625-EMD-001

EOSDIS Maintenance and Development Project

Training Material for the EMD Project
Volume 1: Course Outline

Revision 02

July 2006

Raytheon Company
Upper Marlboro, Maryland

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Preface

This document is a formal contract deliverable. It requires Government review and approval within 45 business days. Changes to this document will be made by document change notice (DCN) or by complete revision.

Any questions should be addressed to:

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Revision History

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Abstract

Volume 1 of the training material for the Earth Observing System Data and Information System (EOSDIS) Maintenance and Development (EMD) Project is the Training Course Outline. The course outline lists a series of sub-tasks that will be used to define a comprehensive course of instruction for the EMD Project. The training addressed in this outline is related to the specific system design, components and operation of the current baseline of the system and does not include training on management or personal development.

***Keywords**:* training, instructional design, course objective.

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Contents

Training Schedule

Abbreviations and Acronyms

Introduction

Identification

Training Material Volume 1 is part of Contract Data Requirements List (CDRL) Item 23, which is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Maintenance and Development (EMD) Contract (NAS5-03098).

Scope

Training Material Volume 1 (Course Outline) provides an overview of available courses developed to support operator training for the EOSDIS Core System (ECS). Each lesson contains a list of tasks (grouped together by subject) required to operate the system. The 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. The objectives serve as the basis for Student Guide and slide presentation material development and course conduct.

Status and Schedule

This document provides an outline of training for the current baseline of the system. Revisions are 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:	The Course Outline section identifies and defines the lesson topics, duration, and scope of the course.

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Related Documentation

Parent Documents

The parent documents are the documents from which the EMD Training Material's scope and content are derived.

423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work
423-46-03	EMD Task 101 Statement of Work For ECS SDPS Maintenance
423-46-02	Contract Data Requirements Document for EMD Task 101 ECS SDPS Maintenance

Applicable Documents

The following documents are referenced within this EMD 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) (ECS F&PRS)
423-46-01	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Science Data Processing System (EMD F&PRS)

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 EMD Training Material.

609-EMD-001	Release 7.11 Operations Tools Manual for the EMD Project
611-EMD-001	Release 7.11 Mission Operation Procedures for the EMD Project

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 EMD Training Material.

305-EMD-001	Release 7.11 Segment/Design Specification for the EMD Project
313-EMD-001	Release 7.11 508-EMD-001 ACRONYMS for the EOSDIS Maintenance and Development (EMD) Project
152-TP-003	Glossary of Terms for the EOSDIS Core System (ECS) Project

Course Outline

The Operator Training Course is grouped into modular lessons based on common task groupings and operational requirements. Each lesson outline will contain a lesson description, a list of recommended class attendees (by position), Commercial Off-the-Shelf (COTS) hardware (HW) and software (SW) requirements, duration (lab and lecture) and a list of sub-tasks required to satisfy the overall lesson objective using tools described in Document 609-EMD-001 (*Release* 7.11 *Operations Tools Manual for the EMD Project*) and procedures described in Document 611-EMD-001 (*Release* 7.11 *Mission Operation Procedures for the EMD Project*). The course consists of the lessons that follow.

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

Volume 2 provides an introduction and detailed system overview of the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Release 7.11 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, 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) Operator and Support personnel, all Systems Monitoring Center (SMC) Operator and Support personnel, all Sustaining Engineering personnel, all Integrated Logistic Support (ILS) personnel, all Investigator support personnel and all Independent Verification and Validation (IV & V) contractor personnel.

Prerequisites: None.

Duration: 13 Hours Lecture

Sub-tasks:

1. Program overview.
    a. Mission.
2. Subsystem and functions.
    a. Data Server.
    b Ingest.
    c Spatial Subscription Server.
    d. Data Pool.

e. Client.

f. Data Management.

g. Order Manager.

h. Planning.

i. Data Processing.

j. System Management Support.

k. Communications.

l. Internetworking.

3. ECS operational functioning.

   a. ASTER Data Acquisition Request (DAR) support.

   b. ASTER chaining and on-demand production.

   c. ASTER expedited data.

   d. User registration.

   e. MODIS 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 Operator and Support personnel, all SMC Operator and Support personnel, all Sustaining Engineering personnel, all 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. Writing a trouble ticket.

   a. Writing/submitting trouble tickets.

2. Documenting changes.

   a. Reviewing and modifying trouble tickets.

3. Problem management..
    a. Control board reviews.
    b. Assessing/categorizing problem severity.

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

1. Students will write a trouble ticket.
2. Students will document trouble ticket 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. 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 Representative, DAAC System Administrators, Sustaining Engineering personnel, DAAC Computer Operator and DAAC System Engineer.

Prerequisites: None.

Duration: 7 Hours (4 Lecture, 3 Lab)

Sub-tasks:

1. Secure shell (ssh).
    a. Secure access to DAACs.
    b. Setting up ssh.
    c. Remote ssh access.
    d. Changing your passphrase.
    e. Logging in to system hosts.

2 System startup and shutdown.
    a. Cold startup by subsystem.
    b. Warm startup.
    c. Updating leapsec.dat and utcpole.dat files.
    d. Normal shutdown.

e. Emergency shutdown.

f. System shutdown by server.

3. Checking the health and status of the system.

   a. WhatsUp Professional 2006 Premium Edition.

   b. Whazzup???

   c. ECS Health Check GUI.

   d. ECS Assistant and ECS Monitor.

4. Tape operations.

   a. Networker administrative screen.

   b. Labeling tapes.

   c. Indexing tapes.

5. System backups and restores.

   a. Incremental backup.

   b. Full system backup.

   c. Single or multiple file restore.

   d. Complete system restore.

6. User administration.

   a. Screening personnel.

   b. Screening procedures.

   c. Adding a new user.

   d. Deleting a user.

   e. Changing a user's account configuration.

   f. Changing user access privileges.

   g. Changing a user password.

   h. Checking a file/directory access privilege status.

   i. Changing a file/directory access privilege.

   j. Moving a user's home directory.

7. Commercial Off-The-Shelf (COTS) administration.

   a. Installation.

   b. Log files.

c. COTS configuration.

8. Security.

   a. Generating security reports.

   b. User activity data.

   c. User audit trail information.

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

1. Students will perform system startup and shutdown.
2. Students will perform tape operations, system backup and restore.
3. Students will perform user administration.
4. Students will perform system maintenance.

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 Representative, Sustaining Engineering personnel, DAAC System Administrator, DAAC Resource Manager, DAAC System Engineer.

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

Duration: 6 Hours (3 Lecture, 3 Lab)

Sub-tasks:

1. Network topology.

   a. Network hardware components.

2. Domain Name Services (DNS) structure.
3. Network security.

   a. Network connectivity.

   b. Specific security limitations.

4. Route Add scripts.

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

1. Students will describe network topology.
2. Students will perform network monitoring and management activities.

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, Sustaining Engineering personnel and DAAC User Services Representative.

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

Duration: 20 Hours (10 Lecture, 10 Lab)

Sub-tasks:

1. Production Planning and Processing context.
2. Production requests.
3. Logging in to system hosts.
4. Launching the Production Request Editor.
5. Creating/updating/deleting a production request.
6. Reviewing/deleting data processing requests.
7. Launching planning workbench related GUIs.
8. Creating a new production plan.
9. Cleaning the PDPS database and science processing disks.
10. Troubleshooting production planning problems.
11. Production processing.
12. Launching the AutoSys GUI control panel.
13. Configuring AutoSys screens/displays.
14. Monitoring/controlling job processing.
15. Tuning system parameters.
16. Troubleshooting processing problems.
17. Launching the QA Monitor.
18. Performing science product quality assurance (QA).
19. Regenerating granules.

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

1. Students will log in to system hosts.
2. Students will launch the Production Request Editor.
3. Students will create a new production request using the Production Request Editor GUI.

4. Students will create new production requests using the Production Request Generator (command-line interface).
5. Students will edit/modify a production request.
6. Students will delete a production request.
7. Students will review data processing requests.
8. Students will delete a data processing request.
9. Students will launch the Production Strategies GUI.
10. Students will launch Planning Workbench-related GUIs.
11. Students will define a production strategy.
12. Students will create a new production plan.
13. Students will review a plan timeline.
14. Students will clean the PDPS database and science processing disks.
15. Students will troubleshoot production planning problems.
16. Students will launch the AutoSys GUI Control Panel.
17. Students will configure AutoSys runtime options.
18. Students will monitor/control job processing.
19. Students will respond to alarms (including selecting alarms to be displayed).
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 (including sending an event to a job) using AutoSys.
23. Students will review activity reports and job dependency reports.
24. Students will define and run monitors/browsers.
25. Students will troubleshoot processing problems.
26. Students will launch the QA Monitor GUI.
27. Students will update Quality Assurance (QA) metadata.
28. 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 Representative, 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 Sustaining Engineering personnel.

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

Duration: 4 Hours (2 Lecture, 2 Lab)

Sub-tasks:

1. Resource planning concepts.
    a. System context.
    b. Planning subsystem.
    c. Data Processing subsystem.
    d. Resource definition and resource scheduling processes.
2. Logging in to system hosts.
3. Launching and shutting down resource planning applications.
    a. Launching resource planning applications.
    b. Shutting down resource planning applications.
4. Defining resources.
    a. Adding or modifying resources.
    b. Deleting a resource.
5. Creating a resource reservation request.
6. 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.
7. Reviewing a resource timeline.
8. Tuning system parameters.
    a. Tuning system configuration parameters.
    b. Monitoring the load on processing resources.
    c. Strategies for tuning.

9. Troubleshooting resource planning problems.
    a. Trouble symptoms.
    b. Fault recovery.
    c. Troubleshooting a resource planning failure.
    d. Troubleshooting procedures.

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

1. Students will log in to system hosts.
2. Students will launch resource planning applications.
3. Students will shut down resource planning applications.
4. Students will determine actual processing resources to be added to the resource planning list.
5. Students will add resources to the resource planning list.
6. Students will modify resources on the resource planning list.
7. Students will delete resources from the resource planning list.
8. Students will create a resource reservation request.
9. Students will edit/modify a resource reservation request.
10. Students will validate or reject a resource reservation request.
11. Students will approve resource reservation requests.
12. Students will commit resource reservation requests.
13. Students will delete a resource reservation request.
14. Students will review a resource timeline.
15. 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 Technician, DAAC System Engineer, DAAC System Test Engineer, DAAC User Services Representative and Sustaining Engineering personnel.

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

Duration: 8 Hours (4 Lecture, 4 Lab)

Sub-tasks:

1. Ingest concepts.
2. Logging in to system hosts.
3. Launching the ECS Ingest and Storage Management Control GUIs.
4. Handling cross-DAAC or cross-mode ingest.
5. Monitoring ingest status.
6. Cleaning directories.
7. Performing hard (physical) media ingest.
8. Modifying ingest tunable parameters and performing file transfers.
9. Troubleshooting ingest problems.

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

1. Students will log in to system hosts.
2. Students will launch the ECS Ingest GUI.
3. Students will launch the Storage Management Control GUI.
4. Students will handle cross-DAAC or cross-mode ingest.
5. Students will monitor/control ingest requests.
6. Students will view the ingest history log.
7. Students will verify the archiving of ingested data.
8. Students will clean the polling directories.
9. Students will perform hard media ingest.
10. Students will modify external data provider information.
11. Students will modify system parameters using the ECS Ingest GUI.
12. Students will transfer files using the ECS Ingest GUI.
13. Students will modify system parameters using isql.
14. Students will troubleshoot ingest problems.

Volume 9: Data Distribution

Volume 9 provides information to support the operators in distributing science data using various media. This lesson describes the process for distribution of products to the user community and data processing. Operation of the Order Manager (OM) GUI (including physical media distribution using the OM GUI) is presented..

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

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

Duration: 24 Hours (12 Lecture, 12 Lab)

Sub-tasks:

1. Distribution concepts.
2. Logging in to system hosts.
3. Launching the Data Distribution Operator and Storage Management Control GUIs.
4. Monitoring/controlling distribution requests.
5. Modifying preambles.
6. Configuring storage management polling and deleting files from cache.
7. Monitoring storage management server operations.
8. Launching the Order Manager GUI.
9. Monitoring/controlling Order Manager operations (including physical media distribution).
10. Using the Order Manager Command Line Utility.
11. Using the OMS configuration script (OMS Configuration CI).
12. Tuning Data Server Subsystem parameters.
13. Tuning Order Manager Subsystem and Data Pool parameters.
14. Troubleshooting DDIST and Order Manager GUI problems.

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

1. Students will log in to system hosts.
2. Students will launch the data distribution operator and storage management control GUIs.
3. Students will monitor/control data distribution requests.
4. Students will modify preambles.
5. Students will configure storage management polling.
6. Students will delete files from cache.
7. Students will view storage management event log information.
8. Students will monitor storage management server operations.
9. Students will launch the OM GUI.

10. Students will view open intervention information on the OM GUI.
11. Students will respond to an open intervention.
12. Students will monitor/control distribution request information on the OM GUI.
13. Students will change the priority of a distribution request using the OM GUI.
14. Students will suspend, resume, cancel, or resubmit a distribution request using the OM GUI.
15. Students will edit ftppush parameters.
16. Students will view open HDF-EOS to GeoTIFF Conversion Tool (HEG) request intervention information on the OM GUI.
17. Students will respond to an open HEG intervention.
18. Students will view pending HEG granules on the OM GUI.
19. Students will view operator alerts on the OM GUI.
20. Students will view a completed intervention.
21. Students will view and respond to suspended ftp push distribution destinations.
22. Students will check/modify OM queue status.
23. Students will check/modify HEG order status.
24. Students will check staging status.
25. Students will check/modify OM configuration parameters.
26. Students will add a destination to the frequently used destinations list.
27. Students will view the OM GUI log.
28. Students will view physical media distribution (PMD) open intervention information on the OM GUI.
29. Students will respond to a PMD open intervention.
30. Students will check and modify PMD device configuration.
31. Students will monitor/control PMD media creation on the OM GUI.
32. Students will prepare an input file for use with the OMS Configuration CI.
33. Students will process an input file specified for Synergy III exceptions.
34. Students will configure how long order-tracking information is kept in the OMS database.
35. Students will switch between Synergy IV and Synergy III operations.
36. Students will modify system parameters.
37. Students will troubleshoot data distribution (DDIST) problems.
38. Students will troubleshoot OM GUI 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 Technician, DAAC System Engineer, DAAC System Test Engineer, DAAC SW Maintenance Engineer, DAAC User Services Representative and Sustaining Engineering personnel.

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

Duration: 8 Hours (4 Lecture, 4 Lab)

Sub-tasks:

1. Overview of archive processing.
    a. Archive Manager.
    b. Hardware.
    c. Software.
    d. Data sources and uses.
2. Starting and shutting down AMASS.
    a. Starting the AMASS tape archive system.
    b. Shutting down AMASS tape archive system.
    c. Rebooting AMASS.
    d. Entering the archive after AMASS is started.
3. Archive storage structures.
    a. Storage element relationships.
    b. Launching DSS GUIs.
    c. Archive resource management.
4. Insert data into the archive.
    a. Archive insert scenario.
5. Monitor archive requests.
    a. Request Status window.
    b. Distrib'n Requests window.

6. Retrieving data from the archive.
7. Deleting Granules.
    a. Deletion capability and features.
    b. Deletion sequence.
    c. Undelete capability.
8 Loading archive media.
    a. Automatically loading archive media.
    b. Manually loading archive media.
    c. Formatting a volume.
    d. Remove media.
9. Backup archived data.
    a. Creating offsite backups.
    b. Creating a backup for AMASS.
    c. Replacing the AMASS database backup volume (Volume 1).
    d. Create replacement backups manually from existing archives.
10 Restore archive data.
    a. Use of backup data for recovery.
11. AMASS Graphical User Interface.
    a. Using the AMASS GUI.
    b. Modify a volume group.
    c. Modify a volume.
12. Archive Monitoring and Troubleshooting.
    a. AMASS Commands, Utilities, and Scripts for Monitoring and Fault Response.
    b. Recovery from failure to store or retrieve data.
    c. Checksum de-activation.
13. Data Pool Management.
    a. Features of the Data Pool Maintenance GUI.
    b. Using the Data Pool Maintenance GUI.
    c. Working with Data Pool scripts.
    d. Working with the DataPool Order Status & Control GUI.

e. Tuning Data Pool and Order Manager Subsystem configuration parameters.

f. Troubleshooting Data Pool problems.

14. Open Geospatial Consortium (OGC) Web Services (OWS) Support.

a. Deployment of Open Geospatial Consortium (OGC) Web Services (DOWS).

b. Standalone OGC (WCS/WMS) Archive.

15. Using the Spatial Subscription Server (NBSRV) GUI.

a. Spatial Subscription Server (NBSRV) GUI.

b. Using the Spatial Subscription Server GUI.

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

1. Students will start and shut down AMASS.
2. Students will use the Data Distribution GUI to examine the list of distribution requests.
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 load archive media.
7. Students will use AMASS commands and utilities to monitor archive and AMASS activities and status.
8. Students will run the amass_log script to display AMASS messages.
9. Students will use the Data Pool Maintenance GUI to monitor and control Data Pool insert actions.
10. Students will use the NBSRV GUI to display subscriptions in the NBSRV database, view acquire and notification actions in the Action Queue, manage bundling orders, and display statistics on NBSRV processing of events and actions.
11. Students will run the Update Granule Utility to extend the period of retention for a single granule in the Data Pool.
12. Students will invoke the Data Pool Cleanup Utility from the command line.
13. Students will execute the Data Pool Access Statistics Utility from the command line.
14. Students will use the Data Pool Archive Access Statistics Data Utility to archive statistics on Data Pool access.
15. Students will use the Batch Insert Utility to insert granules from the archive into the Data Pool.

16. Students will launch the DataPool Order Status & Control GUI and review Data Pool orders and their order items.

Volume 11: Database Administration

Volume 11 provides a functional overview of the system 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 Sustaining Engineering personnel.

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

Duration: 7 Hours (5 Lecture, 2 Lab)

Sub-tasks:

1. System overview.
    a. General design.
    b. Database management.
2. Database Administrator (DBA) responsibilities.
3. Starting and stopping servers.
4. Creating database devices and logical volumes.
    a. Database devices.
    b. Logical volumes.
5. Installing Databases and Patches
    a. Custom databases.
    b. COTS databases.
6. Configuring databases.
    a. Configuration parameters.
    b. Configuration parameters and the Configuration Registry.

7. Working with indexes, segments, and caches.
    a. Indexes.
    b. Segments.
    c. Caches.
8. Backing up and recovering data.
    a. Backups.
    b. Database recovery.
9. Establishing database security.
    a. Discretionary access controls.
    b. Identification and authentication controls.
    c. Auditing.
    d. EMD Security Directive.
10. Copying, replicating, and extracting data.
    a. Copying databases.
    b. Individual databases.
    c. Bulk copying.
11. Replication system administration.
    a. Replication system administrator tasks.
    b. DAAC DBA replication roles and tasks.
    c. Database replication.
12. Performance monitoring, tuning, and problem reporting.
    a. Database monitoring.
    b. Database tuning.
13. Ensuring database quality.
14. Sybase troubleshooting.
    a. Space usage.
    b. Deadlocks.
15. Oracle procedures.
    a. Oracle operating system environment.
    b. Starting up the database.

c. Shutting down the database.

d. Controlling the listener.

e. Data Dictionary view categories,

f. Obtaining information and controlling the system.

g. Oracle troubleshooting.

h. Accessing dynamic performance view.

i. Displaying parameter values.

j. Displaying information about users.

k. Displaying information about system privileges and object privileges.

l. Terminating sessions.

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

1. Students will start and stop Sybase Adaptive Server Enterprise (ASE) servers.
2. Students will create new database devices.
3. Students will configure databases using the Configuration Registry GUI.
4. Students will monitor database performance using sp_sysmon.
5. Students will perform a database backup.
6. Students will perform database recovery.
7. Students will troubleshoot chronic deadlocks on a database host.

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 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 Representative, DAAC Configuration Management Administrator, DAAC SW Maintenance Engineer and Sustaining Engineering personnel.

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

Duration: 6 Hours (3 Lecture, 3 Lab)

Sub-tasks:

1. EMD Configuration Management (CM) activities.

2. Configuration Control Boards (CCBs).
3. Configuration Change Requests (CCRs).
4. Software baselines and changes.
5. Changes to hardware baselines.
6. Changes to the baseline.

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, managing subscriptions and Data Pool, 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 Sustaining Engineering personnel.

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

Duration: 8 Hours (4 Lecture, 4 Lab) [LP DAAC 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. Adding privileges to an account created from Universal Resource Locator (URL) registration.

d. Editing/modifying an existing account.

e. Deleting an ECS account.

f. Canceling an ECS account.

3. Troubleshooting account management problems.

4. 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.

5. Canceling/tracking an order.

   a. ECS Order Tracking.

6. Troubleshooting order tracking problems.

   a. ECS Order Tracking Tool user messages.

   b. Checking order tracking server log files.

7. Subscriptions and Data Pool management.

   a. Using the Spatial Subscription Server GUI.

   b. Using the Spatial Subscription Server command line interface.

   c. Troubleshooting Spatial Subscription Server problems.

   d. Guidelines for selecting Data for Data Pool insertion.

8. Data Pool user access.

   a. User access to the Data Pool.

   b. Using the Data Pool Web Access GUI.

   c. Using the Data Pool ftp service.

   d. Data Pool access using the EDG.

9. Data Dictionary maintenance.

   a. Using the Data Dictionary Maintenance Tool.

   b. Exporting valids.

10. Troubleshooting Data Dictionary Maintenance Tool problems.

    a. ECS Data Dictionary Maintenance Tool (DDMT) user messages.

    b. Checking Data Dictionary Server log files.

11. Cross-DAAC referral processing.
    a. Referral to another DAAC.
    b. Receiving a referral from another DAAC.
12. Cross-DAAC order tracking.
    a. Tracking to another DAAC.
    b. Responding to a tracking request from another DAAC.
13. ASTER DAR creation and submission (LP DAAC only).
14. On-demand product requests (LP DAAC 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 create 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 use the Spatial Subscription Server GUI to display events for which a subscription can be created.
11. Students will display subscriptions in the Spatial Subscription Server database.
12. Students will add a subscription to trigger a Data Pool insert.
13. Students will extend the period of retention for a Data Pool insert subscription and associate the subscription with a theme.
14. Students will cancel a subscription.
15. Students will use the Spatial Subscription Server GUI to add a bundling order.
16. Students will use the Data Pool Web Access interface to retrieve data from the Data Pool.
17. Students will use the Data Dictionary Maintenance Tool to create a valids export file.
18. Students will perform cross-DAAC order tracking.
19. Students will create and submit an ASTER DAR (LP DAAC only).

20. Students will use the EOS Data Gateway (EDG) tool 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 new 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, and update the PDPS and Science Data Server databases.

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 Sustaining Engineering personnel.

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

Duration: 40 Hours (20 Lecture, 20 Lab)

Sub-tasks:

1. Science software configuration management.
    a. Creating a view in ClearCase.
    b. Setting a view in ClearCase.
    c. Creating a new directory.
    d. Importing files into ClearCase.
    e. Checking out a file from ClearCase.
    f. Checking a modified element into ClearCase.
2. Science Software Integration and Test (SSI&T) preparation, processes, and setup.
    a. General process.
    b. Science software integration and test flow.
3. Science Software Integration and Test (SSIT) Manager
    a. SSIT Manager Overview.
    b. SSIT Manager Tools.

4. Acquiring and unpacking the Delivered Algorithm Package (DAP).
    a. Acquiring the algorithm package via ftp.
    b. Unpacking a DAP.
    c. Performing a DAP insert.
5. DAP acquire.
    a. Performing a DAP acquire using SSIT Manager.
    b. Performing a DAP acquire using Ingest.
6. Inserting a Science Software Archive Package (SSAP).
    a. Inserting an SSAP into PDPS.
7. Updating an SSAP.
8. Standards checking of science software.
    a. Standards checking of science software overview.
    b. Checking for prohibited functions.
    c. Checking Process Control Files (PCFs).
    d. Extracting prologs.
9. Compiling and linking science software.
    a. Updating PCFs.
    b. Setting up an SDP Toolkit environment.
    c. Compiling Status Message Facility (SMF) files.
10. Building science software with the SCF Version of the SDP Toolkit.
11. Building Science Software with the DAAC Version of the SDP Toolkit.
12. Running a PGE in a simulated SCF environment.
    a. Setting up the environment for running the PGE.
    b. Running and profiling the PGE.
    c. Checking the PGE for memory leaks.
13. Using ECS Assistant, scripts, and Whazzup.
    a. Using scripts to start up/shut down servers.
    b. Using ECS Assistant to view the Science Data Server database.
    b. Monitoring ECS using the Whazzup web GUI.

14. Earth Science Data Type (ESDT) management.
    a. Inspecting ESDTs.
    b. Removing ESDTs.
    c. Adding ESDTs.
    d. Updating ESDTs.
    e. Modifying an ESDT's volume group information.
    f. Adding an ESDT's volume group information.
15. Production rules.
16. Data Preprocessing (DPREP).
17. Updating the orbit model.
18. PGE registration and test data preparation.
    a. PGE registration.
    b. PGE Object Description Language (ODL) file preparation.
    c. ESDT ODL file preparation.
    d. Operational metadata.
    e. Using the SSIT Operational Metadata Update GUI.
    f. Preparing test data and inserting data granules.
    g. Placing the Science Software Executable (SSEP) onto Science Data Server.
19. PGE planning, processing, and product retrieval.
20. Postprocessing and general investigation.
    a. Examining PGE log files.
    b. Examining PDPS-related scripts and message files.
    c. Examining AutoSys Job Information Language (JIL) scripts.
    d. Examining application log files (ALOGs).
21. File comparison and data visualization.
    a. Comparing files using the GUI HDF File Comparison GUI.
    b. Comparing files using the hdiff HDF File Comparison Tool.
    c. Comparing files using the ASCII File Comparison Tool.
    d. Comparing files using the Binary File Difference Assistant.
    e. Viewing product metadata with the EOSView Tool.

g. Viewing product metadata using the SSIT Manager.

h. Viewing product data with the IDL Tool.

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

1. Students will use ECS Assistant to:
   a. Start up/shut down servers.
   b. Open/view log files for a selected server.
   c. 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) from the command line.
12. Students will set up an SDP Toolkit environment.
13. Students will carry out 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 the SCF version of the SDP toolkit.
17. Students will compile and link a PGE with the 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 information.
23. Students will use a browser to view ECS Science PDPS 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 a PGE.

26. Students will perform PGE registration.

27. Students will perform test data preparation and insertion of data granules.

28. Students will prepare a Science Software Executable Package (SSEP) for placement onto Science Data Server.

29. Students will demonstrate PGE planning, processing, and product retrieval.

30. Students will perform postprocessing and general investigation.

31. Students will perform file comparison and data visualization.

32. Students 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 Representative, DAAC Computer Operator, DAAC System Administrators, DAAC Maintenance Coordinator, DAAC System Engineer, DAAC System Test Engineer, DAAC SW Maintenance Engineer, DAAC User Services Representative and Sustaining Engineering personnel.

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

Duration: 16 Hours (6 Lecture, 10 Lab)

Sub-tasks:

1. Configuration parameters.
    a. Configuration Registry.
    b. General configuration parameters.
2. System performance monitoring.
    a. Accessing the EOS Mission Support Network (EMSn) Web Page.
    b. Log in to system hosts.
    c. Checking the health and status of the network.
    d. ECS Health Check GUI.

e. ECS Assistant and ECS Monitor.

3. Problem analysis/troubleshooting.

   a. Analysis and troubleshooting of the system.

   b. Analysis and troubleshooting of COTS hardware.

   c. Performing preventive maintenance.

   d. Analysis and troubleshooting of COTS software.

   e. COTS software licenses.

   f. Installing COTS software.

   g. Safeguarding COTS software media.

   h. Obtaining COTS software support.

4. Troubleshooting of custom software.

   a. Implementation of modifications.

   b. Obtaining custom software support.

   c. General system troubleshooting.

   d. Using WhatsUp Professional, Whazzup, ECS Monitor, and EcCsIdPingServers script to check the status of hosts and servers.

   e. Checking server log files.

   f. Recovering from a connectivity problem.

   g. Recovering from a database access problem.

   h. Recovering from a missing mount point or other file access problem.

   i. Recovering from a Subscription Server/NBSRV problem.

   j. Recovering from granule insertion problems.

   k. Handling an acquire failure.

   l. Recovering from Ingest problems.

   m. Recovering from PDPS plan creation/activation and PGE problems.

   n. Recovering from QA Monitor problems.

   o. Recovering from problems with ESDTs or SSI&T.

   p. Recovering from problems with data search and order.

   q. Recovering from problems with Data Pool.

   r. Recovering from data distribution problems.

s. Recovering from problems with submission of an ASTER Data Acquisition Request (LP DAAC only).

t. Recovering from problems with on-demand product requests (LP DAAC Only).

5. Trouble Ticket (TT).

   a. Using problem report software.

   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 problem using the Inventory/Logistical Management (ILM) tool.
4. Students will add users to Remedy.
5. Students will change privileges in Remedy.
6. Students will generate Trouble Ticket reports.
7. Students will conduct detailed checkout and troubleshooting of 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 log in to system hosts.
2. Students will launch resource planning applications.
3. Students will shut down resource planning applications.
4. Students will determine actual processing resources to be added to the resource planning list.
5. Students will add resources to the resource planning list.
6. Students will modify resources on the resource planning list.

7. Students will delete resources from the resource planning list.
8. Students will create resource reservation requests.
9. Students will edit/modify resource reservation requests.
10. Students will validate or reject resource reservation requests.
11. Students will approve resource reservation requests.
12. Students will commit resource reservation requests.
13. Students will delete a resource reservation request.
14. Students will review a resource timeline.
15. Students will troubleshoot resource planning problems.
16. Students will launch the Production Request Editor.
17. Students will create new production requests using the Production Request Editor GUI.
18. Students will create new production requests using the Production Request Generator (command-line interface).
19. Students will delete a production request.
20. Students will review data processing requests.
21. Students will delete a data processing request.
22. Students will launch the Production Strategies GUI.
23. Students will launch Planning Workbench-related GUIs.
24. Students will define a production strategy.
25. Students will create a new production plan.
26. Students will review a production plan timeline.
27. Students will save and reset the PDPS database.
28. Students will clean the PDPS database.
29. Students will clean the DPS disks.
30. Students will troubleshoot production planning problems.
31. Students will launch the AutoSys GUI Control Panel.
32. Students will monitor/control job processing.
33. Students will view PDPS database entries using isql.
34. Students will troubleshoot processing problems.
35. Students will view product granules using EOSView.
36. Students will review production history granules.
37. Students will review FAILPGE granules.

Training Schedule

Course Duration

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

Table 1. Course Duration Summary

LESSON	DURATION (Hrs)	LECTURE/LAB (Hrs)
Introduction and Detailed System Overview; Science Data Processing Internal Training	13	13/0
Problem Management	2	1/1
System Administration	7	4/3
Network Administration	6	3/3
Production Planning and Processing	20	10/10
Resource Planning	4	2/2
Ingest	8	4/4
Data Distribution	24	12/12
Archive	8	4/4
Database Administration	7	5/2
Configuration Management	6	3/3
User Services	8 (LP DAAC 12)	4/4 (LP DAAC 5/7)
Science Software I&T	40	20/20
System Troubleshooting	16	6/10
Advanced Production Planning and Processing	16	0/16
TOTAL	185 (LP DAAC 189)	91/94 (LP DAAC 92/97)

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Abbreviations and Acronyms

Additional abbreviations and acronyms are listed in document 508-EMD-001, ACRONYMS for the EOSDIS Maintenance and Development (EMD) Project.

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
DPREP	Data Preprocessing
DPS	Data Processing Subsystem
DSS	Data Server Subsystem
ECS	EOSDIS Core System
EMD	EOSDIS Maintenance and Development [Project]
EMSn	EOS Mission Support Network
EOC	EOS Operations Center
EOSDIS	Earth Observing System Data Information System
ESDT	Earth Science Data Type
GeoTIFF	Georeferenced Tagged Image File Format
GUI	Graphical User Interface
HDF	Hierarchical Data Format

HEG	HDF-EOS to GeoTIFF Conversion Tool
HW	Hardware
I&T	Integration and Test
ILM	Inventory/Logistical Management
ILS	Integrated Logistics Support
IV&V	Independent Verification and Validation
LSM	Local System Management
MSS	System Management Subsystem
NASA	National Aeronautics and Space Administration
NBSRV	Spatial Subscription Server
OGC	Open Geospatial Consortium
OWS	Open Geospatial Consortium (OGC) Web Services
PDPS	Planning and Data Processing Subsystems (especially with reference to the Planning and Data Processing Subsystems' shared database)
PDS	Product Distribution System
PGE	Product Generation Executive
PGE	Principal Investigator
PMD	Physical Media Distribution
QA	Quality Assurance
S/C	Spacecraft
SCF	Science Computing Facility
SDP	Science Data Processing
SE	Sustaining Engineering
SMC	Systems Monitoring Center
SME	Subject-Matter Expert
SSI&T	Science Software Integration and Test
SW	Software
T^3	Train-the-Trainer