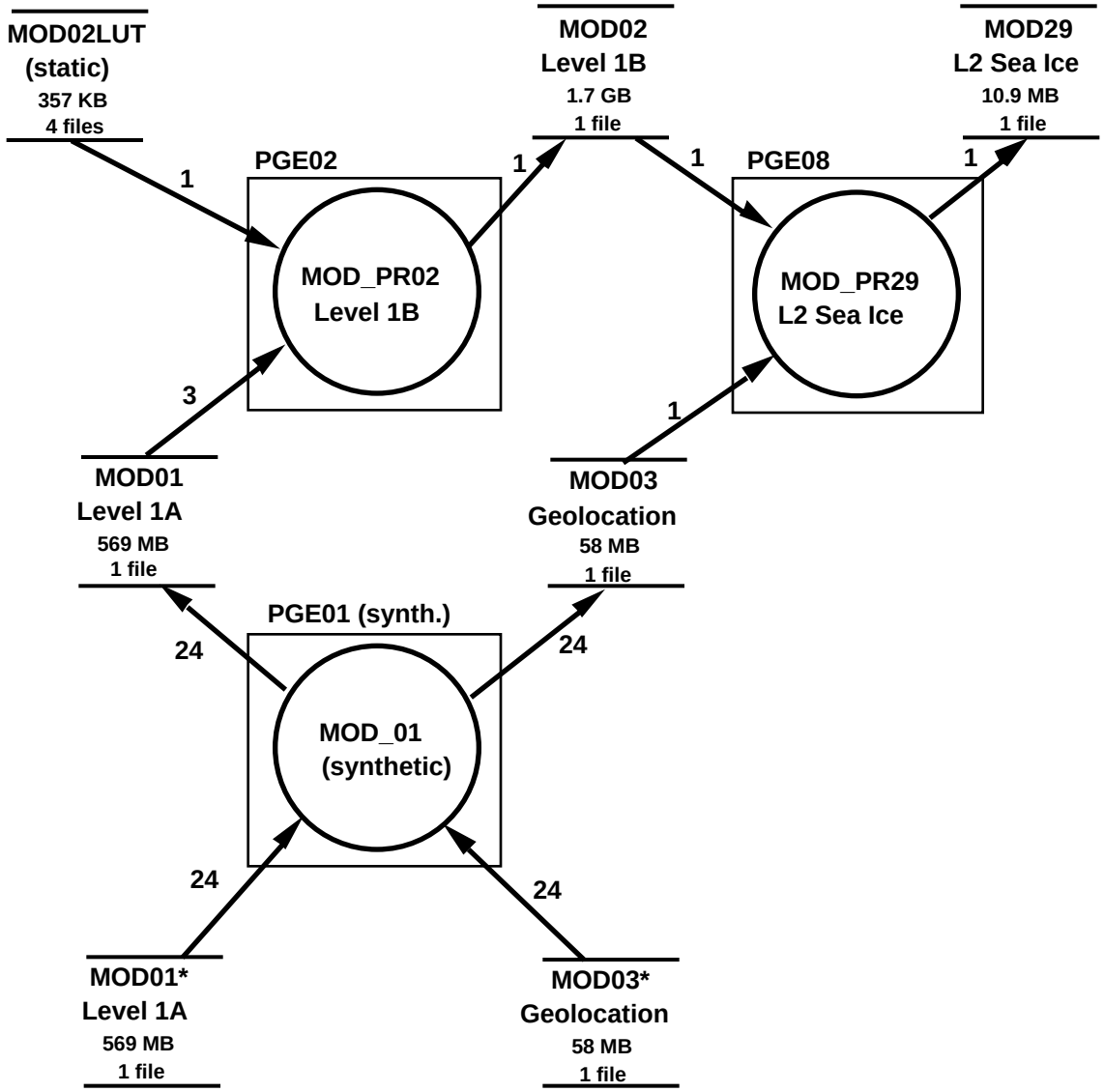

ESDIS Data Systems Working Group's (DSWG) Priorities Mapped to Demo Scenarios

	Critical Function	Scenario
1	S/C & Instrument Ops	< Not applicable >
2	Capture Data	ASTER DAR, MODIS
3	Ingest/Archive source data at DAACs	ASTER, Landsat
4	Backup Ancillary Data	< Not scheduled for Demo >
5	Catalog Data	ASTER, MODIS, Landsat
6	Retrieval of Source Data	ASTER, MODIS, Landsat
7	Run PGEs	ASTER, MODIS
8	IT Retrieval of products	ASTER, MODIS
9	Run PGEs for testing/QA	Formal SSI&T
10	Retrieval of products by ITs across DAACs	ASTER, MODIS < Single DAAC Demo, available for others >
11	Production Processing	ASTER, MODIS
12	Retrieval of data across DAACs	ASTER, MODIS, Landsat < Single DAAC Demo, available for others >

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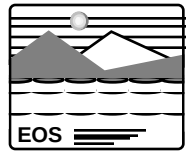
EOSDIS Review Group (ERG) Findings



- **August Demonstration a “qualified” success**
  - Requirements criteria set higher than initial expectations of ESDIS Project or ECS contractor; the “bar” set at demanding yet appropriate level
  - Considerable functionality evident, but performance a concern
  - Terminate all efforts associated with EOSDIS Alternative Implementation Plan (EAIP)
- **All functions associated with AM-1 and Landsat-7 at-launch capability requirements demonstrated**
  - Five of forty-six original criteria highlighted for further efforts
  - Two criteria classified as “potentially troublesome”: Concurrent execution of MODIS and ASTER PGE’s and temporary workaround for ASTER on-demand processing with backward chaining
  - Concurrent PGE executions now demonstrated; plans in place to address all specific concerns

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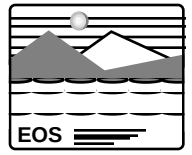
EOSDIS Review Group (ERG) Findings



- **Significant performance enhancements mandatory**
  - "If ECS had to field a system (today) it would not be able to meet the at-launch requirements"
  - Demonstration designed around a single thread configuration capable of running one string of programs at a time; no performance tuning has been attempted.
  - Planned changes to accommodate required performance improvements identified
- **Provide "early as possible" deployment of the system to the field**

  Project Actions:
  - Incremental system capabilities "system drops" planned
  - Increased training available to IT and DAAC personnel at both ECS contractor facility and GSFC DAAC
  - Series of one-on-one's with IT's and DAAC's currently underway to fully validate ECS development priorities and examine options to enhance existing non-ECS science data processing, archiving, and distribution capabilities

ESDIS

Criteria Support in Demo

EOS

Criteria	Support	Scenarios	Comments
1. External Interfaces			
1.1 Demonstrate ASTER DAR submission.	✓	ASTER	
1.2.1 Show that the system can support the EDOS PDS interface protocol.	✓	Prior	Used EDOS PDS for MOD00 data. Results presented.
1.2.2 Show that the system can support the EDOS EDS interface protocol.	✓	ASTER	Used EDOS EDS for AST00 data.
1.2.3 Show that the system can support the LPS interface protocol.	✓	L7	Used LPS simulator from L7.
1.2.4 Show that the system can support the IAS interface protocols.	✓	L7	
1.3 Show that the system can support expedited data access to ASTER L0.	✓	ASTER	Used EDOS provided AST00.
2. Data Ingest			
2.1.1 Demonstrate ingest of AM-1 Level 0 data.	✓	ASTER, Prior	Used EDOS provided L0 data (AST00 and MOD00).
2.1.2 Demonstrate ingest of ASTER L1A and L1B data from D3 tape.	✓	Prior	Used ASTER GDS provided data. Results presented.
2.1.3 Demonstrate ingest of Landsat-7 L0R.	✓	L7	Used LPS simulator & L7 provided data.
2.1.4 Demonstrate ingest of IAS calibration parameter files.	✓	L7	Used L7 provided data.
2.2 The system must support > 50% of its at-launch (3.0 Mbytes/s) ingest rates.	✓	Prior	Achieved 3.0 MBytes/s. Results presented.
3. Data Production			
3.1.1 Show that archived data can be used as input to PGE execution.	✓	ASTER, MODIS	Used IT provided PGEs and data.
3.1.2 Show that archived ancillary data can be used as input to PGE execution.	✓	ASTER	Used ASTER provided data.
3.2 Show that the insertion of data into the archive can cause the automatic scheduling of PGE executions.	✓	ASTER, MODIS	Used IT provided PGEs and data.
3.3 Show concurrent execution of PGEs that have different resource needs, preferably using a mix of ASTER and MODIS PGEs.	✓	MODIS	Concurrent execution of MODIS PGE02. Additional verification will be provided in ECS test program.
3.4.1 Demonstrate that the system can support the Advanced Temporal production rule.	✓	MODIS	Used to execute MODIS PGE02.

ESDIS

Criteria Support in Demo

EOS

Criteria	Support	Scenarios	Comments
3.4.2 Demonstrate that the system can support the Metadata-based Activation production rule.	-	None	Planned for SSI&T when actual PGEs are available.
3.4.3 Demonstrate that the system can support the Orbit-based Activation production rule.	-	None	Planned for SSI&T when actual PGEs are available.
3.4.4 Demonstrate that the system can support the Alternate Inputs (including timers and use of ancillary data) production rule.	-	None	Planned for SSI&T when actual PGEs are available.
3.4.5 Demonstrate that the system can support the boundary and period specifications production rule.	✓	ASTER, MODIS	Used for all IT provided PGEs.
3.5 Show that the system can support multiple runs of the same PGE.	-	RC11	Not scheduled for completion prior to demo. Will be available for SSI&T.
3.6 Show that the output of one PGE can be used as the input of another PGE, preferably using an ASTER or MODIS end-to-end processing thread	✓	ASTER, MODIS	Used IT provided PGEs and data.
3.7 Show that the system can handle failed PGE executions.	✓	MODIS	Fail instance of MODIS PGE08.
3.8.1 Demonstrate support for converting AM-1 ancillary packets into orbit files.	✓	Prior	Pre-demo activity. Results presented.
3.8.2 Demonstrate support for converting AM-1 ancillary packets into attitude files.	✓	Prior	Pre-demo activity. Results presented.
3.9 Demonstrate the B.0' workaround for ASTER on-demand processing and backward chaining.	✓	ASTER	Used ASTER provided data and PGEs. Additional verification will be provided in ECS test program.
4. Data Archive			
4.1.1 Show that ingested data are catalogued and archived so that they can be located and retrieved for production and distribution.	✓	All	Used IT, L7 and EDOS provided data.
4.1.2 Show that data resulting from production are catalogued and archived so that they can be located and retrieved for production and distribution.	✓	ASTER, MODIS	Used output from IT provided PGEs.
5. Data Access and QA			
5.1.1 Demonstrate that an SCF can acquire and view production results to perform QA.	✓	ASTER	Used output from IT provided PGEs.
5.1.2 Demonstrate that a DAAC operator can update QA metadata on behalf of the SCF.	✓	ASTER	

ESDIS

Criteria Support in Demo

EOS

Criteria	Support	Scenarios	Comments
5.2.1 Show that the system supports user registration.	✓	L7	
5.2.2 Show that the system supports user login.	✓	All	
5.3.1 Show that the B.0' Version 0-like Client allows a user to perform directory searches.	✓	L7	
5.3.2 Show that the B.0' Version 0-like Client allows a user to perform inventory searches.	✓	All	
5.4.1 Show that a user can order any archived data to be delivered electronically via FTP.	✓	L7	Used L7 provided data.
5.4.2 Show that a user can order any archived data to be delivered through mail via 8mm tape.	✓	L7	Used L7 provided data.
5.5 Show that the system supports user orders for Landsat-7 scene data, which is generated on-the-fly using subsetting services	✓	L7	Used L7 provided data.
5.6.1 Show that an operator can submit subscriptions on behalf of a user.	✓	ASTER	Additional verification will be provided in ECS test program.
5.6.2 Show that an operator can submit standing orders on behalf of a user.	✓	All	Additional verification will be provided in ECS test program.
5.7.1 Show that the system can distribute data in response to a subscription order electronically via FTP.	✓	ASTER, MODIS	Used IT provided data.
5.7.2 Show that the system can distribute data in response to a client order electronically via FTP.	✓	L7	Used L7 provided data.
5.7.3 Show that the system can distribute data in response to subscription order via 8mm tape.	✓	L7	Used L7 provided data.
5.7.4 Show that the system can distribute data in response to client order via 8mm tape.	✓	L7	Used L7 provided data.
5.8 Demonstrate that operations staff can obtain order status from the system.	✓	L7	
5.9 Show that the system can support simultaneous orders from multiple users.	✓	L7	Concurrent CPF and scene order using L7 provided data. Additional verification will be provided in ECS test program.
5.10 Show that a user can use EOSView to view data that are distributed to them.	✓	All	Used L7 provided data and ouput from IT provided PGEs.