

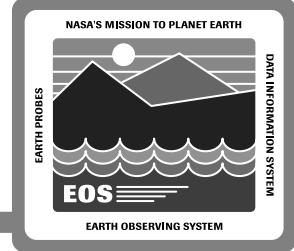
---

# Day-in-the-Life with Release A

## Stan Dunn

---

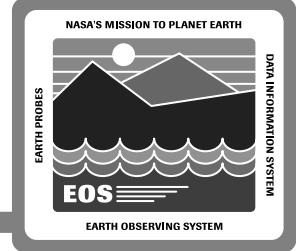
16 February 1995



# Objective

To validate, through the use of Day-in-the-Life ops scenarios, the operability and usability of the ECS Release-A system to accomplish:

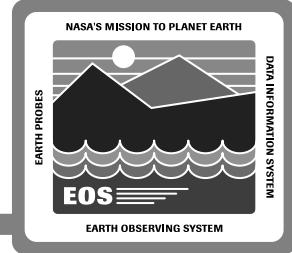
- TRMM science data production, distribution and access
- AM-1 algorithm I&T and interface testing
- V0 migration and interoperability



# Agenda

- **What have we done to get here**
- **Set the stage for day-in-the-life-of-operations**
  - **System schedule, missions and activities**
  - **Operational roles and coverage**
- **MSFC ECS operations**
- **GSFC ECS operations**
- **EDC ECS support**
- **LaRC ECS operations**
- **Day-in-the-life-of-operations at LaRC**
- **What's next**

# Ops Telecons



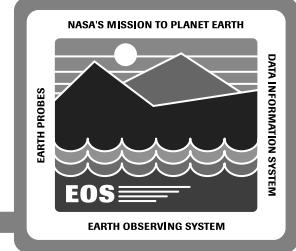
## Objectives:

- Involve ops community in understanding ECS design and concept of operations from operator's point of view
- Allow ops community influence on evolving design
- Have details to support staffing and facility projections

## Status:

- 12 telecons to date (9/15/94 - 1/26/95)
- Topics: planning and scheduling of ops support activities; systems admin, ops readiness, performance mgt; I&T of science S/W; ingest/ archive/distribution operations; science data production planning; fault, performance, security and accountability mgt; and science data production
- Future topics: configuration mgt; network mgt; data server mgt; schema & data dictionary mgt; information search and access; user support tools; accounting and billing

# Ops Concepts and Scenario Tracking



ECS contractor in process of generating a new Ops Concept document (DID 604)

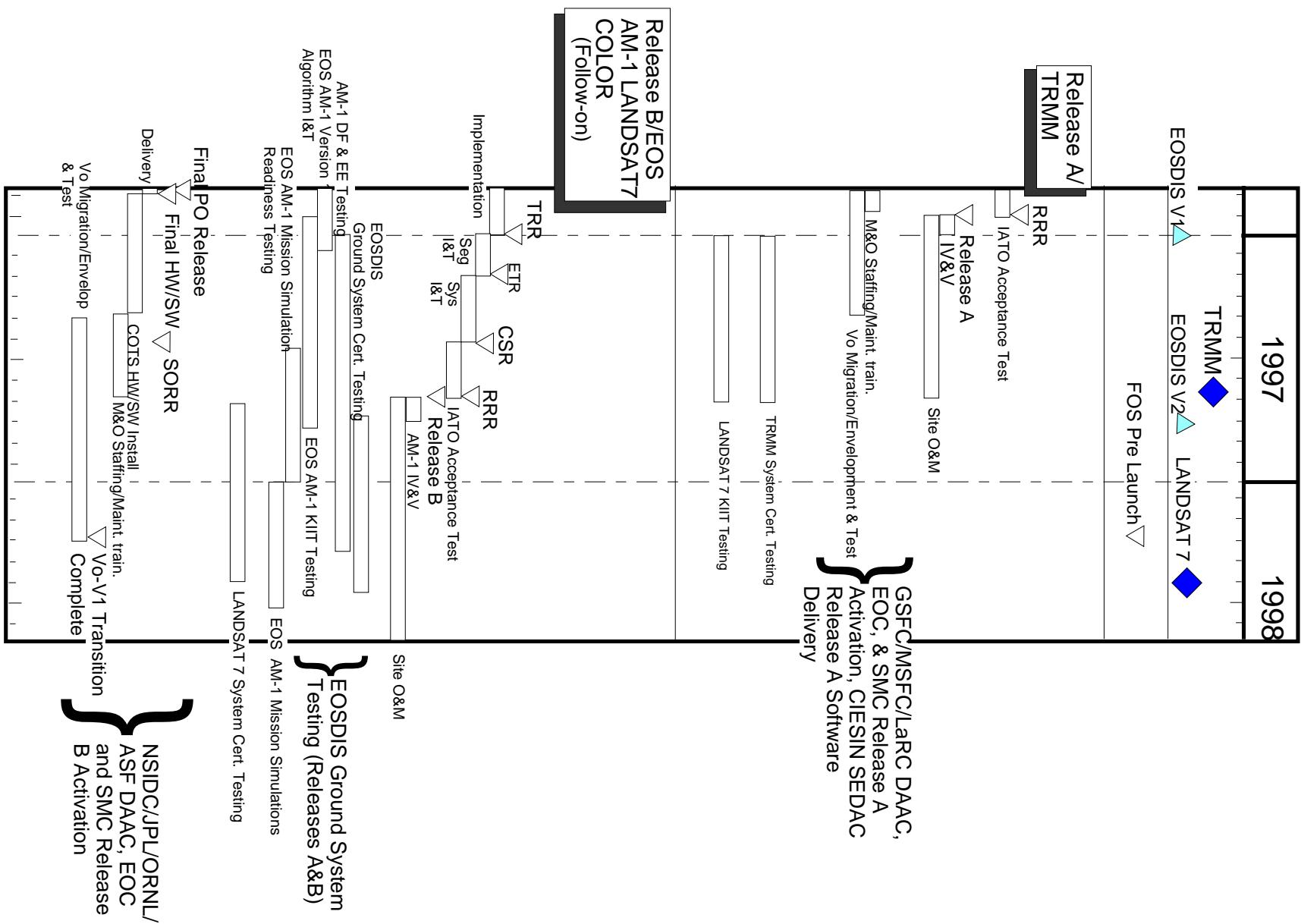
- Will be at a high level and not release dependent
- DAAC comments from previous review being evaluated for inclusion in ops concepts
- Intent is to have a concept that will not change on a regular basis

ECS contractor responsible for generating set of operational scenarios on a release basis

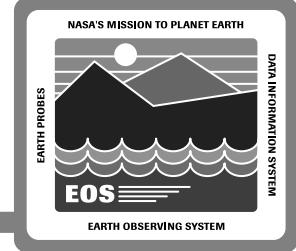
- Scenarios to cover ECS systems starting with Release A
- Placed under change control
- Coordinated with ops sites

# ECS Level 1 Master Development Schedule

## November 1994



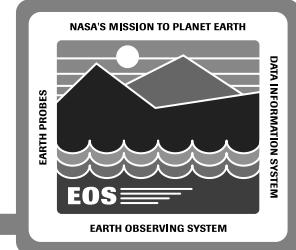
# Relationship Between Design Evaluation and Staffing



- Goals are to insure that 1) design allows flexibility in defining ops positions and 2) has sufficient automation and/or operability to support current staffing projections
- Operational roles are defined to support ops scenario analysis and discussion
- Staffing analysis requires the application of these roles into real people for the purposes of establishing a staffing budget only

# ECS DAAC Roles

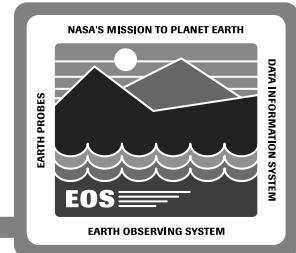
## What not Who



- User services
  - Support user with data expertise
  - Generate and maintain data interface
- Data ingest
  - Monitor electronic
  - Handle media
- Production planning
- Resource planning
- Production monitoring and control
- Archive management
- Data distribution
  - Monitor electronic
  - Handle media

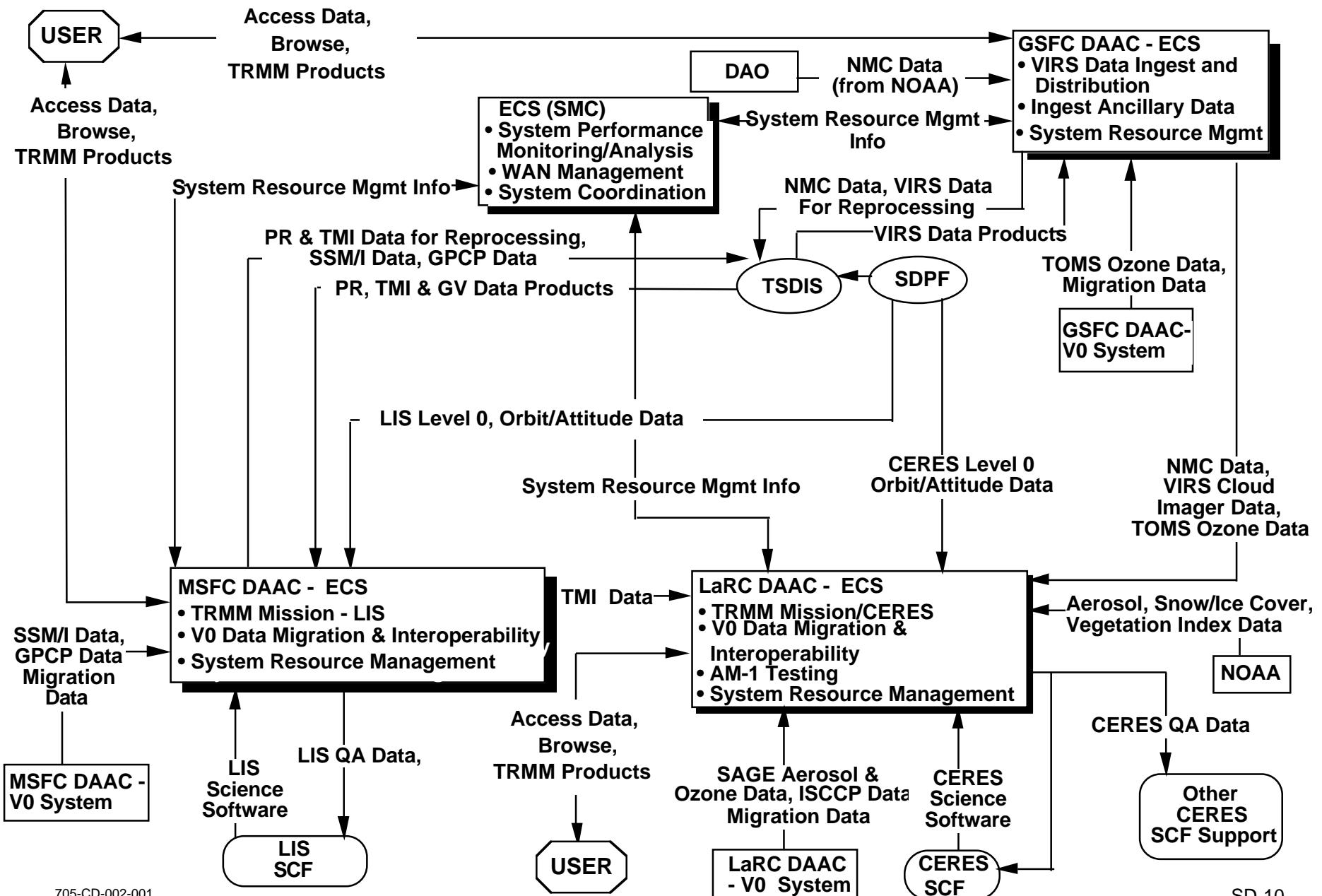
# ECS DAAC Roles

## What not Who (cont.)

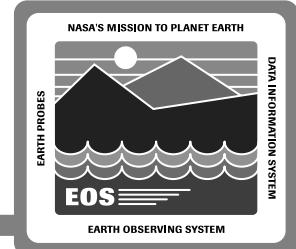


- Resource management
- Algorithm integration support
- Data base maintenance
- System and performance analysis
- Security
- Accounting and billing
- Sustaining engineering
- S/W and H/W maintenance
- Configuration management (change control)
- Testing, training, property management, integrated logistics support, library, administration

# TRMM Mission Key Interfaces - GSFC, LaRC & MSFC



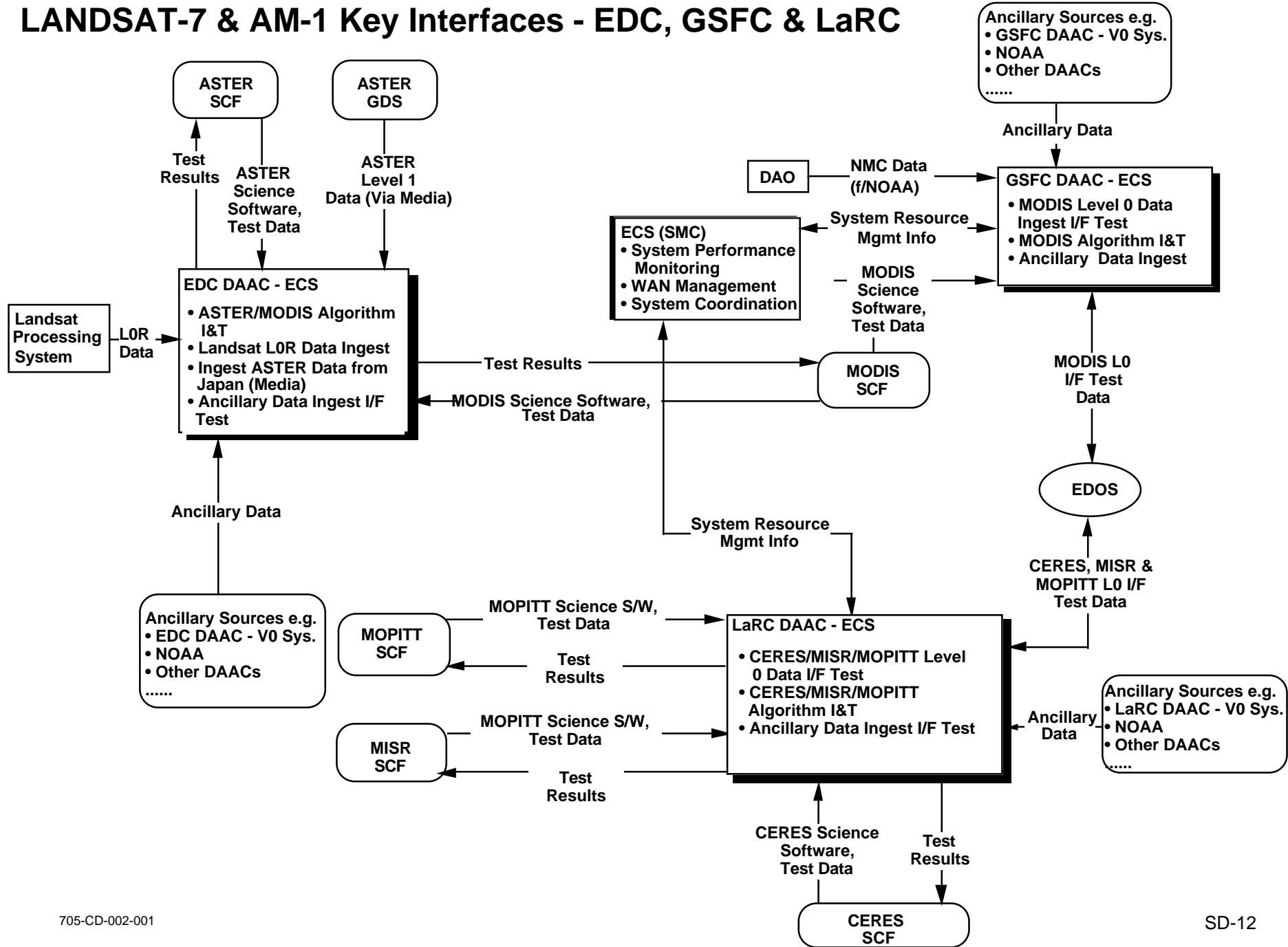
# TRMM Mission



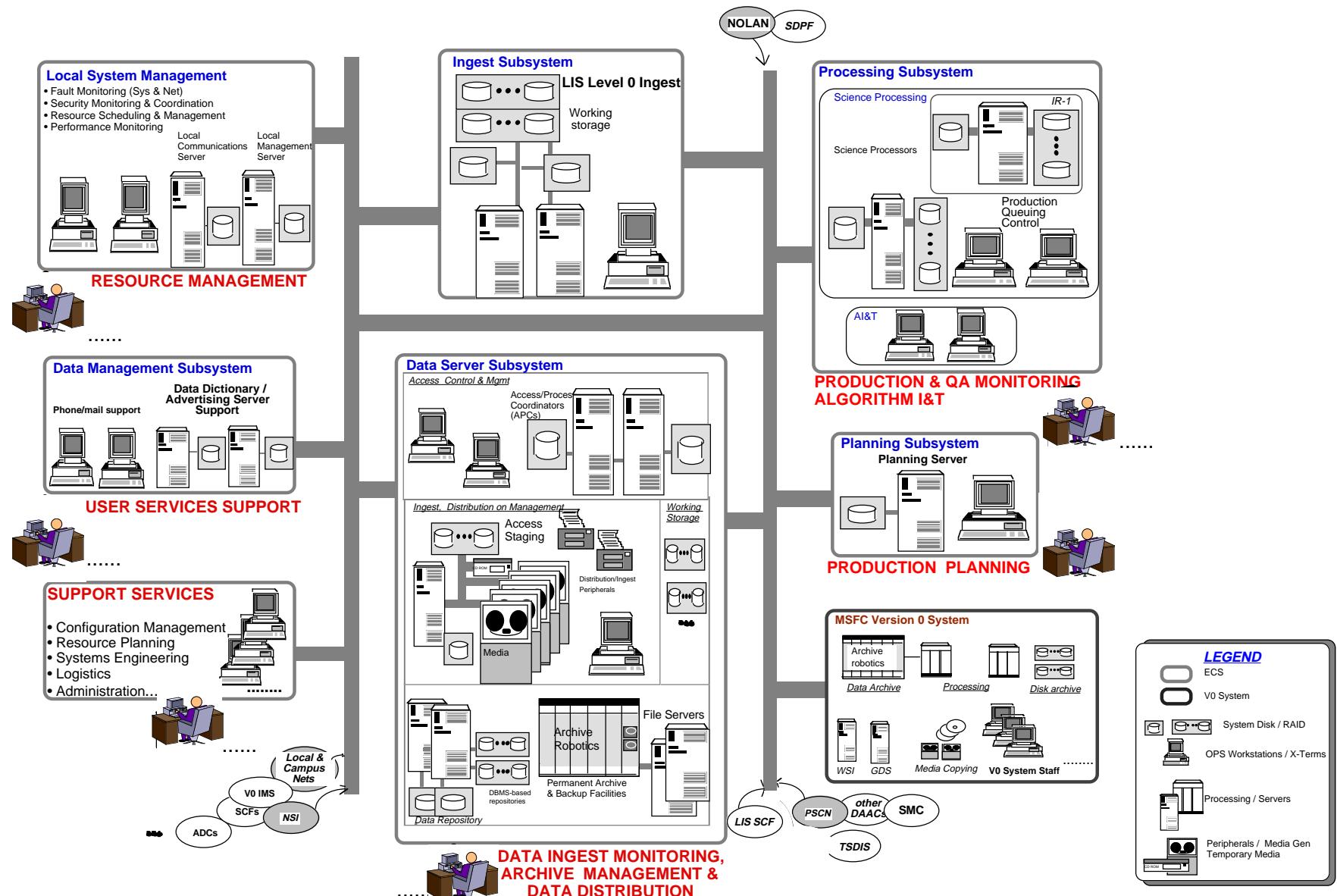
	MSFC	LaRC	GSFC
• Peak GFLOPs	.25GFLOPs	3.6GFLOPs	4.2GFLOPs*
• Fielded Media Capacity	4TB	3TB	6TB
• Distribution RAID Capacity	10GB	10GB	10GB
• Working Storage RAID Capacity	30GB	50GB	30GB
• DBMS RAID Capacity	5B	13GB	45GB
• Media Distribution @1X	15GB/day	11GB/day	1.5GB/day

\* Supports AM-1 Algorithm I&T

# LANDSAT-7 & AM-1 Key Interfaces - EDC, GSFC & LaRC

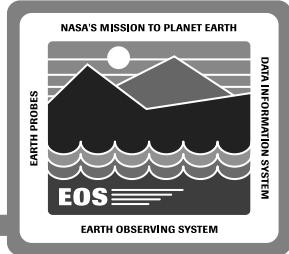


# MSFC DAAC - ECS OPS FUNCTIONALITY



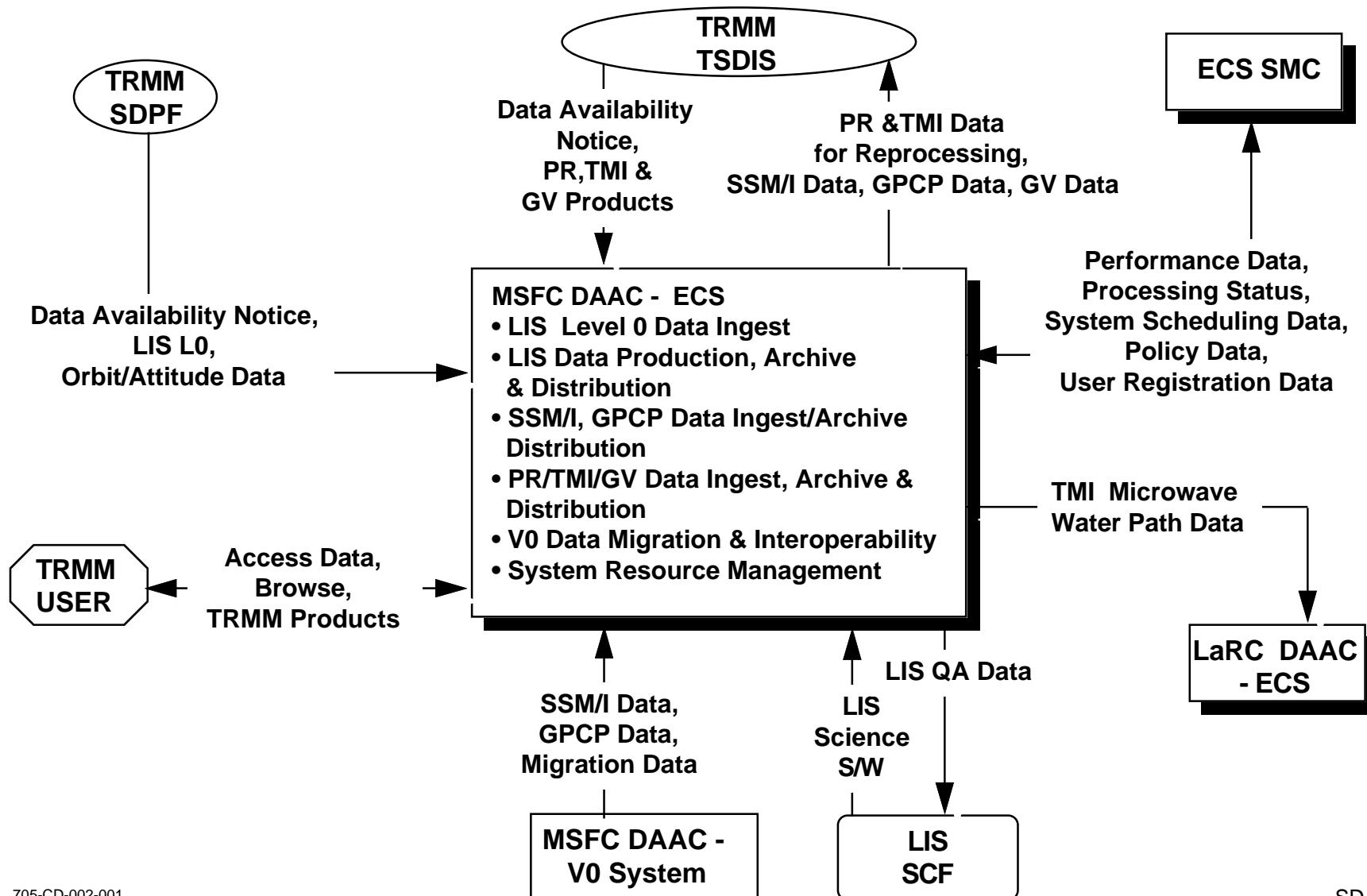
MSFC DAAC Activities	1996												1997												1998			
	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Fe													
ECS Milestones		Rel A RRR							Rel B CSR				Rel B RRR															
MSFC ECS Staffing Hrs	8 hrs/day, Mon - Fri												8 hrs/day, 7 days/week (User Support 16 hrs/day, 7 days/week)															
TRMM																												
Rel A Pre-Ops Activities	IV&V	◇ DAAC Test	◇																									
Sci S/W I&T	◇ LIS V2	◇																										
Ops	Key I/F Testing			System & Operational Readiness Testing												LIS Processing; LIS, PR, TMI ,GV, SSM/I Archive												
Rel B Pre-Ops Activities				Prelim	◇ I&T	◇	◇	I&AT	◇ Sys Test	◇ IV&V	◇ DAAC Test	△																
V0 - ECS Data Migration	◇	SSM/I Pathfinder; TOVS Pathfinder; SMMR Pathfinder																										
V0 Ops																												
SMC Staffing Hrs	24 hrs/day, Mon - Fri												24 hrs/day, 7 days/week															

# MSFC ECS Related Mission and Operations Activities

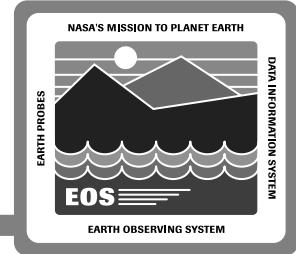


- LIS data ingest, production, archive and distribution
- SSM/I data ingest, archive and distribution
- PR/TMI/GV data ingest, archive and distribution
- V0 data migration, archive and distribution
- LIS algorithm updates integration and test
- Transition to Release B baseline
- Above activities parallel to V0 operations

# TRMM Mission (Release A) Key Interfaces: MSFC DAAC-ECS



# TRMM Mission (Release A) Key Interfaces: MSFC DAAC-ECS



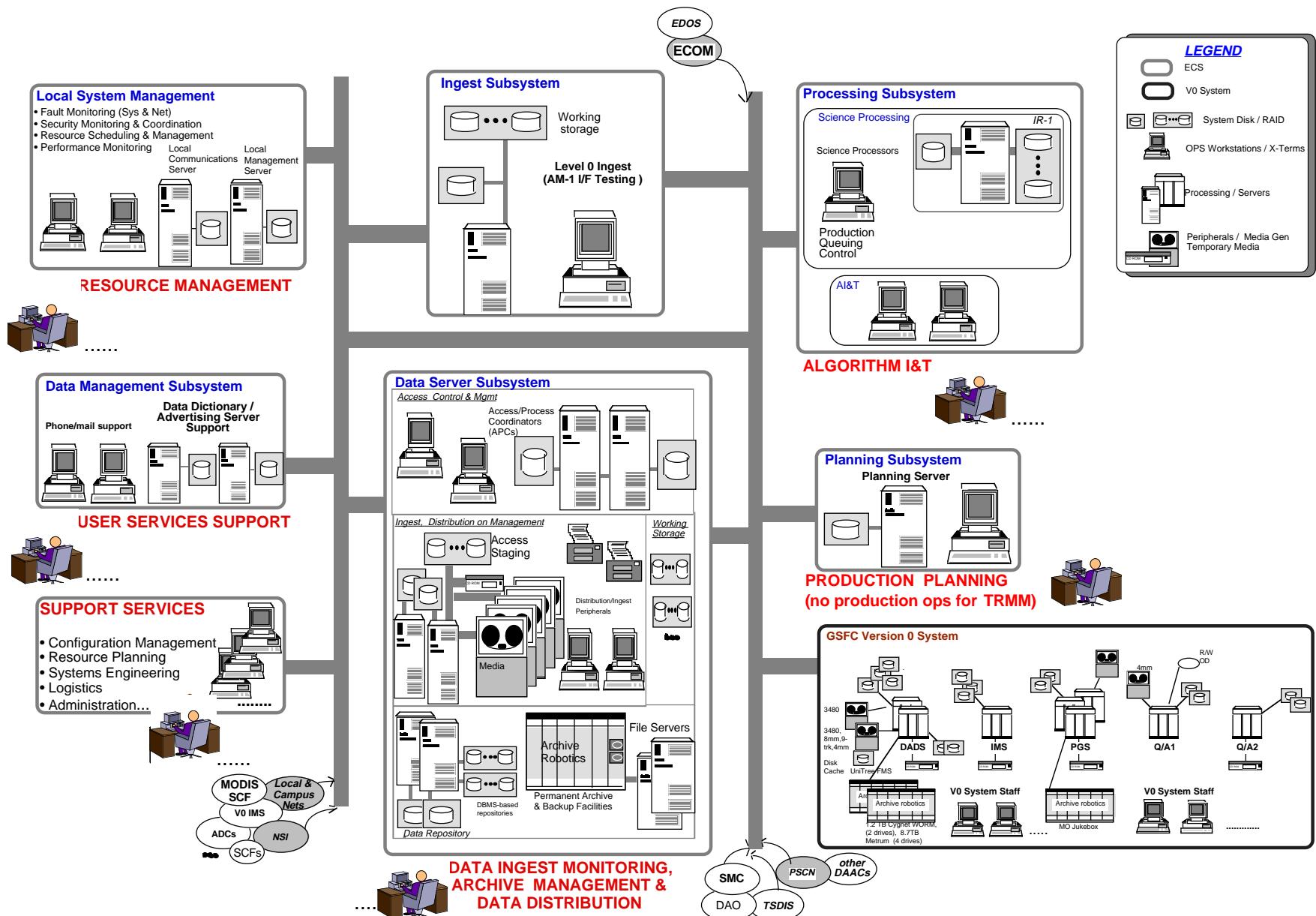
## SDPF:

- LIS data is received once per day within 24 hours of last acq. session
- SDPF notifies LaRC of availability of LIS Level 0
- MSFC “pulls” LIS Level 0 data from SDPF, i.e., FTP
- MSFC acknowledges successful receipt of data
- SDPF retains L0 data for 5 days
- SDPF retains LIS raw data for 2 years

## TSDIS:

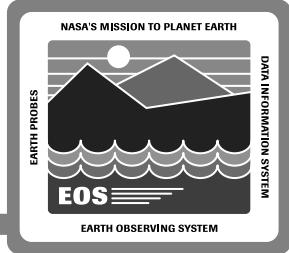
- MSFC “pulls” the data from TSDIS
- TSDIS provides schedule/status of product delivery
- MSFC pushes 2 days worth of PR, TMI, GV, GPCP data & SSM/I anc. to TSDIS for reprocessing DAILY
- MSFC inputs 2 days worth of product data from TSDIS DAILY

# GSFC DAAC - ECS OPS FUNCTIONALITY



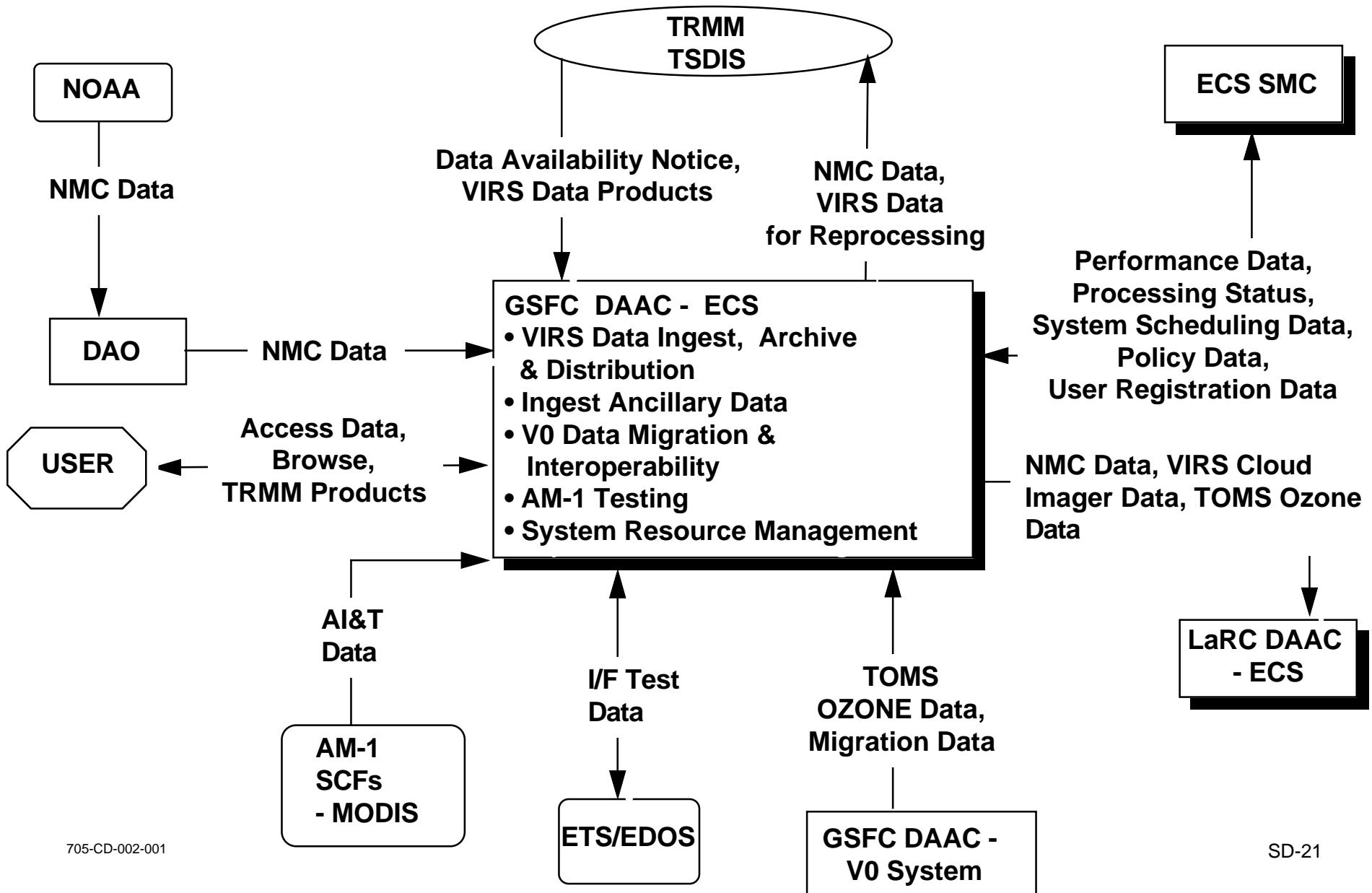
GSFC DAAC Activities	1996												1997												1998			
	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Fe													
ECS Milestones													Rel A RRR				Rel B CSR			TRMM Launch	Rel B RRR							
GSFC ECS Staffing Hrs													8 hrs/day, Mon - Fri; 1/2 day Sat			+ 1 person on 2nd & 3rd shifts M - F									16 hrs/day, 7 days/week			
TRMM																												
Rel A Pre-Ops Activities													IV&V ◇ DAAC Test ◇															
Ops													Key I/F Testing ◇				System & Operational Readiness Testing ◇			VIRS Archiving ◇								
AM-1																												
Rel B Pre-Ops Activities													◇ H/W Install ◇				Prelim I&T ◇			◇ I&AT ◇	◇ Sys Test ◇	◇ IV&V ◇ DAAC Test ◇						
Sci S/W I&T													◇ MODIS V1 ◇				(Note: DAO & AIRS/AMSU/MHS I&T schedules are still TBD.)									◇ MODIS V2 ◇		
Ops																	AM-1 Key I/F Testing ◇			◇ System Testing & Operational Readiness								
V0 - ECS Data Migration													◇				TOMS-nimbus 7; CZCS L1; AVHRR Pathfinder											
V0 Ops																												
SMC Staffing Hrs													24 hrs/day, Mon - Fri							24 hrs/day, 7 days/week								

# GSFC ECS Related Mission and Operations Activities

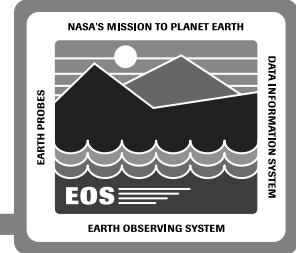


- VIRS data ingest, archive and distribution
- MODIS algorithm integration and test
- AM-1 interface test support
- V0 data migration, archive and distribution
- Transition to Release B baseline
- Above activities parallel to V0 operations

# TRMM Mission (Release A) Key Interfaces: GSFC DAAC-ECS



# TRMM Mission (Release A) Key Interfaces: GSFC DAAC-ECS



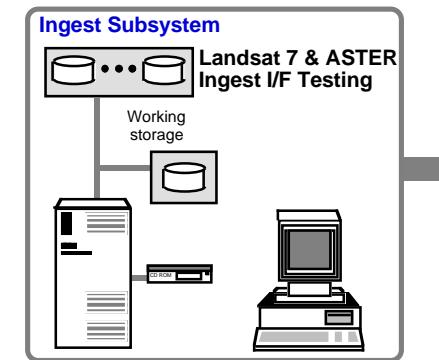
## TSDIS: (NO SDPF I/F)

- TSDIS provides schedule/status of product delivery
- GSFC “pushes” 2 days worth of VIRS, GPCP data, NMC anc. to TSDIS for reprocessing DAILY
- GSFC “pulls” 2 days worth of VIRS data products from TSDIS DAILY

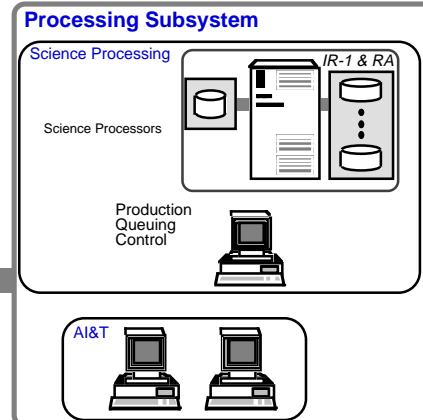
## AM-1:

- I/F testing with EDOS for AM-1
- AI&T for AM-1

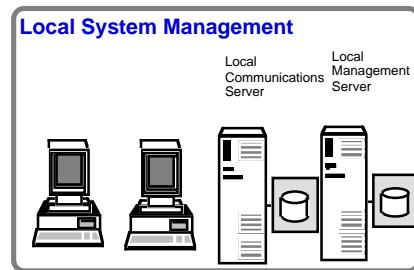
# EDC DAAC - ECS Ops Functionality



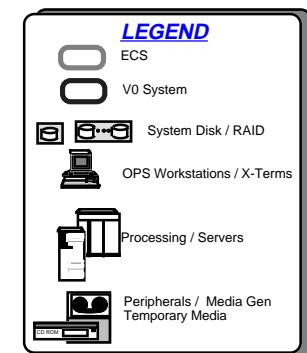
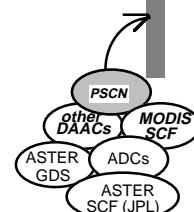
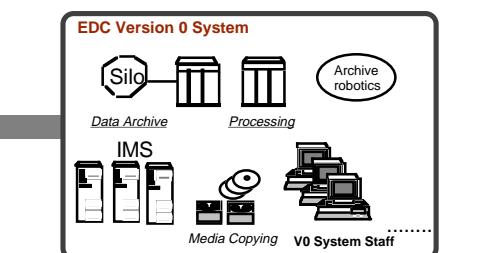
INGEST I/F TESTING SUPPORT



ALGORITHM I&T

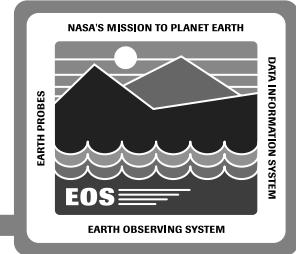


RESOURCE MANAGEMENT



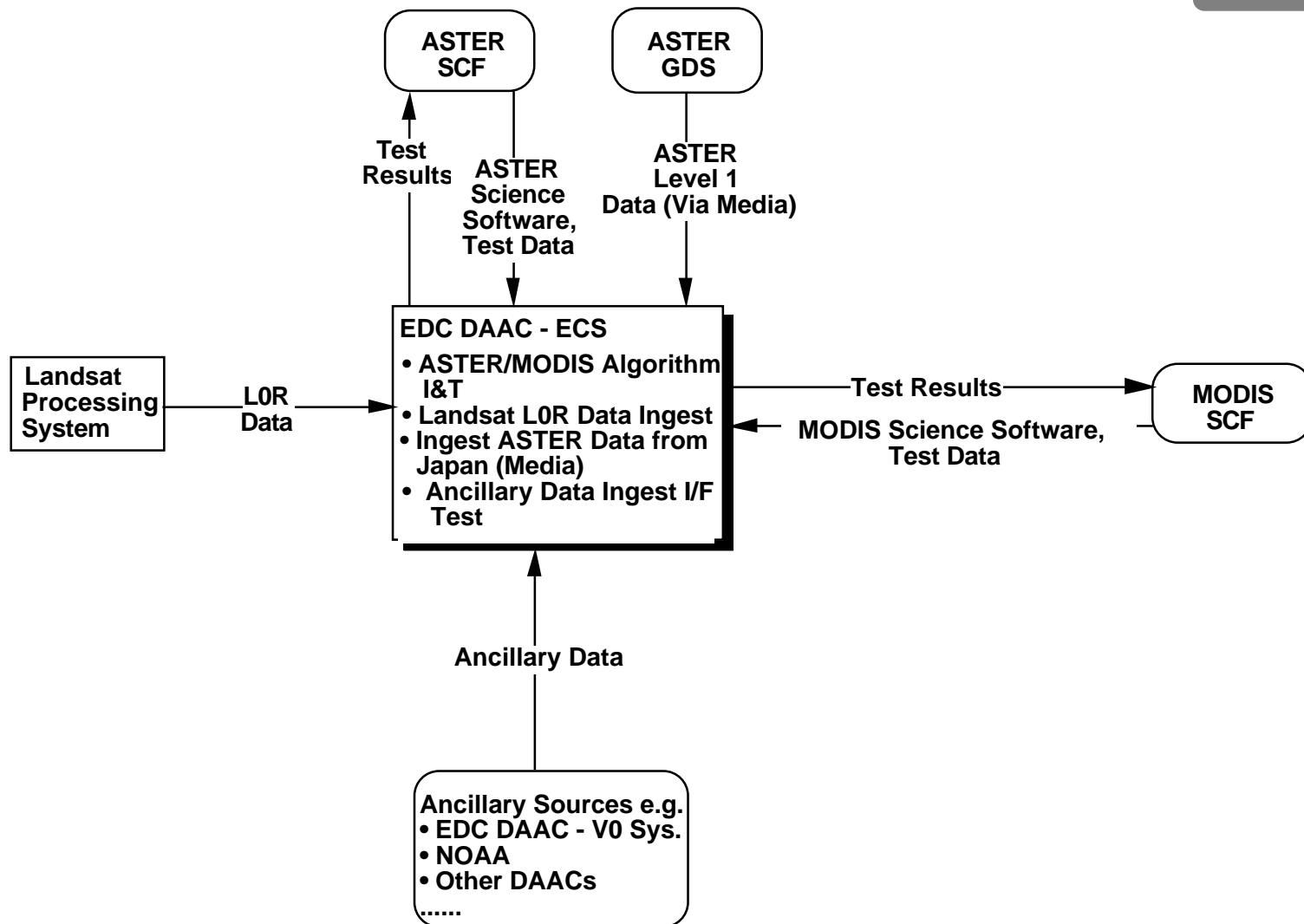
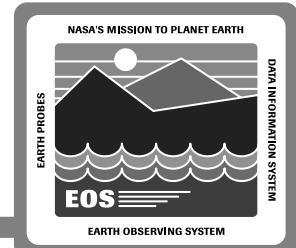
EDC DAAC Activities	1996			1997												1998			
	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Fe				
ECS Milestones																			
EDC ECS Staffing Hrs																			
AM-1, Landsat 7																			
Rel A Activities	IV&V	◇ DAAC Test	◇																
Sci S/W I&T	◇ ASTER V1	◇															◇ ASTER V2		
Ops		◇	AM-1 & Landsat 7 Key I/F Testing								◇	System & Operational Readiness Testing							
Rel B Activities	◇ H/W Install	◇				◇ Prelim I&T	◇	◇	I&AT		◇ Sys Test	◇ IV&V	◇ DAAC Test	◇					
V0 - ECS Data Migration														◇					
V0 Ops																			
SMC Staffing Hrs																			
	24 hrs/day, Mon - Fri												24 hrs/day, 7 days/week						

# EDC ECS Related Mission and Operations Activities

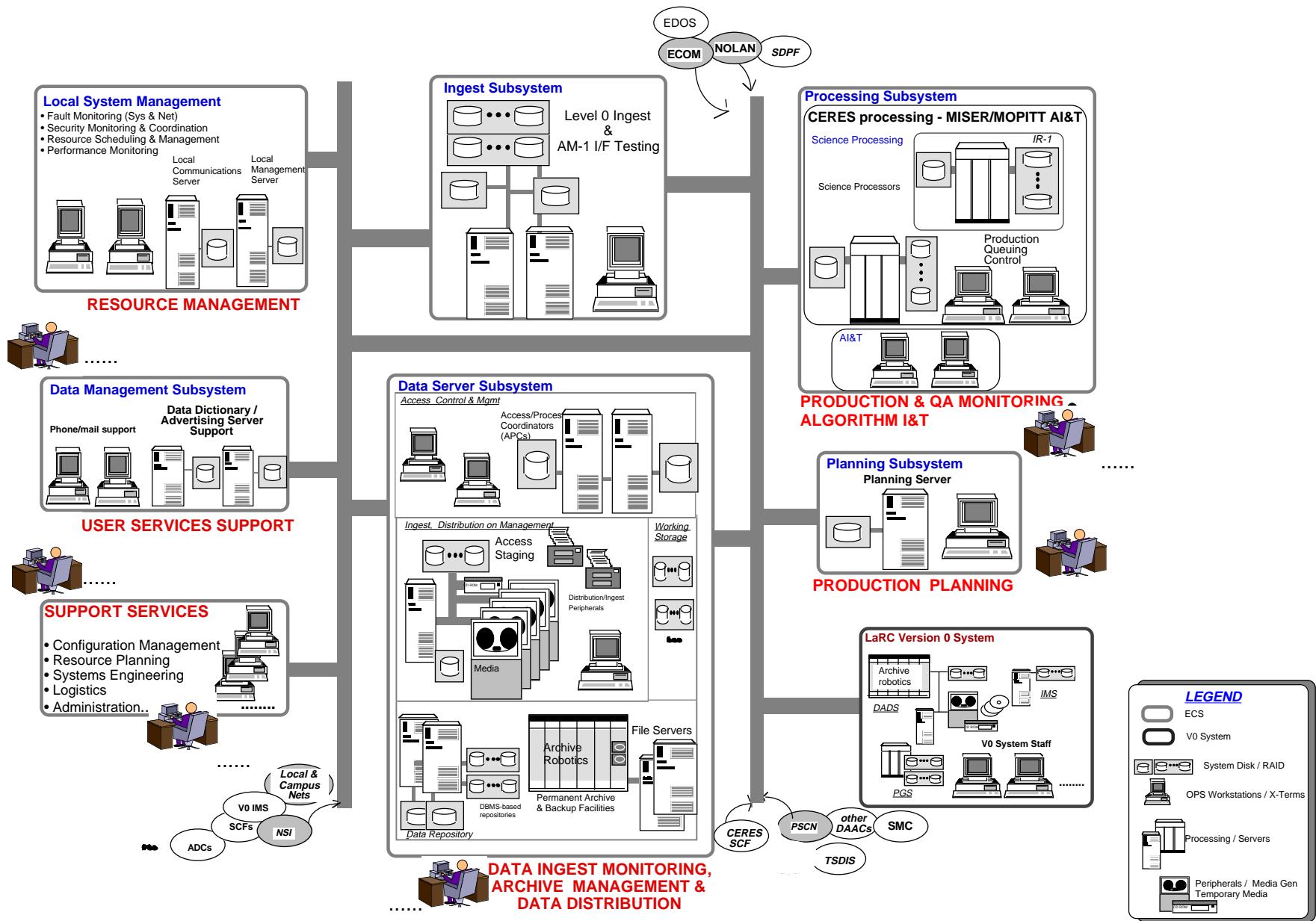


- ASTER algorithm integration and test
- AM-1 interface test support
  - External interfaces via V0 network and/or media
- Landsat 7 interface test support
  - Interfaces TBD
- V0 data migration, archive and distribution
- Transition to Release B baseline
- Above activities parallel to V0 operations

# Release A Key Interfaces: EDC DAAC-ECS

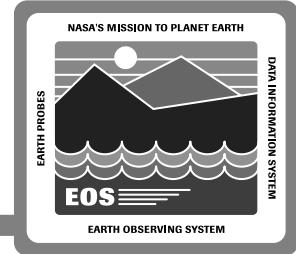


# LaRC DAAC - ECS OPS FUNCTIONALITY



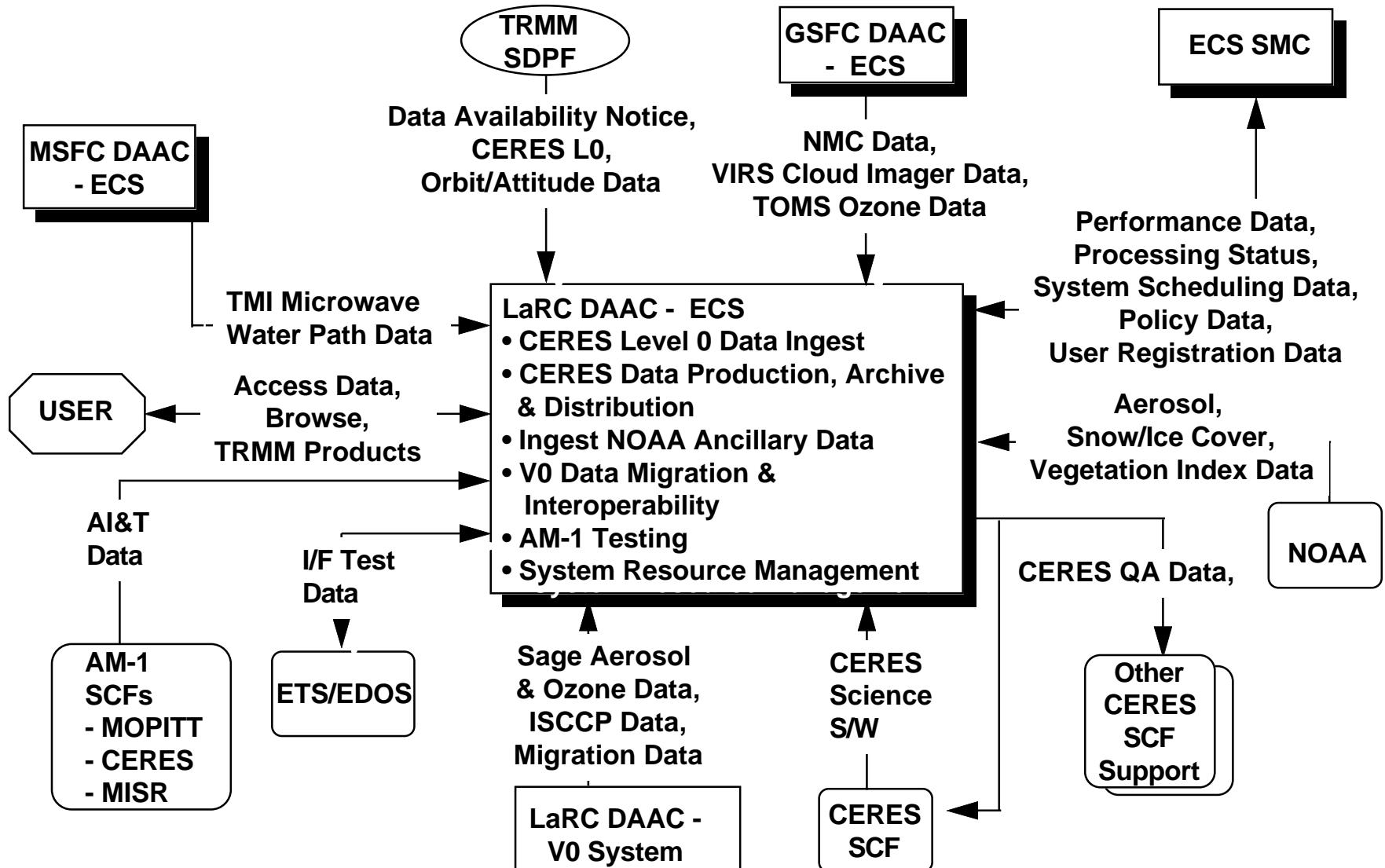
LaRC DAAC Activities	1996	1997												1998	
	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Fe
ECS Milestones	Rel A RRR						Rel B CSR				TRMM Launch	Rel B RRR			
LaRC ECS Staffing Hrs	8 hrs/day, Mon - Fri							16 hrs/day, 7 days/week							
TRMM															
Rel A Pre-Ops Activities	IV&V	◇ DAAC Test	◇												
Sci S/W I&T		◇ CERES V2	◇												
Ops	Key I/F Testing	◇	System & Operational Readiness Testing							◇	CERES Processing & Archiving				
AM-1		◇ H/W Install	◇				◇ Prelim I&T	◇	◇	I&AT	◇ Sys Test	◇ IV&V	◇ DAAC Test	△	
Rel B Pre-Ops Activities		◇ MISR V1	◇					◇ MOPITT V2	◇					◇ MISR V2	◇
Sci S/W I&T	(Note: ACRIM & SAGE III I&T schedules are still TBD)														
Ops		◇	AM-1 Key I/F Tests							◇	Sys & Ops Read. Testing				
V0 - ECS Data Migration	◇	ERBE; ISCCP D-X, D-1, D-2; SAGE II L2 and L3													
V0 Ops															
SMC Staffing Hrs	24 hrs/day, Mon - Fri							24 hrs/day, 7 days/week							

# LaRC ECS Related Mission and Operations Activities

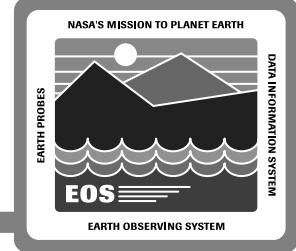


- CERES data ingest, production, archive and distribution
- MISR and MOPITT algorithm integration and test
- CERES algorithm updates integration and test
- AM-1 interface test support
- V0 data migration, archive and distribution
- Transition to Release B baseline
- Above activities parallel to V0 operations

# TRMM Mission (Release A) Key Interfaces: LaRC DAAC-ECS



# TRMM Mission (Release A) Key Interfaces: LaRC DAAC-ECS



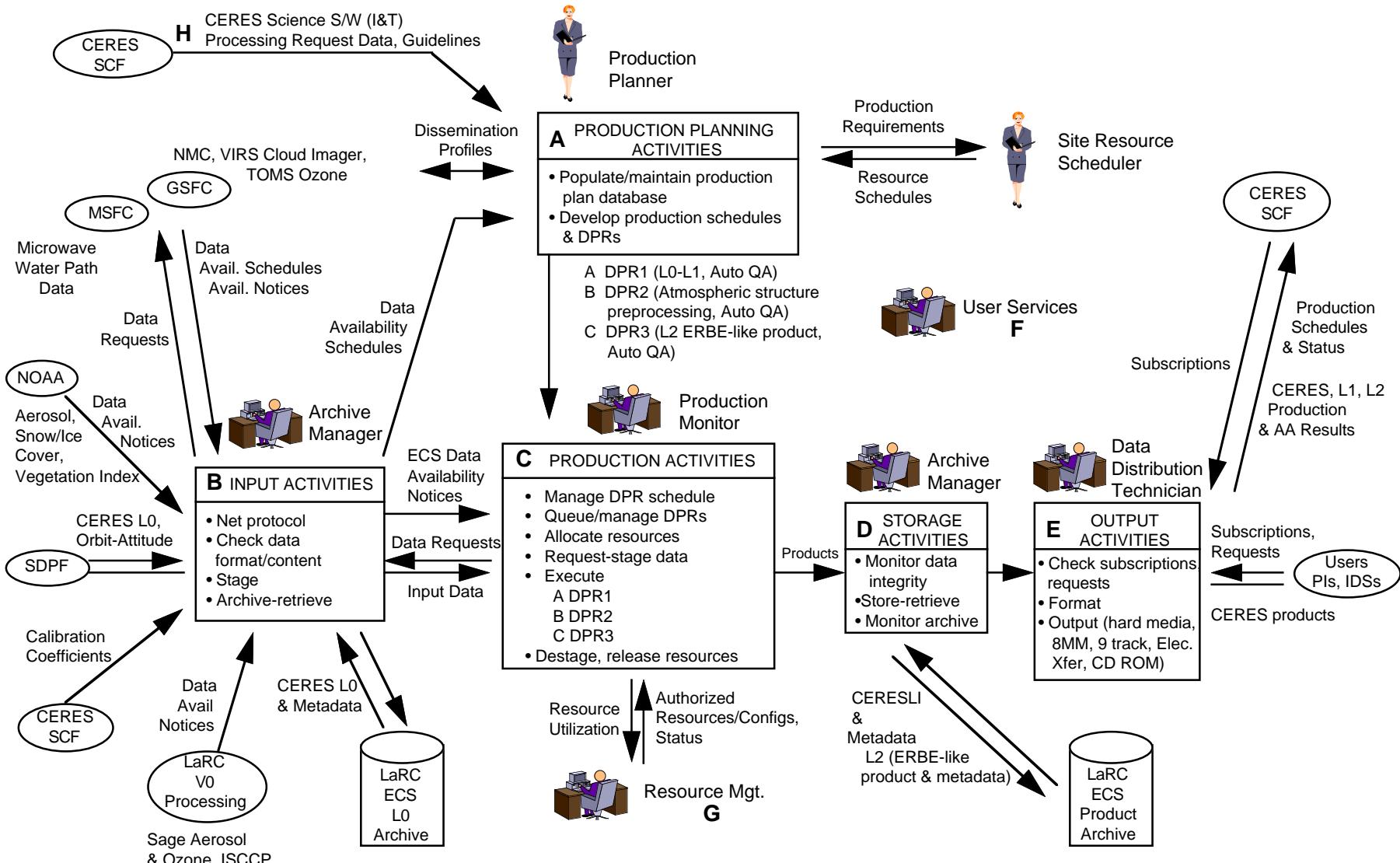
## SDPF: (NO TSDIS I/F)

- CERES data is received once per day within 24 hours of last acq. session
- SDPF notifies LaRC of availability of CERES
- LaRC “pulls” CERES data from SDPF, i.e., FTP
- LaRC acknowledges successful receipt of data
- SDPF retains L0 data for 5 days
- SDPF retains CERES raw data for 2 years

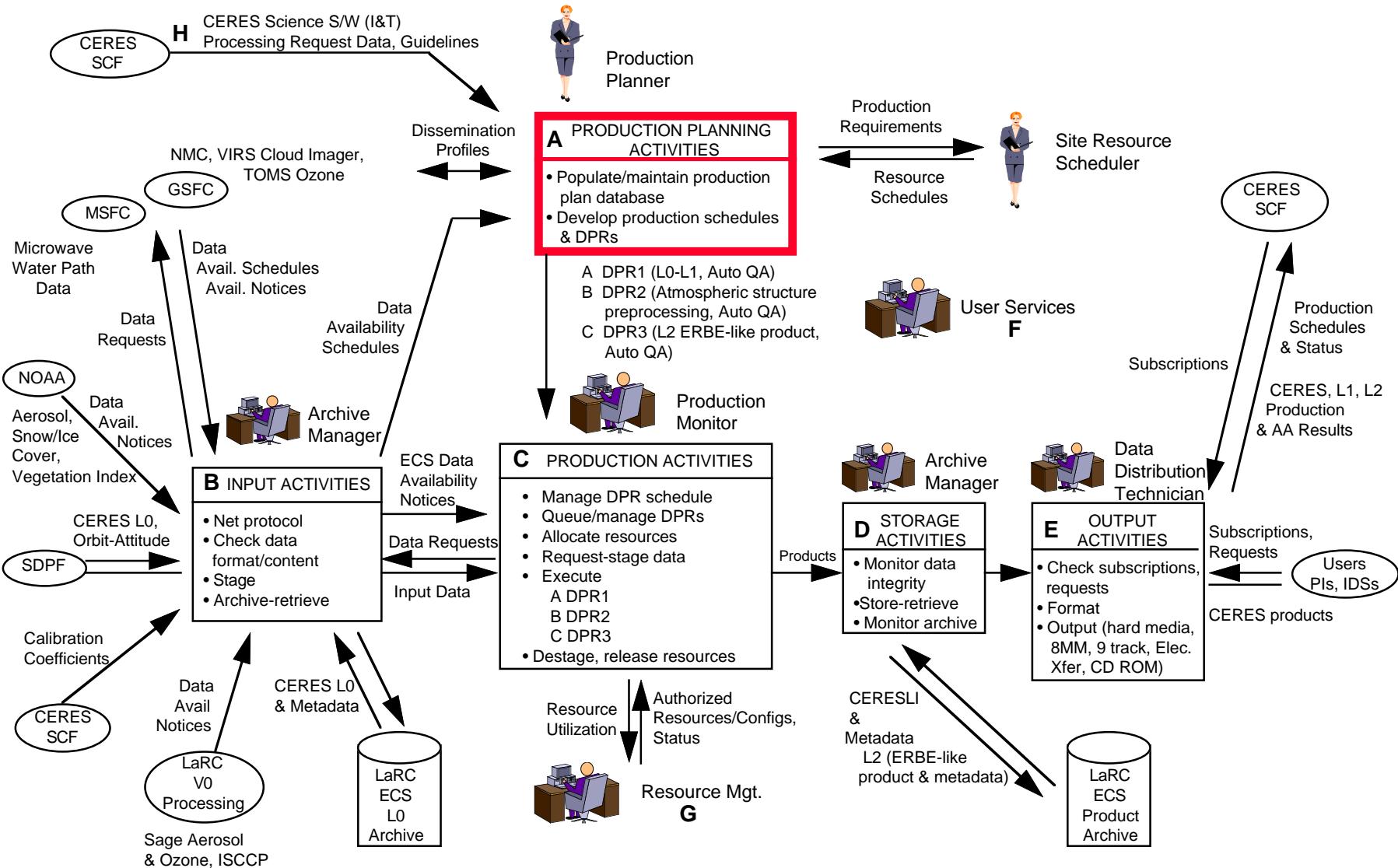
## AM-1:

- I/F testing with EDOS for AM-1
- AI&T for AM-1

# LaRC-CERES Science Data Operations

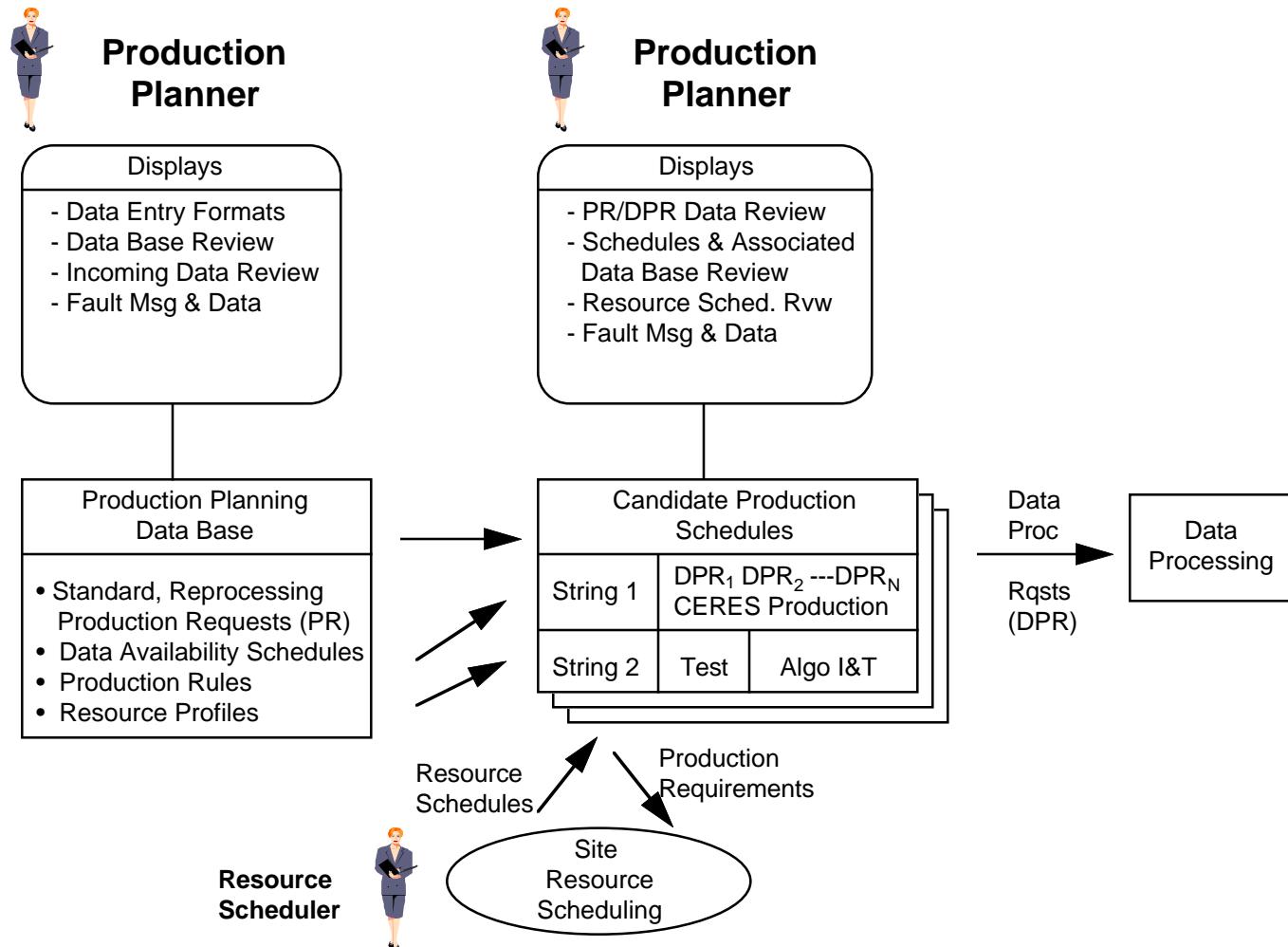
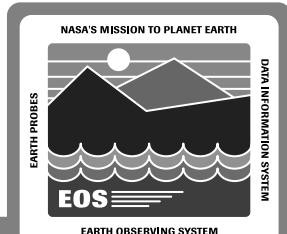


# LaRC-CERES Science Data Operations

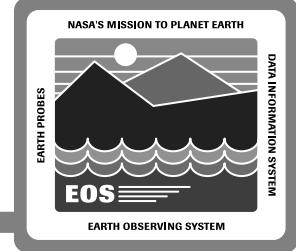


# CERES

## Production Planning Activities



# CERES Production Planning Activities



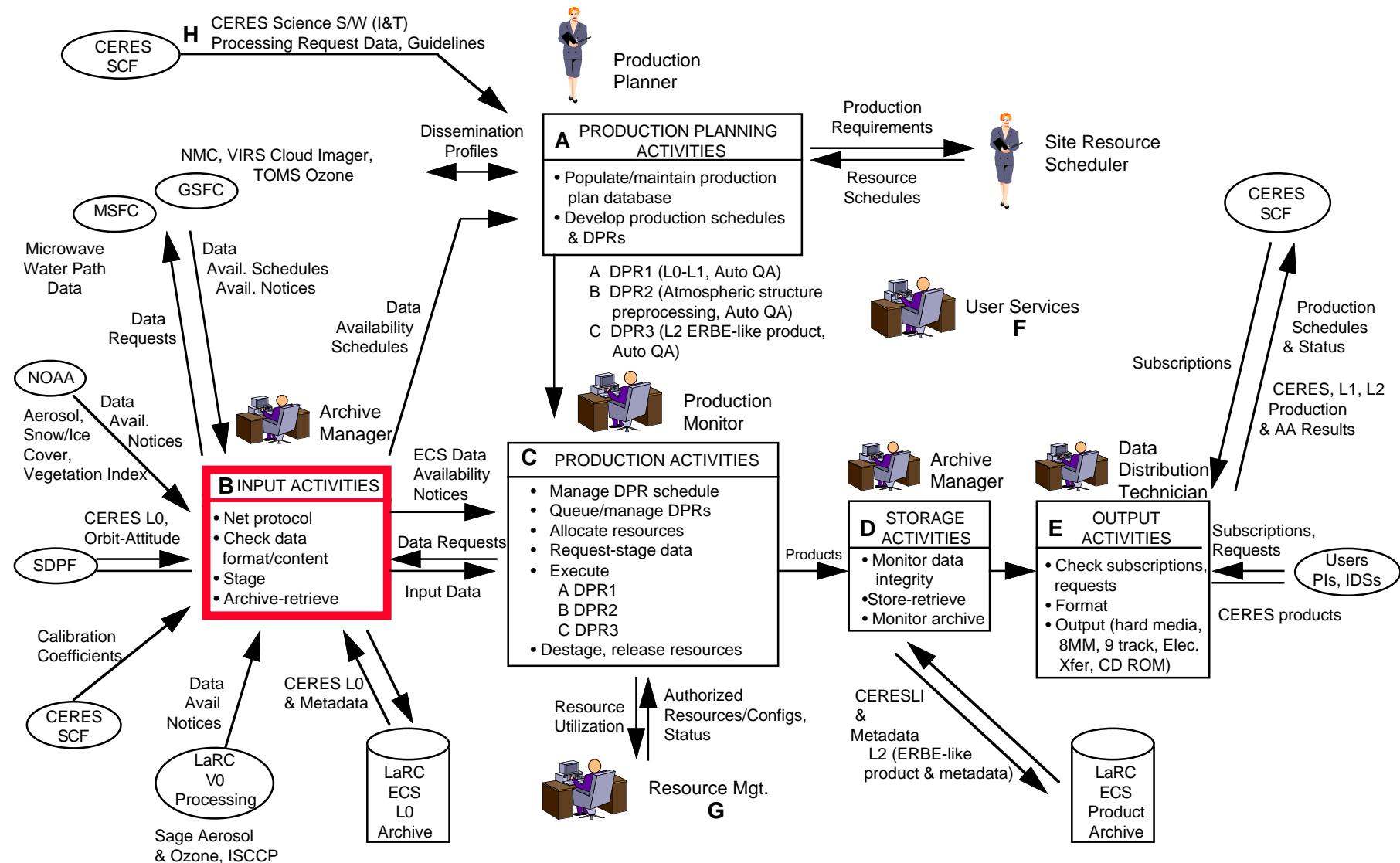
## Populate/Maintain Planning Data Base

- The Production Planner administers the planning data base containing CERES and other production requests, input data availability schedules (predicted), production rules/priorities and site processing resource configurations/characteristics

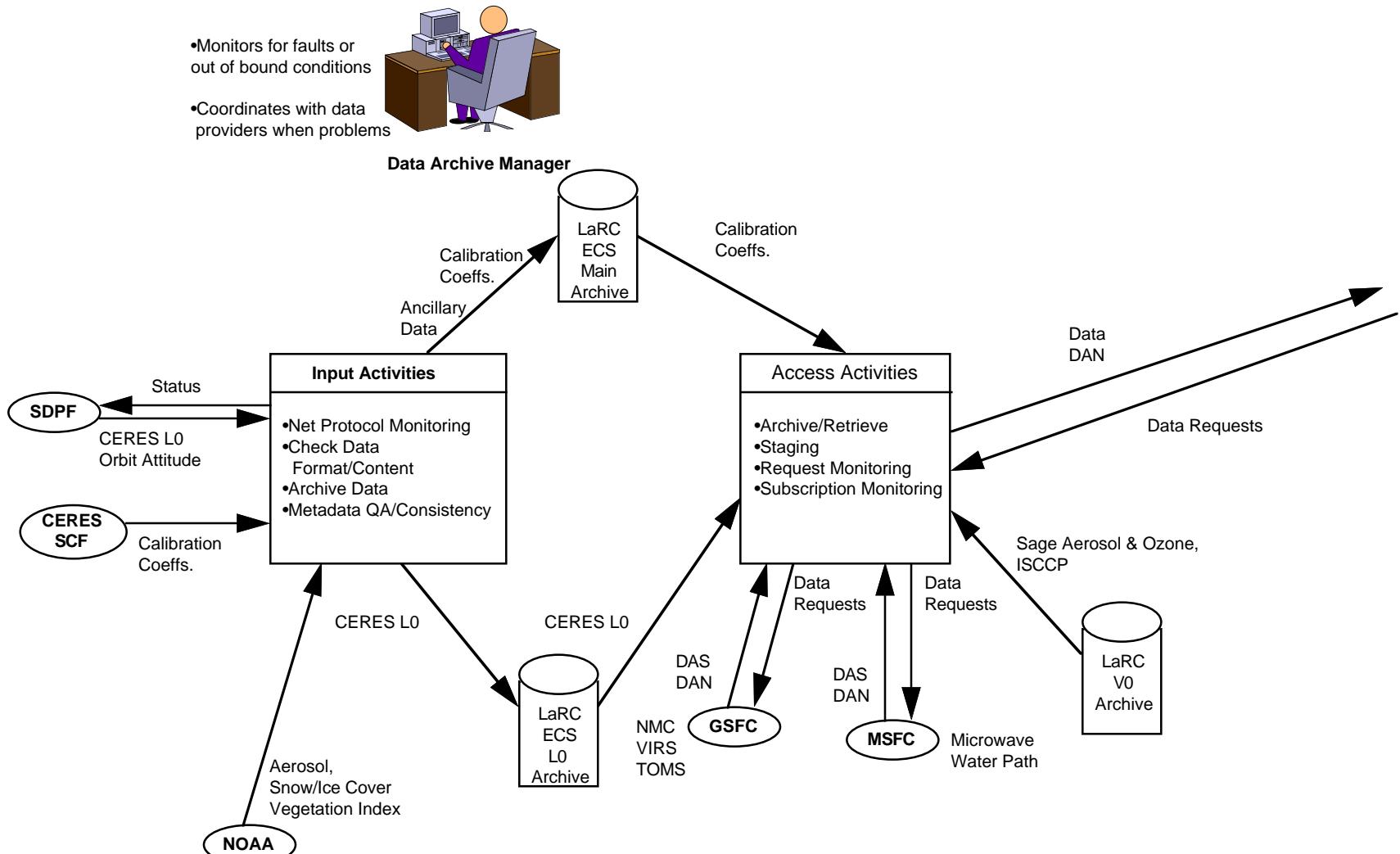
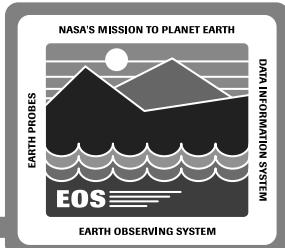
## Develop New and Replan Candidate Schedules

- The Production Planner creates new day's candidate production schedules and associated Data Processing Requests (DPR) and, when required due to anomalies, input changes and optimization, updates (replans) the remaining current production schedule

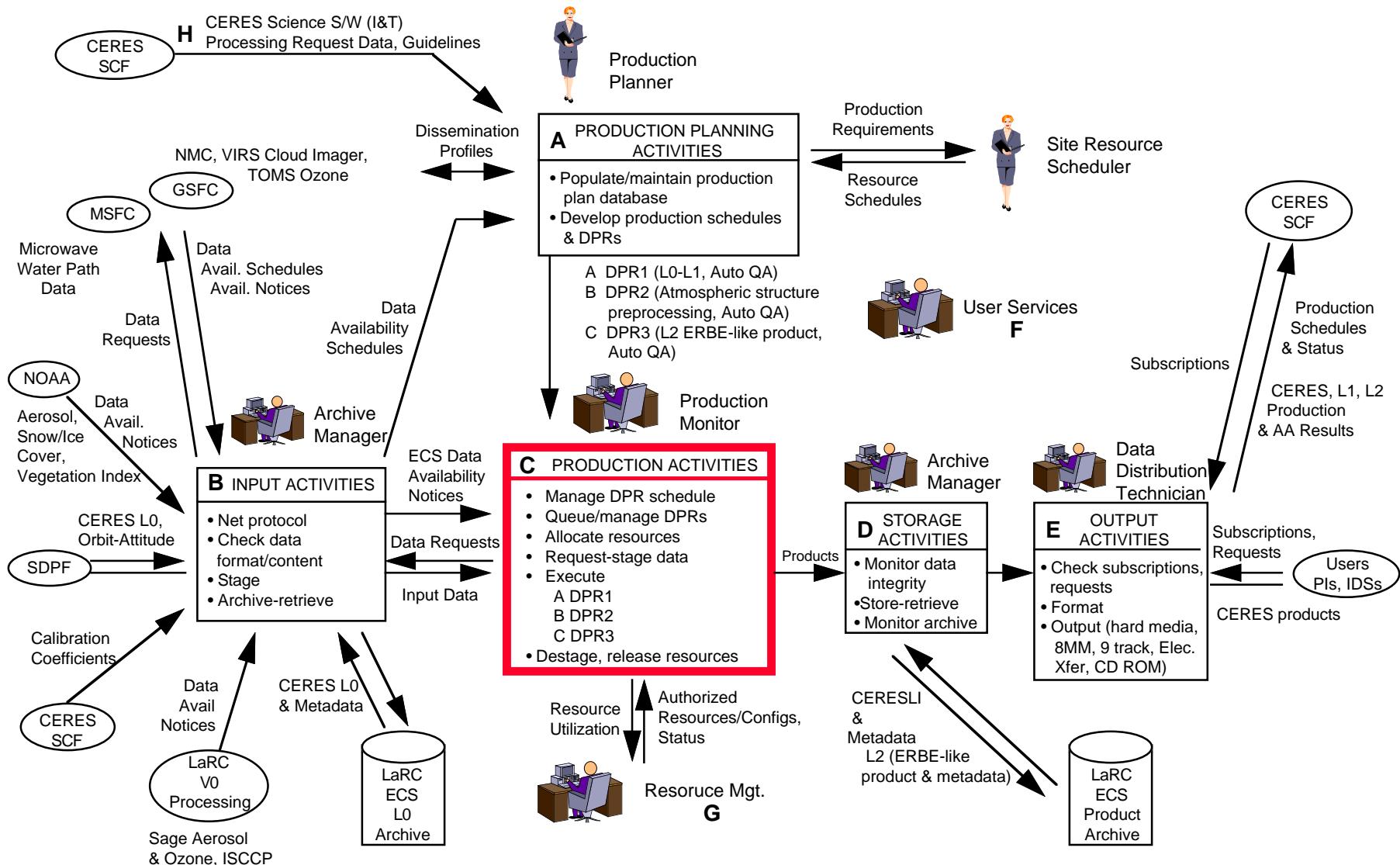
# LaRC-CERES Science Data Operations



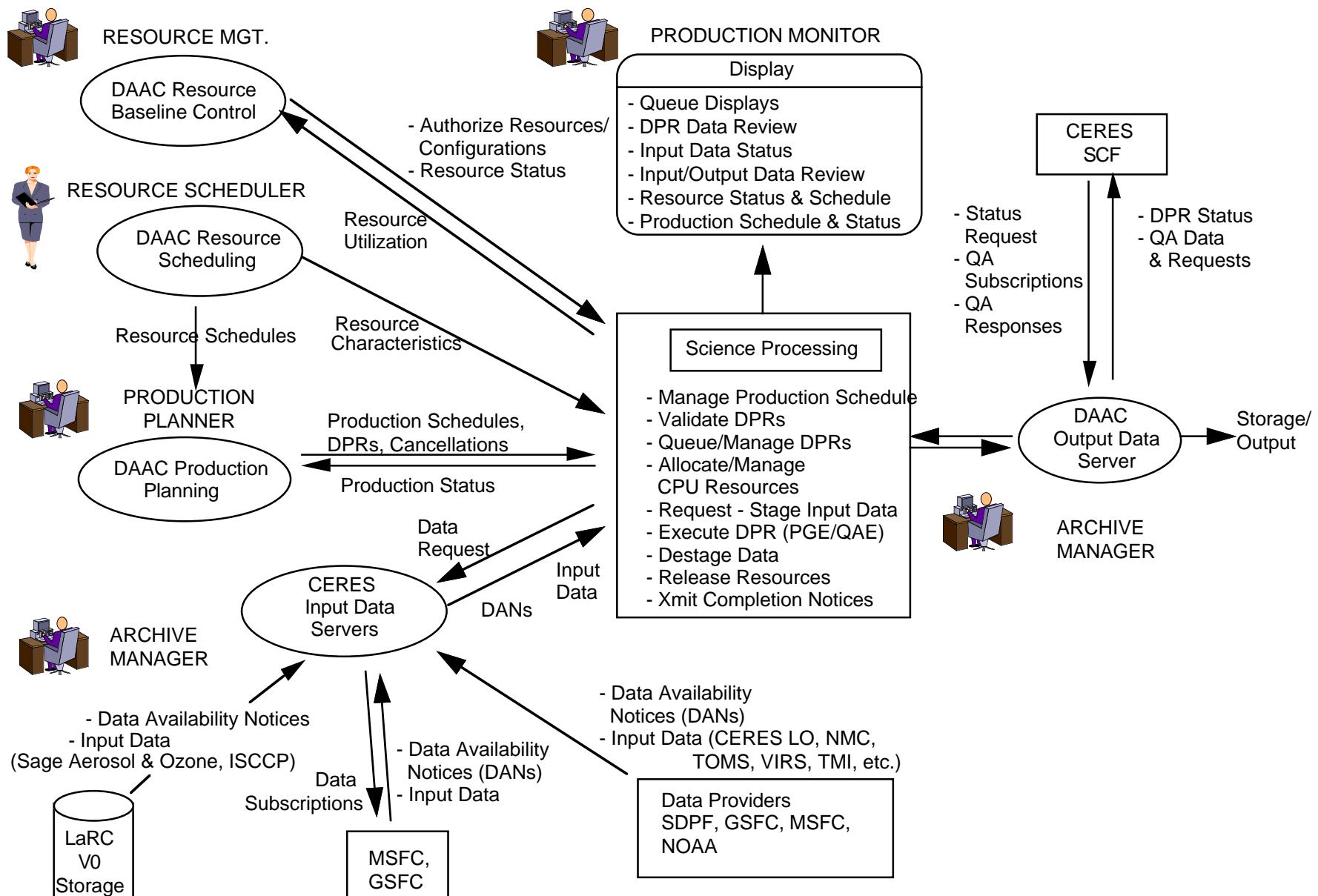
# Input Activities



# LaRC-CERES Science Data Operations

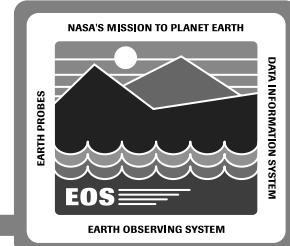


# CERES Data Production Activities



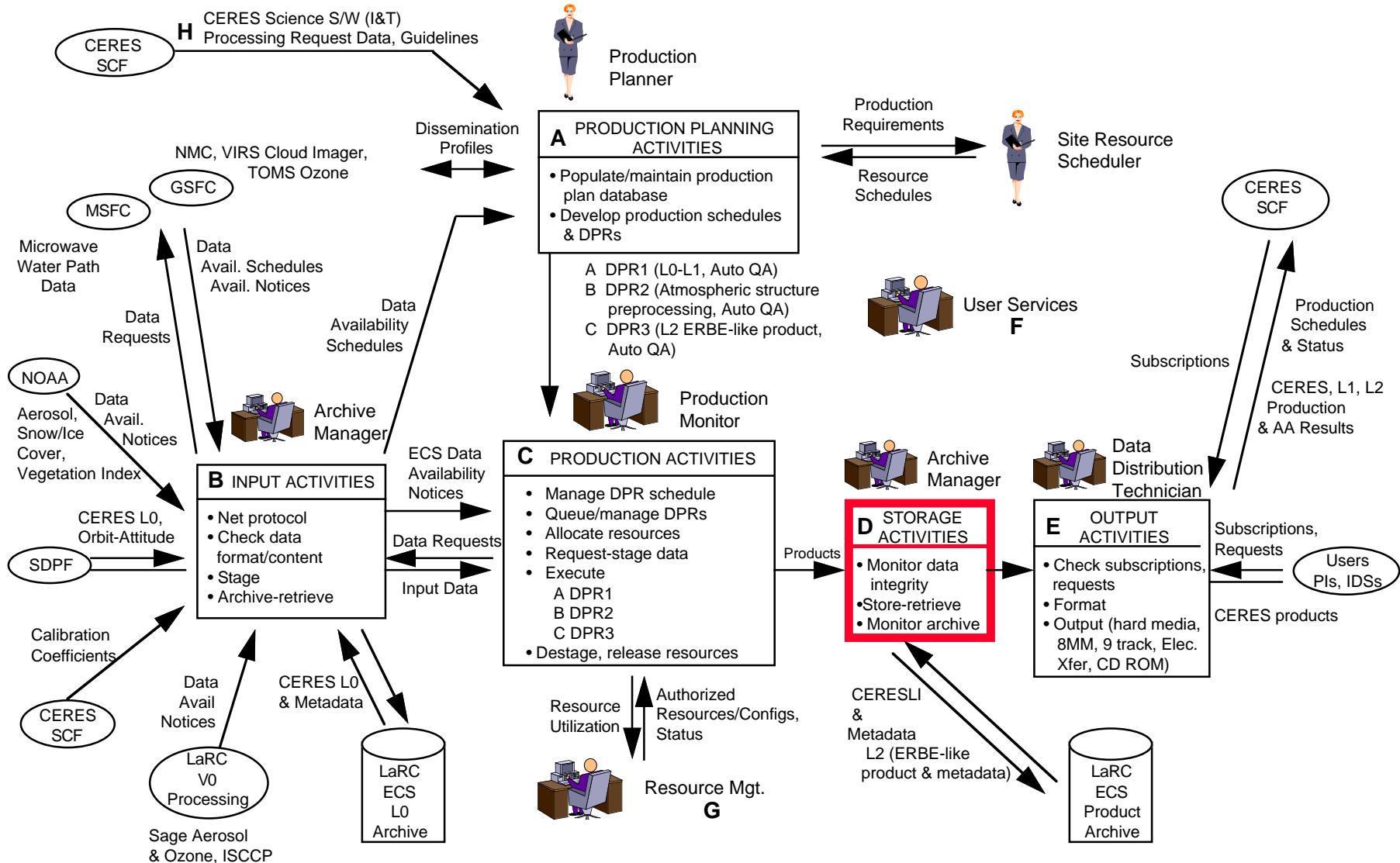
# CERES

## Data Production Activities

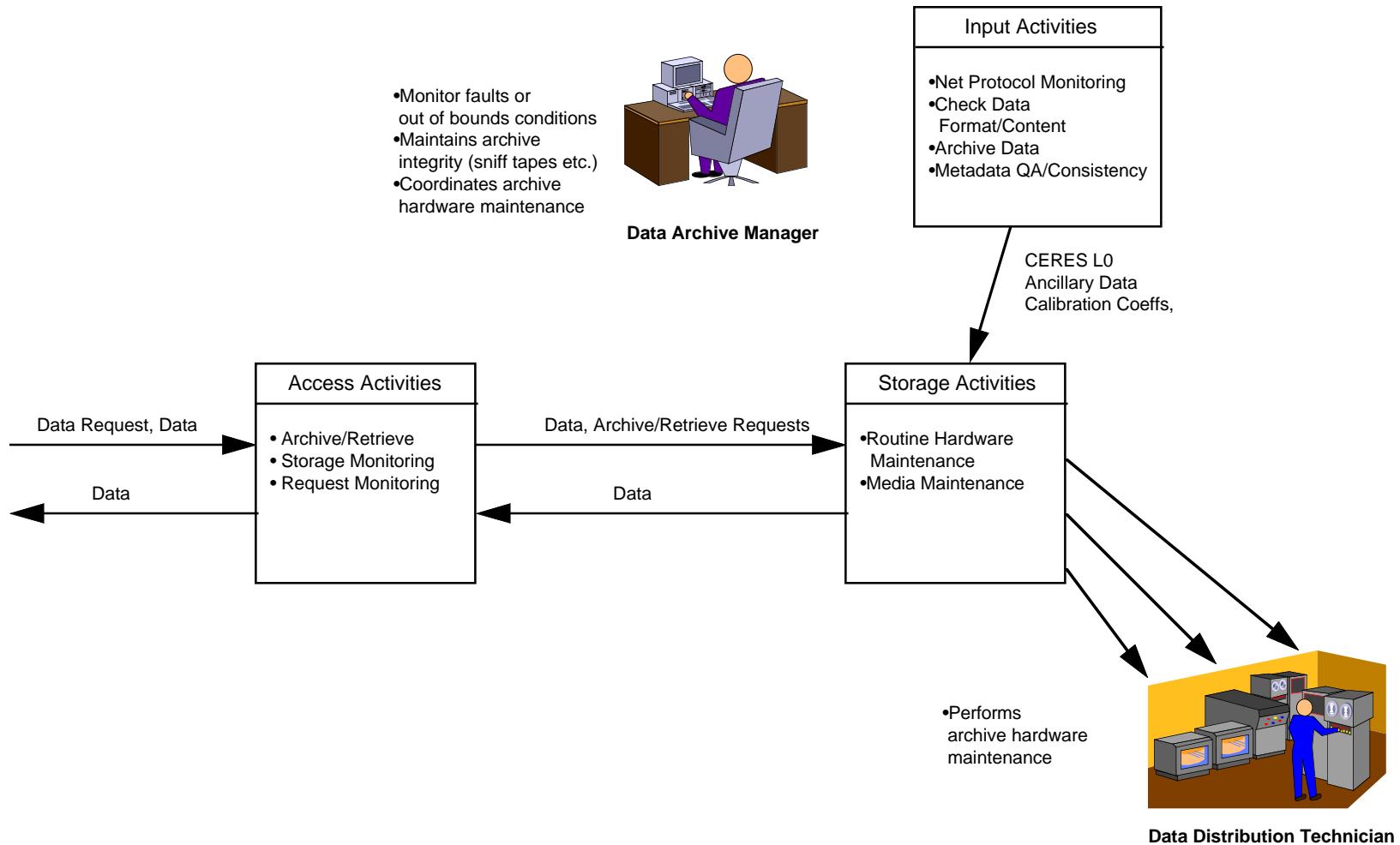
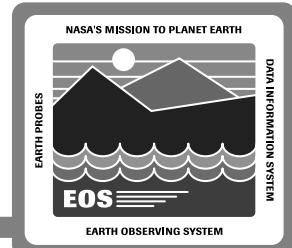


- Processing resources are initialized and controlled in accordance with CM-authorized ops baselines and the active production schedule. The Resource Manager maintains site resource status and utilization data. Processing resource characteristics and schedules are developed/maintained by the Resource Scheduler.
- When all required input data is available within ECS resources (DANs received) for a Data Processing Request (DPR), the DPR is automatically transferred to the processing queue(s) where its source, format and parameter values are validated.
- The DPR is then queued consistent with its priority and resource requirements. Queues can be operator manipulated to delete or modify DPRs.
- Upon availability of the required resources, the CERES DPRs input data are requested from the input data subsystem, GSFC and MSFC DAACs. The data is staged through the CERES input data server, passed to the processor and the CERES Product Generation or Quality Assurance Executive (PGE/QAE) contained in the DPR is executed.
- CERES science products, metadata, browse and quality assurance (QA) data are generated. QA can be automatically performed with results recorded in metadata or QA data and Review Request Notification is output. The QA data is later distributed to its subscriber (reviewer), reviewed and the QA metadata updated.
- The destaging of data via the CERES data server includes deletion of unneeded temporary data and transfer of products to archive and distribution.
- Resources are released to awaiting DPRs and completion status messages are distributed.

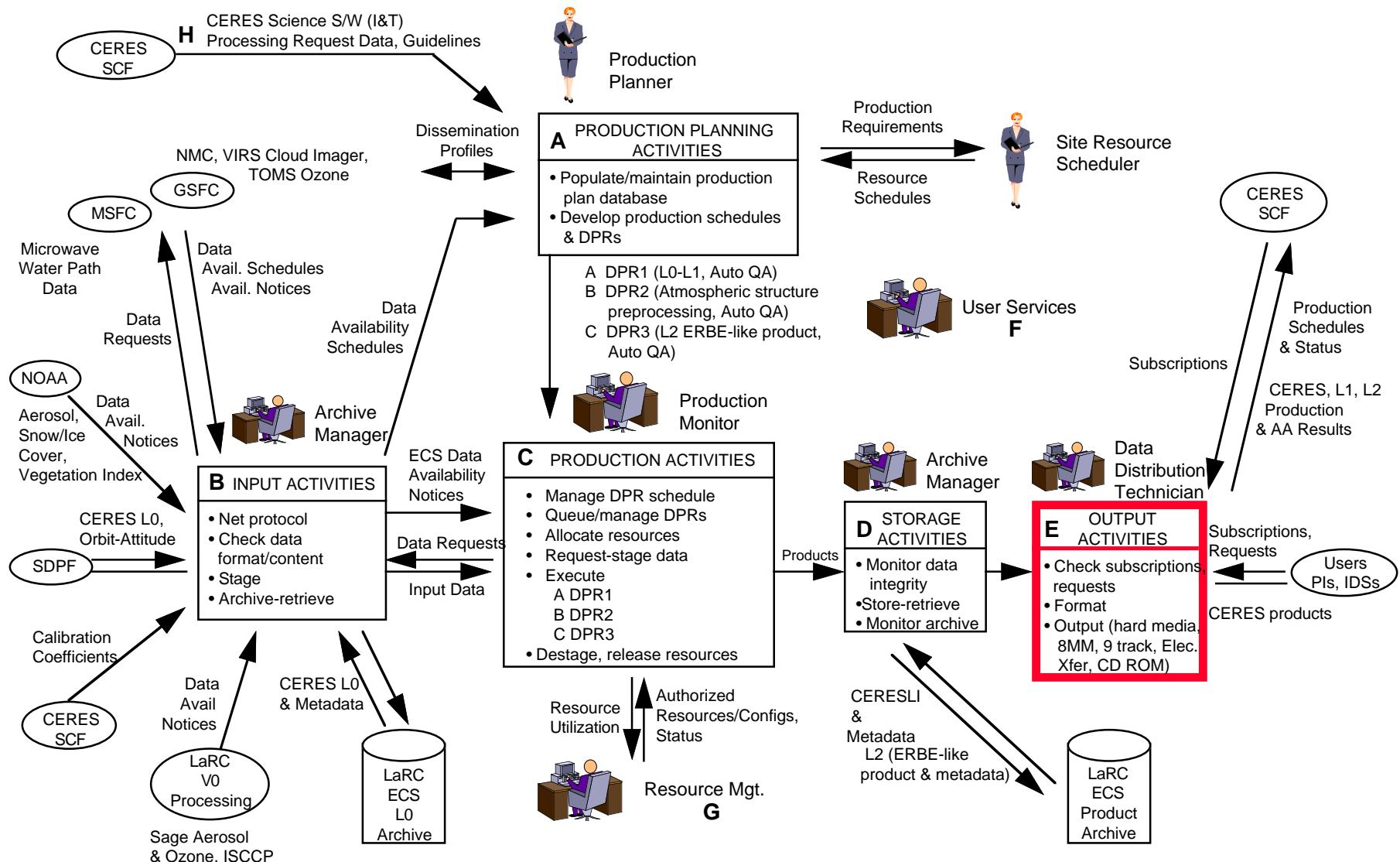
# LaRC-CERES Science Data Operations



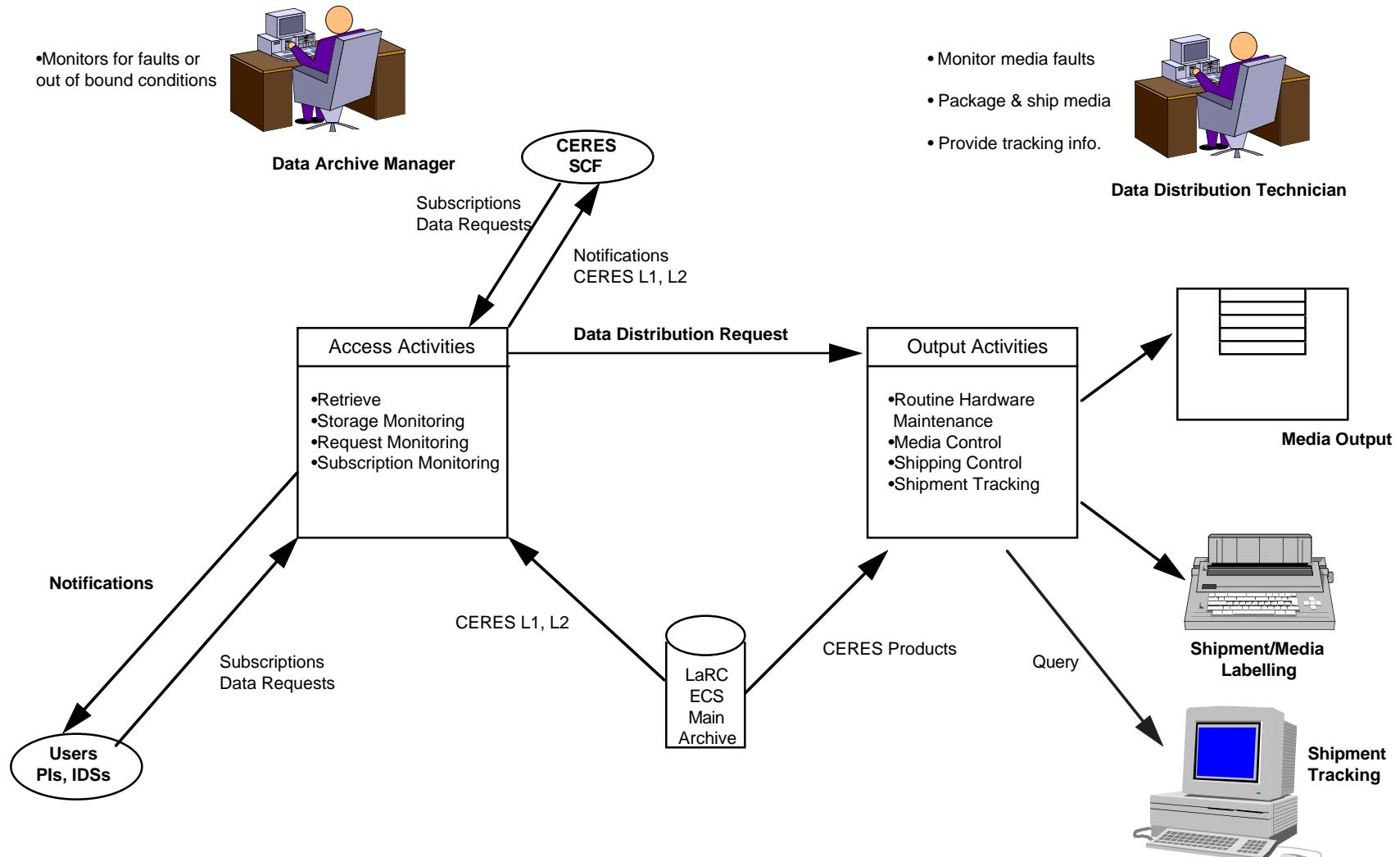
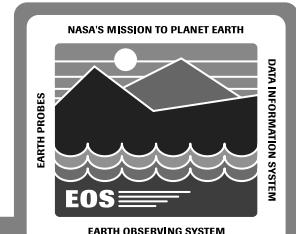
# Storage Activities



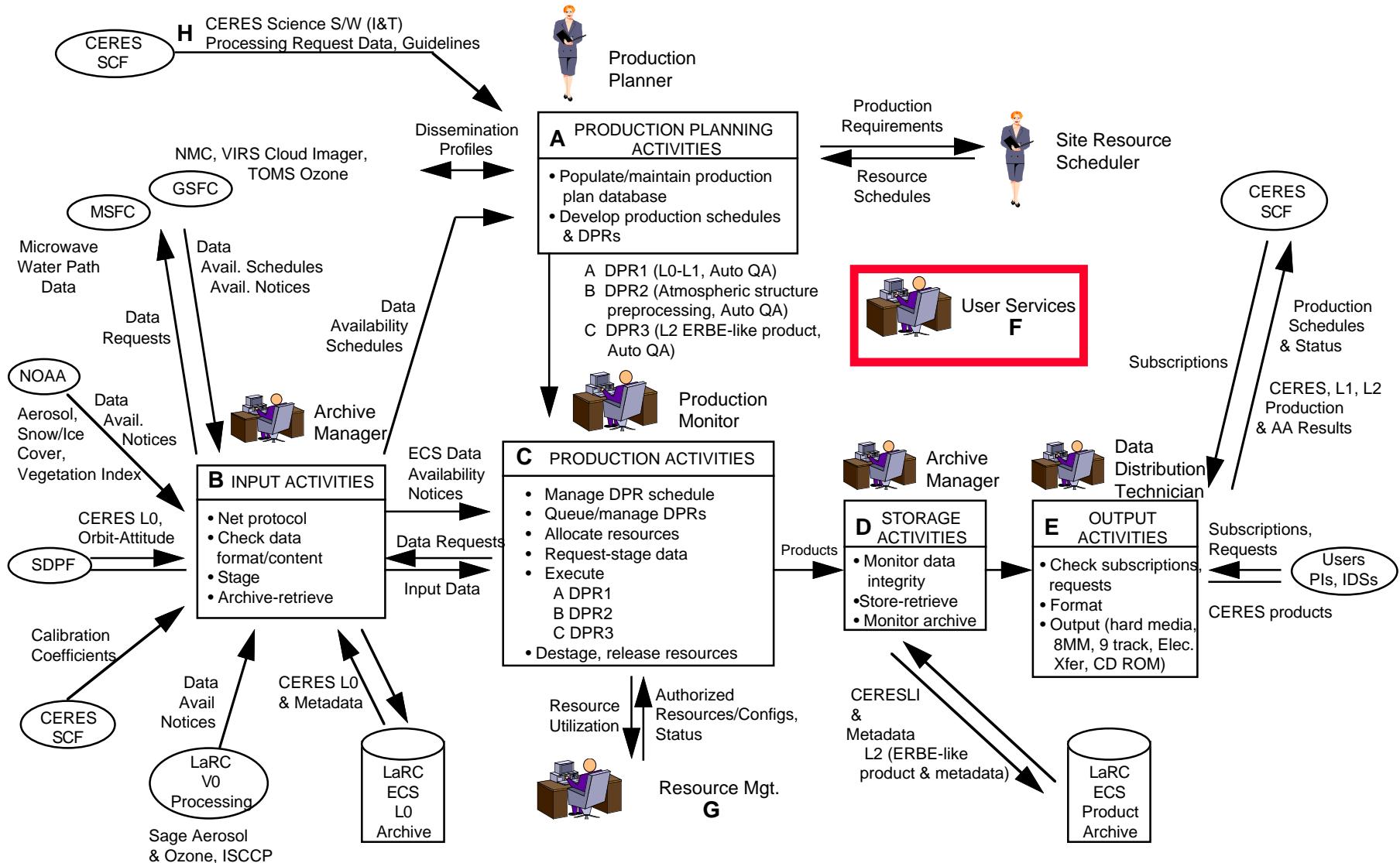
# LaRC-CERES Science Data Operations



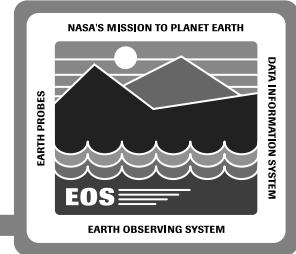
# Output Activities



# LaRC-CERES Science Data Operations

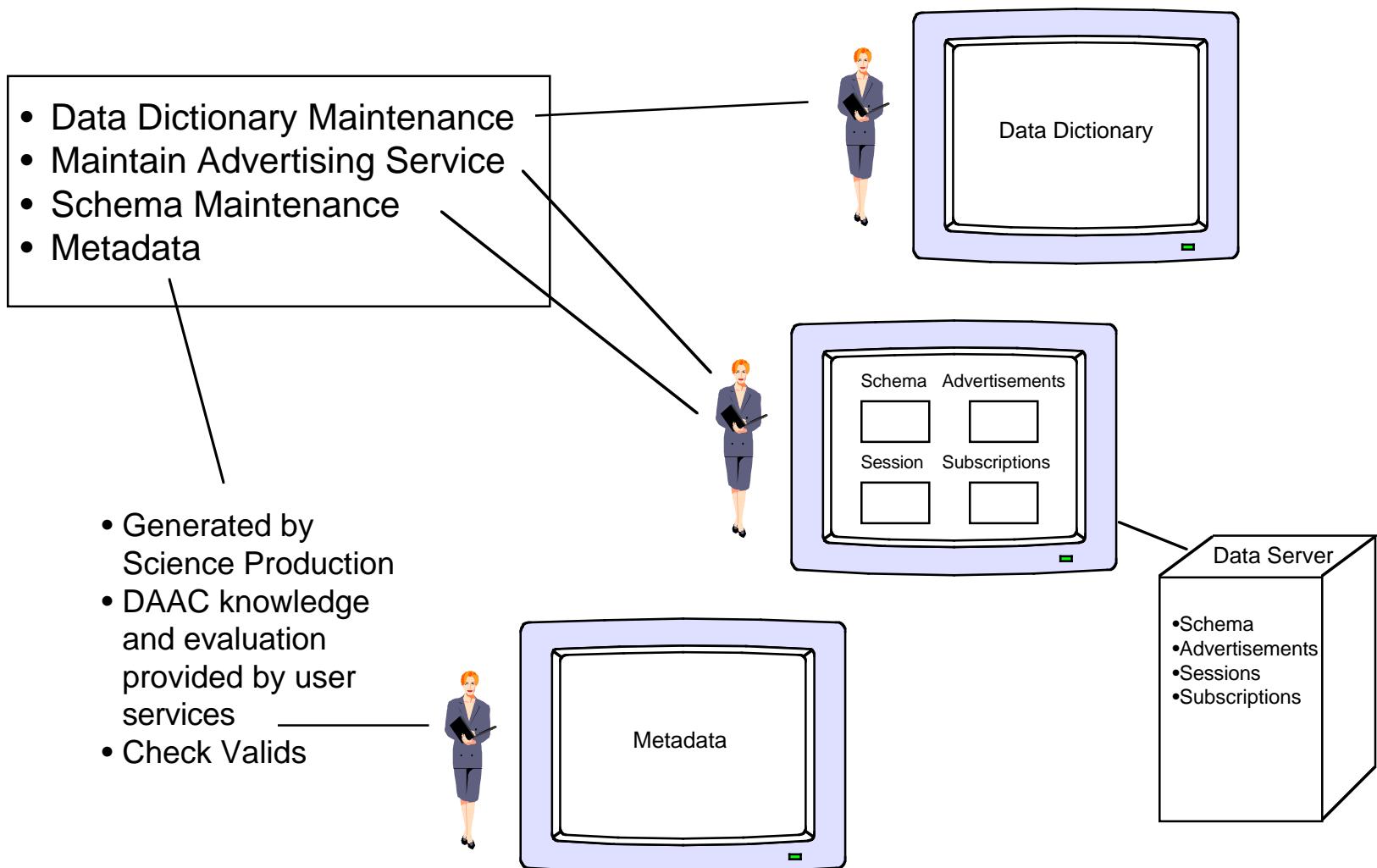
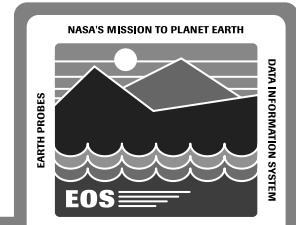


# Examples of DAAC User Services

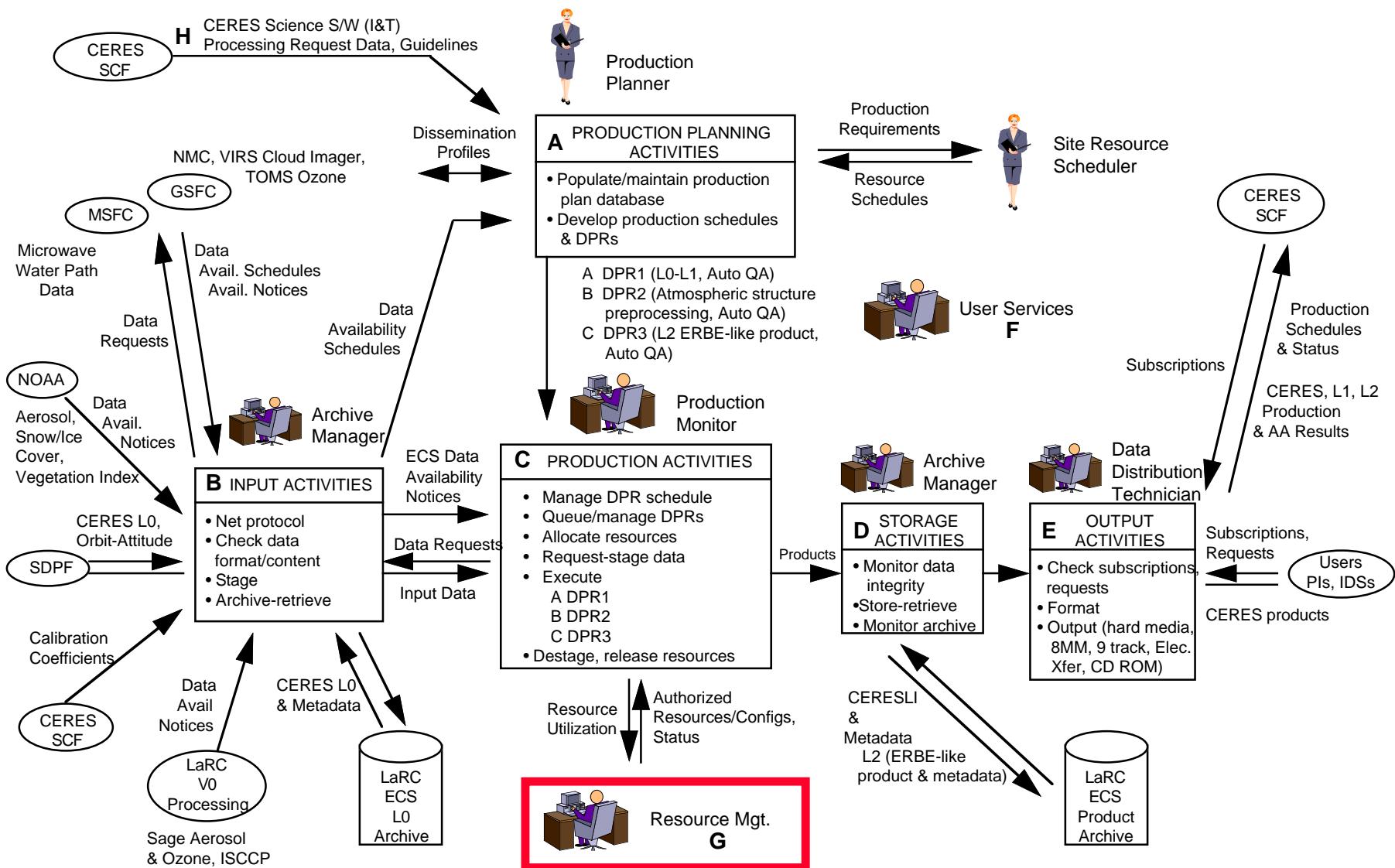


- Direct user assistance
  - Help resolve log on problems
  - Aid users in finding desired data
  - Support user registration
  - Answer questions about data and media
  - Clarify use of various toolkits
  - Monitor product orders
  - Coordinate data archive strategy
  - Hard media input coordination

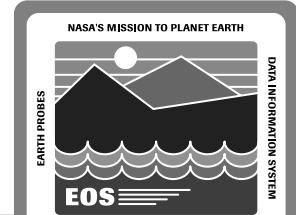
# User Services



# LaRC-CERES Science Data Operations



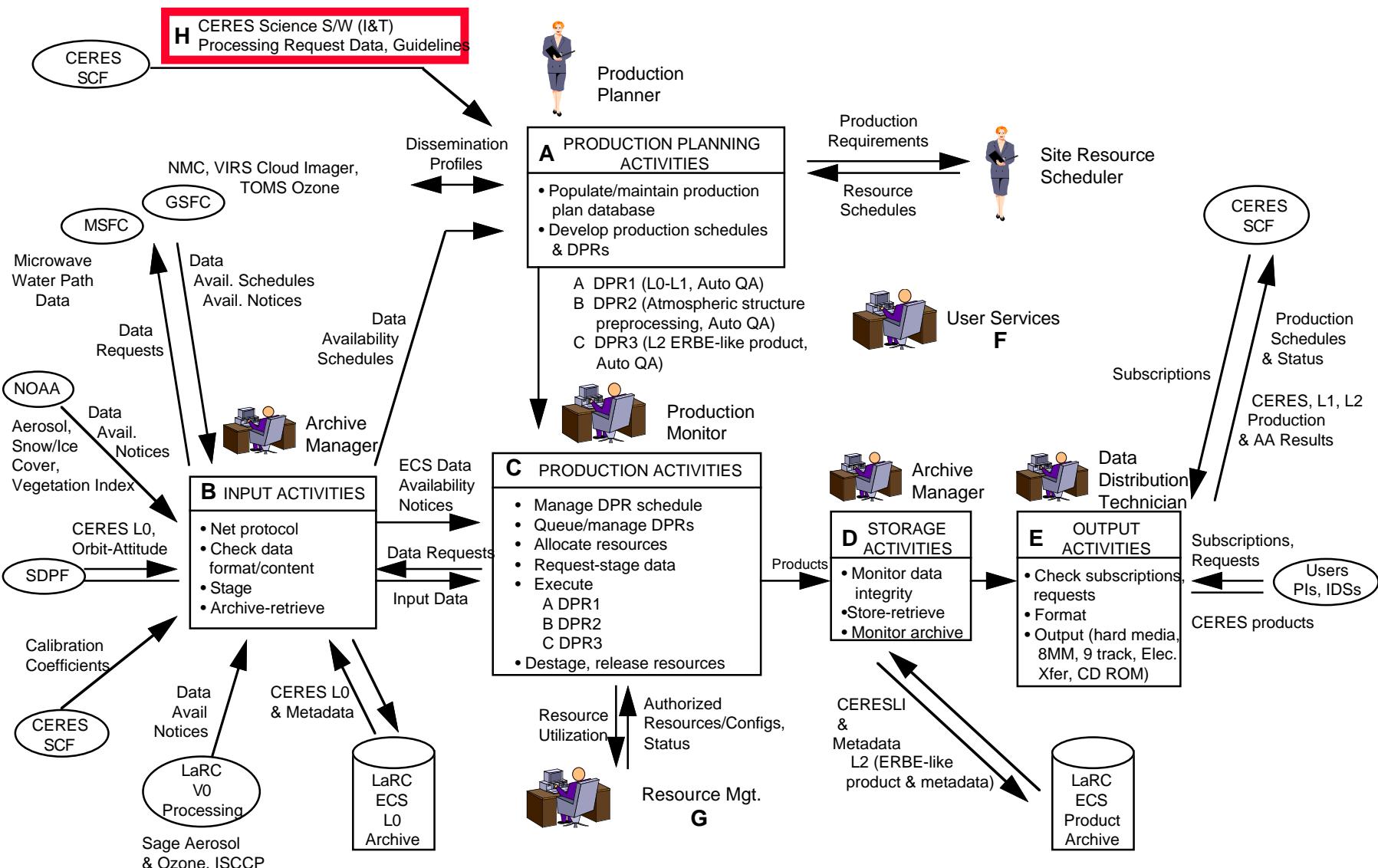
# Resource Management



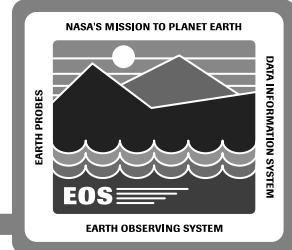
**Resource Manager**

Roles	Monitors	Controls	Automation
<b>Fault Management</b> Detection Notification Isolation & Diagnosis Recovery	Failures	Recovery	Medium
<b>Resource Scheduling &amp; Management</b> Schedule Ground Events Schedule Coordination	Availability	Reallocation & Coordination	Low-Medium
<b>Performance Management</b> Data Collection Analysis	Utilizations & Throughputs	Off-line	Medium
<b>Security Management</b> Database Management Compliance Management Intrusion Detection	Violations	Recovery Coordination	Medium
<b>Accountability</b> User Registration User Audit Trails Data Audit Trails	Off-line	Off-line	Medium
<b>Problem Reporting</b> Documenting Tracking Resolving	Off-line	Documenting & Tracking	Low-Medium

# LaRC-CERES Science Data Operations

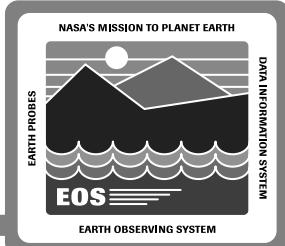


# Algorithm Integration and Test



- Refine Science Software Integration and Test Process
  - Procedures, reviews, organizational responsibilities, support, etc.
  - Tools (e.g., code checkers, scripts, etc.)
- Demonstrate Portability of the Science Software
  - Adherence to standards
  - Use of SDP toolkit
- Determine Production Resource Requirements
  - (e.g., CPU time, I/O, RAM, temporary storage)
- Test Interfaces
  - SCF <--> DAAC interfaces (e.g., log files, QA data)
  - Ancillary data inputs (e.g., NMC data)
- Test the Production Readiness of the Science Software
  - Reliability (i.e., runs to normal completion repeatedly over the normal range of data inputs and run-time conditions)
  - Safety (i.e., executes without interfering with other S/W or DAAC operations)

# ECS Release A - AI&T at LaRC



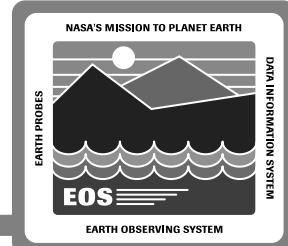
Instrument:	CERES	MISR	MOPITT	ACRIM
Science S/W Version:	Rel. 2	V1	V1	Beta
Status:	Op.	Eng.	Eng.	Early
Satellite:	TRMM	AM-1	AM-1	ACRIMSAT

STATUS	STATUS	STATUS	STATUS
Process	Process	Process	Process
Portability	Portability	Portability	Portability
Resources	Resources	Resources	Resources
Interfaces	Interfaces	Interfaces	Interfaces
Readiness	Readiness	Readiness	Readiness

**Challenge:**

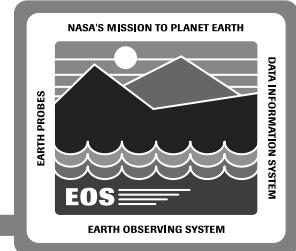
**Scheduling of resources to support AI&T activities for multiple instruments, with priority to CERES.**

# ECS Release A - AI&T at GSFC, MSFC and EDC



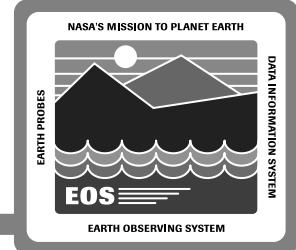
<b>Location:</b>	GSFC	MSFC	EDC
<b>Instrument:</b>	MODIS	LIS	ASTER
<b>Science S/W Version:</b>	V1	V2	V1
<b>Status:</b>	Engineering	Operational	Engineering
<b>Satellite:</b>	AM-1	TRMM	AM-1
	<b>STATUS</b>	<b>STATUS</b>	<b>STATUS</b>
	Process	Process	Process
	Portability	Portability	Portability
	Resources	Resources	Resources
	Interfaces	Interfaces	Interfaces
	Readiness	Readiness	Readiness
<b>Challenge:</b>	Post-launch algorithm enhancements.		Testing the full range of user-specified information in On-Demand Production Requests.

# M&O Release A Assessment



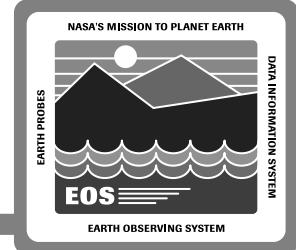
- Ingest, Data Server, Processing, Archiving, and Management (CSMS) subsystems provide automated capabilities with operational monitoring and control functions that will support the ECS TRMM mission requirements
- The ops functions that are automated in Release A are:
  - Archive management for Level 0 and deep archive
  - Data input and staging
  - Production processing
  - Electronic data distribution
  - Resource fault detection
  - Accounting

# M&O Release A Assessment (cont.)



- H/W and S/W will allow TRMM ops and required I&T activities to run simultaneously
  - Release B delay would require some H/W insertion
- Design allows flexibility in defining and implementing ops positions at each DAAC
- Initial staffing analysis of Release A capabilities against the TRMM mission match current operational staffing projections
- DAAC ECS roles that will require further staffing analysis prior to CDR are:
  - Data distribution
  - User services
  - Production monitoring

# Next Steps



- Establish a configurable set of day-in-the-life ops scenarios and take them to the next lower level of detail
- Continue the ops telecons with DAAC, ESDIS, developer, and M&O participation
- Promote and establish a solid operational understanding throughout the development organization through use of operational scenarios and close working relationship with M&O and DAACs
- Work with DAACs and ESDIS on the facility and staffing analysis and definitization