

625-CD-601-001 |

## **EOSDIS Core System Project**

# **ECS Project Training Material Volume 1: Course Outline**

March 2001 |

Raytheon Company  
Upper Marlboro, Maryland

# ECS Project Training Material Volume 1: Course Outline

March 2001

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# Preface

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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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*Note:* This document contains change bars to indicate the addition or revision of material since the issuance of the predecessor document containing training material for Release 6A of the Earth Observing System Data and Information System (EOSDIS) Core System (ECS).

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# Abstract

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This Training Course Outline lists a series of sub-tasks that will be used to define a comprehensive course of instruction for Release 6A of ECS. The training addressed in this outline is related to the specific system design, components and operation of Release 6A and does not include training on management and personal development.

**Keywords:** training, instructional design, courseware

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## **Abbreviations and Acronyms**

# Introduction

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## 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 (Course Outline) provides an overview of available courses developed to support operator training for ECS. Each lesson contains a list of tasks grouped together by subject, required to operate ECS. These tasks serve as the foundation of the Operator Training course and define expectations for each lesson.

## Purpose

The course outline highlights the learning path for curriculum development as well as course conduct. Lesson objectives are formed using the tasks listed in the course outline. These objectives will serve as the basis for Student Guide and slide presentation material development and course conduct. Once the course outline is completed, curriculum development can be completed and subsequent training courses conducted.

## Status and Schedule

This lesson module provides detailed information about training for Release 6A. 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

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## 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:

420-05-03                      Goddard Space Flight Center, Earth Observing System (EOS) Performance Assurance Requirements for the EOSDIS Core System (ECS)

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)

## 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-600                      Release 6A Operations Tools Manual for the ECS Project

611-CD-600                      Mission Operation Procedures for the ECS Project

910-TDA-022                      Custom Configuration Parameters for ECS Release 6A

### 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.

305-CD-600                      Release 6A Segment/Design Specification for the ECS Project

311-CD-600                      Release 6A Data Management Subsystem Database Design and Database Schema Specifications for the ECS Project

311-CD-601                      Release 6A Ingest Database Design and Database Schema Specifications for the ECS Project

311-CD-602	Release 6A Interoperability Subsystem (IOS) Database Design and Database Schema Specifications for the ECS Project
311-CD-603	Release 6A Planning and Data Processing Subsystem Database Design and Schema Specifications for the ECS Project
311-CD-604	Release 6A Science Data Server Database Design and Schema Specifications for the ECS Project
311-CD-605	Release 6A Storage Management and Data Distribution Subsystems Database Design and Database Schema Specifications for the ECS Project
311-CD-606	Release 6A Subscription Server Database Design and Schema Specifications for the ECS Project
311-CD-607	Release 6A Systems Management Subsystem Database Design and Schema Specifications for the ECS Project
311-CD-608	Release 6A Registry Database Design and Schema Specifications for the ECS Project
313-CD-600	Release 6A ECS Internal Interface Control Document for the ECS Project
334-CD-600	6A Science System Release Plan for the ECS Project
601-CD-001	Maintenance and Operations Management Plan for the ECS Project
603-CD-003	ECS Operational Readiness Plan for Release 2.0
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
152-TP-001	ACRONYMS for the EOSDIS Core System (ECS) Project
152-TP-003	Glossary of Terms for the EOSDIS Core System (ECS) Project
211-TP-005	Transition Plan 4PX to 4PY, 4PY to 5A, and 5A to 5B for the ECS Project
220-TP-001	Operations Scenarios - ECS Release B.0 Impacts
500-1002	Goddard Space Flight Center, Network and Mission Operations Support (NMOS) Certification Program, 1/90
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

# Course Outline

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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 6A 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: 9.5 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 Detailed System Overview; Science Data Processing Internal Training 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 problem resolution process.

- f. Working with the ECS System Operational Support (SOS) Help Desk.
- g. 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.
3. Students will evaluate trouble tickets and critique the description and assignment of severity.

## **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, SEO Support personnel, DAAC Computer Operator and DAAC System Engineer.

Prerequisites: None.

Duration: 7 Hours (4 Lecture, 3 Lab)

Sub-tasks:

1. Secure Shell (ssh).
2. System startup and shutdown.
3. System software server failover/dependencies
  - a. Overview
4. Whazzup: System Monitoring
5. ECS Assistant.
  - a. System monitoring.
  - b. Monitoring server status.
6. Tivoli management environment.
  - a. Overview
7. Tape operations.
8. System backup and restore process.
  - a. Performing incremental backup.

- b. Performing full backup.
  - c. Performing file restore.
  - d. Performing complete system restore.
9. System log maintenance.
10. 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. Moving a user's home directory.
11. New Workstation Installation.
- a. Preparation.
  - b. Installation.
  - b. Testing and Verification.
12. COTS Administration.
13. Security.
- a. Running security management log analysis program.
  - b. Generating security reports.
  - c. Reviewing user activity data.
  - d. Monitoring user audit trail information.

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

- 1. Students will establish a secure shell login and pass phrase.
- 2. Students will perform system monitoring using Whazzup.
- 3. Students will perform system and server monitoring using ECS Assistant and ECS Monitor.
- 4. Students will start the Tivoli Management Environment monitoring program.
- 5. Students will determine active monitor profiles for any specific host.

6. Students will perform an incremental backup.
7. Students will perform a file restore.
8. Students will add a user account.
9. Students will change a user's access privileges.
10. Students will change a file/directory access privilege.
11. Students will change a user account file access privilege.
12. Students will generate security reports.
13. Students will access and review COTS log files.
14. Students will configure COTS subdirectories.
15. Students will install a new workstation.
16. 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, SEO Support personnel, SMC Network Analyst, DAAC System Administrator, DAAC Resource Manager, DAAC System Engineer.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training and Problem Reporting lessons.

Duration: 6 Hours (3 Lecture, 3 Lab)

Sub-tasks:

1. Network Administration.
  - a. Network topology.
  - b. Network hardware components.
  - c. ECS domain name services (DNS) structures.
  - d. Network security.
  - e. Route add scripts.

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

1. Conduct a check of local host access to another local host over your network.
2. Conduct a check of local host access to another local host over the HiPPI switch.

3. Conduct a check of host communication across the EMSn.
4. Conduct a check of a host attached to User Network communicating with Hosts on the Campus Network(s) or to the Internet.
5. Conduct a check of a host communicating with any other host over the HiPPI Switch

## **Volume 6: Production Planning and Processing**

Volume 6 provides a detailed description of the process for setting processing priorities, creating, modifying, and implementing a production plan for a site, monitoring production, and troubleshooting production planning and processing.

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, SEO Support personnel and DAAC User Services Representative.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training and Problem Reporting lessons.

Duration: 20 Hours (10 Lecture, 10 Lab)

Sub-tasks:

1. Production Planning and Processing context.
2. Production requests.
3. Launching the Production Request Editor.
4. Creating/updating/deleting a production request.
5. Reviewing/deleting data processing requests.
6. Launching planning workbench related GUIs.
7. Creating a new production plan.
8. Resetting/cleaning the PDPS database.
9. Troubleshooting production planning problems.
10. Production processing.
11. Launching the AutoSys GUI control panel.
12. Configuring AutoSys screens/displays.
13. Reviewing hardware status, Data Processing Request (DPR) dependency, DPR production timeline, alarms, and job activities.
14. Modifying job status.
15. Reviewing activity and job dependency reports.
16. Defining and running monitors/browsers.
17. Changing the database maintenance time.
18. Tuning system parameters.

19. Troubleshooting processing problems.
20. Launching the QA Monitor.
21. Performing science product quality assurance (QA).
22. 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 delete a production request.
5. Students will review data processing requests.
6. Students will delete a data processing request.
7. Students will launch the production strategies GUI.
8. Students will launch planning workbench-related GUIs.
9. Students will define a production strategy.
10. Students will create a new production plan.
11. Students will review a plan timeline.
12. Students will clean the PDPS database.
13. Students will troubleshoot production planning problems.
14. Students will launch AutoSys GUI control panel.
15. Students will configure Autosys runtime options.
16. Students will review hardware status.
17. Students will review DPR dependencies.
18. Students will review the DPR production timeline.
19. Students will review alarms and configure alarm selection.
20. Students will specify job selection criteria and review job activities.
21. Students will determine the ownership of an AutoSys job.
22. Students will modify job status.
23. Students will review activity reports and job dependency reports.
24. Students will define and run monitors/browsers.
25. Students will review the database maintenance time.
26. Students will troubleshoot processing problems.
27. Students will launch the QA Monitor GUI.
28. Students will update QA metadata.
29. 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, create resource reservation requests, 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, DAAC User Services Representative and SEO Support personnel.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training 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 definition and resource scheduling processes.
2. Launching and shutting down resource planning applications.
  - a. Launching resource planning applications.
  - b. Shutting down resource planning applications.
3. Defining resources.
  - a. Adding or modifying resources.
  - b. Deleting a resource.
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. Tuning system parameters.
  - a. Tuning system configuration parameters.
  - b. Monitoring the load on processing resources.
8. Troubleshooting resource planning problems.
  - a. Trouble symptoms.
  - b. Checking log files.
  - c. Checking database connections.

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

1. Students will launch resource planning applications.
2. Students will shut down resource planning applications.
3. Students will determine actual processing resources to be added to the resource planning list.
4. Students will add 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 edit/modify a resource reservation request.
9. Students will validate or reject a resource reservation request.
10. Students will approve resource reservation requests.
11. Students will commit resource reservation requests.
12. Students will delete 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 from hard media, modifying ingest parameters, and troubleshooting ingest problems.

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

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training and Problem Reporting lessons.

Duration: 8 Hours (4 Lecture, 4 Lab)

Sub-tasks:

1. Ingest concepts.
2. Launching the ECS Ingest storage management GUIs.
3. Monitoring ingest status.
4. Cleaning directories.
5. Performing hard media ingest.
6. Scanning documents.
7. Modifying ingest tunable parameters and performing file transfers.
8. Troubleshooting ingest problems.

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

1. Students will launch the ECS ingest GUI.
2. Students will launch the Storage Management Control GUI.
3. Students will monitor/control ingest requests.
4. Students will view the ingest history log.
5. Students will verify the archiving of ingested data.
6. Students will clean the polling directories.
7. Students will perform media ingest from D3 tape.
8. Students will scan documents and gain access to scanned documents.
9. Students will modify external data provider information.
10. Students will modify system parameters using the ECS Ingest GUI.
11. Students will transfer files using the ECS ingest GUI.
12. Students will modify system parameters using isql.
13. Students will troubleshoot ingest problems.

## 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, DAAC User Services Representative and SEO Support personnel.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training and Problem Reporting lessons.

Duration: 8 Hours (4 Lecture, 4 Lab)

Sub-tasks:

1. Distribution concepts.
2. Launching the data distribution operator and storage management control GUIs.
3. Monitoring/controlling data distribution requests.
4. Modifying preambles.
5. Performing hard (physical) media operations.
6. Configuring storage management polling and deleting files from cache.
7. Monitoring storage management server operations.
8. Tuning system parameters.
9. Troubleshooting data distribution problems.

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

1. Students will launch the data distribution operator and storage management control GUIs.
2. Students will monitor/control data distribution requests.
3. Students will modify preambles.
4. Students will configure storage management polling.
5. Students will delete files from cache.
6. Students will view storage management event log information.
7. Students will monitor storage management server operations.
8. Students will modify system parameters.
9. 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, DAAC User Services Representative and SEO Support personnel.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training 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 Granules.
6. Deleting pull disk data.
7. Loading archive media.
8. Backup of Archive Data to offsite storage.
9. Restoring archive data from offsite storage.
10. Using the AMASS GUI.
11. Monitoring archive system and fault notification.
12. 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 use the Granule Delete capability to delete granules from the archive and inventory.
6. Students will delete pull disk data.
7. Students will load archive media.
8. Students will prepare copies of archive data for offsite storage.
9. Students will restore archive data from offsite storage.
10. Students will monitor archive system and perform fault notification.
11. 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, DAAC User Services Representative and SEO Support personnel.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training and Problem Reporting lessons.

Duration: 6 Hours (3 Lecture, 3 Lab)

Sub-tasks:

1. Database functions and descriptions.
2. Release 6A 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
12. Sybase Replication Server Administration

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 a 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, DAAC SW Maintenance Engineer and SEO Support personnel.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training and Problem Reporting lessons.

Duration: 6 Hours (3 Lecture, 3 Lab)

Sub-tasks:

1. M&O role in ECS CM activities.
2. Configuration Control Board (CCB) process.
3. Configuration Change Requests (CCR) process.
4. Impact analysis.

2. Software baselines and changes.
3. Hardware baselines and changes.
  - a. Software transfer and installation.
  - b. Configuration parameters and the Configuration Registry.
7. Changes to the baseline.
  - a. Physical asset management and monitoring.
  - b. Baseline management.
  - c. Inventory Logistic Maintenance (ILM) management.

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 perform updates to the baseline manager for software change.
6. Students will use the Configuration Registry GUI to review configuration parameters.
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, DAAC SW Maintenance Engineer and SEO Support personnel.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training and Problem Reporting lessons.

Duration: 8 Hours (4 Lecture, 4 Lab) [EDC only: 12 Hours (5 Lecture, 7 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.
  - h. Troubleshooting account management problems.
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.
  - c. Troubleshooting order tracking problems.
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.
  - e. Troubleshooting subscription problems.
6. Data dictionary maintenance.
- a. Update attribute/keyword mapping.
  - b. Exporting valids.
  - c. Importing valids.
  - d. Troubleshooting Data Dictionary Maintenance Tool problems.
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.
  - c. Responding to a tracking request from another DAAC.
9. ASTER DAR creation and submission (EDC only).
10. On-Demand product requests (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).
18. Students will use the HTML interface to the ASTER On-Demand Form Request Manager (ODFRM) to create an ASTER production request.

## **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, register 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, DAAC SW Maintenance Engineer and SEO Support personnel.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training and Problem Reporting lessons.

Duration: 40 Hours (20 Lecture, 20 Lab)

Sub-tasks:

1. Release 6A 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. General Process
  - b. Science Software Integration and Test Flow
  - c. SSIT Manager Overview.

- d. SSIT Manager GUI.
  - e. General Set Up of the SSI&T Manager.
  - f. 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: Verdex 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 ESDT/DLL's to the Storage Area.
  - c. Installing/Removing (ESDT/DLL) using the Science Data Server Operator GUI.
  - d. Validating Successful ESDT Installation.
  - e. Using ECS Assistant to View Databases.
  - f. 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.
  - g. Production Rules Technical Information.
  - h. Production Rules Syntax.
- 13. Production Requests.
- 14. Science Software and Production Requests
- 15. Types of Processing
  - a. Routine Processing
  - b. Reprocessing
  - c. Ad-Hoc Reprocessing
  - d. On-Demand Processing
- 16. Production Rules
  - a. Syntax of Production Rules
  - b. Basic Temporal Production Rule

- c. Advanced Temporal Production Rule
  - d. Alternate Input and Optional Input Production Rules
  - e. Minimum/Maximum Number of Granules Production Rule
  - f. Optional DPRs Production Rule
  - g. Intermittent Activation Production Rule
  - h. Metadata Checks and Metadata Query Production Rules
  - i. Data Day Production Rule
  - j. Spatial Query Production Rule
  - k. Tiling Production Rule
  - l. Closest Granule Production Rule
  - m. Orbital Processing Production Rule
17. Production Planning Considerations
18. DPREP
- a. Introduction.
  - b. SSI&T Activity for DPREP.
  - c. DPREP Processes and Procedures.
  - d. Setups for DPREP.
19. 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.
20. 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.
21. Placing the Science Software Executable (SSEP) onto Science Data Server.
- a. Package onto Science Data Server.

22. 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.
23. Post Processing 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).
24. 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.
25. Miscellaneous
- a. Setting Up Environment for Direct PDPS Database Access
26. Examples of PGE and ESDT ODL Files for Each Instrument Team
- a. Template ODL Files
27. 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. Demonstrate 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, DAAC User Services Representative and SEO Support personnel.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training and Problem Reporting lessons.

Duration: 16 Hours (6 Lecture, 10 Lab)

Sub-tasks:

- 1. System/Performance monitoring.
  - a. Checking the health and status of the network.
    - 1) Starting Whazzup and monitoring the status of hosts and servers.

- 2) ECS Assistant and ECS Monitor.
- 3) Tivoli Management Environment.
- b. Accessing the EOSDIS Backbone Network (Ebnet) Web Page.
2. Problem analysis/troubleshooting.
  - a. Analysis/troubleshooting System.
  - b. Analysis/troubleshooting COTS hardware.
    - 1) Documenting hardware problems with the ILM tool.
  - c. Failover/Switchover
  - d. Performing preventive maintenance.
  - e. Analysis and Troubleshooting of COTS software.
  - f. Specific ECS custom software check-out and troubleshooting.
    - 1) Checking server status.
    - 2) Checking server log files.
    - 3) Recovering from a DCE/Connectivity problem.
    - 4) Using *cdsbrowser* to Check DCE Entries for a Server.
    - 5) Checking for Consistency between Calling and Called DCE Entries.
    - 6) Recovering from a Database Access Problem.
    - 7) Recovering from a Missing Mount Point or Other File Access Problem.
    - 8) Recovering from a Subscription Server Problem.
    - 9) Recovering from Granule Insertion Problems.
    - 10) Handling an Acquire Failure.
    - 11) Recovering from Ingest Problems.
    - 12) Recovering from PDPS Plan Creation/Activation and PGE Problems.
    - 13) Recovering from QA Monitor Problems.
    - 14) Recovering from Problems with ESDTs, DAP Insertion, or SSI&T.
    - 15) Recovering from Problems with Data Search and Order.
    - 16) Recovering from Data Distribution Problems.
    - 17) Recovering from Problems with Submission of an ASTER Data Acquisition Request (EDC Only) .
    - 18) Recovering from Problems with On-Demand Product Requests

(EDC Only).

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.

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 conduct detailed check-out and troubleshooting of ECS custom software.

## **Volume 18: Advanced Production Planning and Processing**

Volume 18 provides significant practice in defining production resources; scheduling resource reservations; creating and implementing production requests, production strategies, and production plans for a site; monitoring the processing of production jobs; and troubleshooting problems in resource planning, production planning, and production processing.

Attendees: DAAC Production Monitor, DAAC Production Planner.

Prerequisites: Introduction and Detailed System Overview; Science Data Processing Internal Training, Problem Management, and Production Planning and Processing lessons.

Duration: 16 Hours (16 Lab)

Sub-tasks:

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

1. Students will launch resource planning applications.
2. Students will shut down resource planning applications.
3. Students will determine actual processing resources.

4. Students will add 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 resource reservation requests.
8. Students will edit/modify resource reservation requests.
9. Students will validate or reject a resource reservation request.
10. Students will approve resource reservation requests.
11. Students will commit resource reservation requests.
12. Students will delete a resource reservation request.
13. Students will review a resource timeline.
14. Students will troubleshoot resource planning problems.
15. Students will launch the Production Request Editor.
16. Students will create new production requests.
17. Students will delete a production request.
18. Students will review data processing requests.
19. Students will delete a data processing request.
20. Students will launch the production strategies GUI.
21. Students will launch planning workbench-related GUIs.
22. Students will define a production strategy.
23. Students will create a new production plan.
24. Students will review a production plan timeline.
25. Students will save and reset the PDPS database.
26. Students will clean the PDPS database.
27. Students will clean the DPS disks.
28. Students will troubleshoot production planning problems.
29. Students will launch the AutoSys GUI control panel.
30. Students will monitor production processing.
31. Students will view PDPS database entries using isql.
32. Students will troubleshoot processing problems.
33. Students will view product granules using EOSView.

34. Students will review production history granules.
35. Students will review failpge granules.

# Release 6A Training Schedule

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## 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	9	9/0
Problem Management	2	1/1
System Administration	7	4/3
Network Administration	6	3/3
Database Administration	6	3/3
Production Planning and Processing	20	10/10
Resource Planning	4	2/2
Ingest	8	4/4
Data Distribution	8	4/4
Archive	6	3/3
Configuration Management	6	3/3
User Services	8 (EDC 12)	4/4 (EDC 5/7)
Science Software I&T	40	20/20
System Troubleshooting	16	6/10
Advanced Production Planning and Processing	16	0/16
<b>TOTAL</b>	<b>162</b>	<b>76/86</b>

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# Abbreviations and Acronyms

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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

PI	Principle Investigator
QA	Quality Assurance
QO	Quality Office
S/C	Spacecraft
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 <sup>3</sup>	Train-the-Trainer