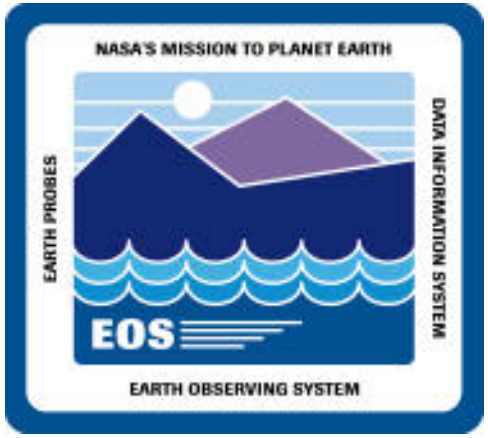
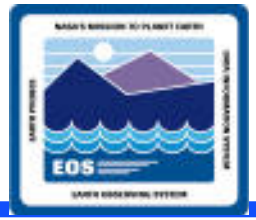


Science Software Integration & Test

Shirley M. Read

ECS Pre-Release B Testbed Training

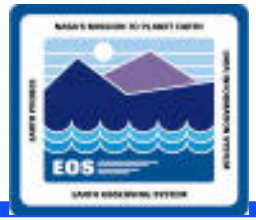
Science Software Integration and Test (SSI&T) Overview



WHAT ECS SSI&T IS

- SSI&T is the process by which science software developed by Instrument Teams at local SCFs is tested and integrated into the ECS at the DAACs.
- The scope of SSI&T for pre-launch releases covers activities starting with delivery of the science software to the DAACs and ending with either the successful integration of each delivered PGE into ECS or the scheduled end date for SSI&T support.
- SSI&T is a team effort which can only be successful in the allotted time if all groups cooperate.

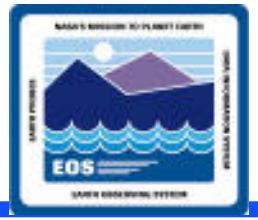
Science Software Integration and Test Overview



WHAT ECS SSI&T IS NOT

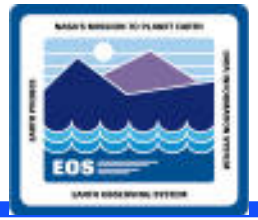
- **SSI&T is not validation of science algorithms that are incorporated into PGEs which produce science data products.**
- **SSI&T is not validation of the science data produced.**
- **Although the Operational Procedures are written as checklists of menu driven activities, SSI&T is not a turnkey process which can be run by test personnel who have no knowledge and experience related to science software development and data processing.**
- **SSI&T is not a simulation of production.**

SSI&T Training Topics
Day 1



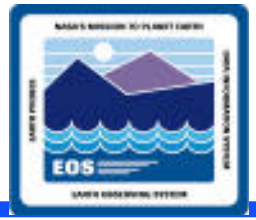
- Preparation and Setup
- Acquiring and Unpacking Delivered Algorithm Package
- Science Software Configuration Management
- Preparation of Earth Science Data Types (ESDTs)
- The SSI&T Manager
- Standards Checking of Science Software
- Compiling and Linking Science Software
- Running a PGE in a Simulated SCF Environment
- Examining PGE Produced Log Files
- File Comparison and Data Visualization

SSI&T Training Topics
Day 2



- Updating the PDPS Database and IMF Data Server
- PGE Planning and Processing
- Post Processing Activities
- Troubleshooting and General Investigation

Objectives



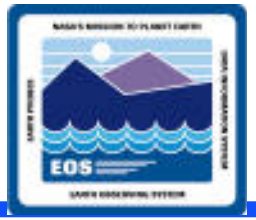
Overall: Provide the proficiency to integrate and test science software into EOSDIS

- **Prepare and setup for SSI&T**
- **Acquire and unpack the delivered science software**
- **Configuration manage the science software**
- **The SSIT Manager GUI**
- **Verify that source files comply with the ESDIS Data Production Software and SCF Standards**
- **Compile and link the PGEs to the SDP Toolkits**
- **Run and profile the PGE in SCF environment**
- **Update the PDPS Database and IMF Data Server**
- **Plan, schedule, and run the PGE in DAAC PDPS environment**
- **Perform HDF, ASCII, or Binary file comparison and view products**
- **Perform trouble shooting and problem tracking**

Pre-SSI&T Activities

- Inspection of contents of delivered algorithm package (DAP)
- Review of delivered documentation
- Checking of science software for standards compliance
- Building of the science software into PGEs with the SCF Toolkit
- Running of the PGEs from the command line
- Collection of performance statistics for the PGEs
- Examination of output log files from the PGE runs
- Viewing of output products and comparison to delivered test data

Formal SSI&T Activities



- Installation of ESDTs on the Science Data Server (SDSRV)
- Registration of the PGEs in the PDPS Database
- Building of the science software into PGEs with the DAAC Toolkit
- Running of the PGEs by submitting individual Production Requests (PRs) to run single PGEs within the PDPS
- Examination of output log files from PGE runs
- Viewing of output products and comparison to delivered test data
- Usage of the Planning Subsystem to run PGE chains

ECS Testbed Support Groups

ECS Support Group	Suggested Functionality
DAAC & SDE SSI&T	Pre-SSI&T and Formal SSI&T Activities, Fix ECS PDPS Software Problems
M&O	Systems Operations & Engineering, Databases, ClearCase VOB Administration, Coordinate with SSI&T Group on Planning Workbench/Schedule Jobs/Run PGEs using AutoSys, Fix System & COTS Problems
Science Liaisons	Support Build & Verification of New ESDTs and Modifications to Existing ESDTs, Support Validation of Database/Products

Preparation and Setup

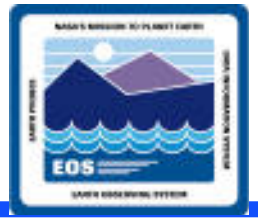
Preparation for SSI&T is a cooperative effort by M&O and SSI&T.

- **Setup of user accounts**
- **Logon**
- **Examine .cshrc file**
- **Set additional environmental variables**
- **Source additional setup files**
- **Verify access to ClearCase VOB**

The Green Book SSI&T Operational Procedures provides a road map to get from a Delivered Algorithm Package to Science Software which is integrated into ECS and ready for production.

- **Procedures are ordered in a logical sequence.**
- **Some deviation will be required for actual work at each DAAC.**

Acquiring and Unpacking the Delivered Algorithm Package



Science Software Delivery:

- **Generally as 1 or more Delivered Algorithm Packages (DAPs)**
- **Usually 1 PGE per DAP**

Typical Contents of DAP:

- **Source code, message files, make or build files, scripts**
- **Process Control File (PCF),**
- **Metadata Configuration File (MCF),**
- **Instructions for building and running PGE,**
- **New metadata and ESDT information,**
- **Test data for input and comparisons**

Acquiring and Unpacking the Delivered Algorithm Package

DAP Usually Acquired via :

- **FTP**
- **Tapes - 4mm or 8mm**

Personnel :

- **SSI&T generally does ftp**
- **System Adminisration does tapes**

Unpacking of files and directories:

- **UNIX tar**
- **gzip or gunzip**

Science Software Configuration Management

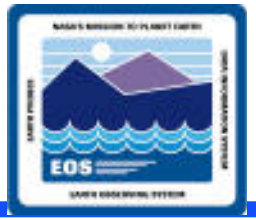
ClearCase - COTS tool for configuration management of science software

Invocation Methods - Command line or Graphical User Interface (GUI)

Key Term -

- **Versioned Object Base (VOB) - a mountable file system which stores version controlled data in directories and files**
  - **any Unix file : source files, script files, documents, spreadsheets**
  - **binary data and object files are not stored efficiently**
  - **Usually accessed with standard UNIX and ClearCase Tools**
- **View - A working context for a user. Used to access any VOB to make files and directories visible and accessible. Comprised of a storage area for checked out files.**
- **Element - File or directory in ClearCase VOB.**

Creating a View



Naming Convention

- **Provides file/directory names that will be used for locating directories or files.**
- **Key Names**
  - **Viewname - name of the view**
  - **pathname - pathname is the path to the VOB directory**
  - **dirname - new directory name**

Scope

. Needs to be created only once

. Must be set at beginning of each user session

Creating a View

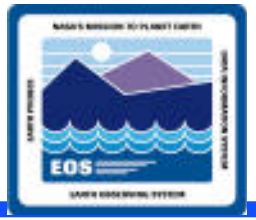
Key Assumptions

- **ClearCase is Available.**
- **A VOB has been created.**

ClearCase Commands

- **cleartool mkview - creates a view**
- **cleartool setview - sets a view**
- **cd VOBpathname - changes directory to the VOB**
- **cleartool lsvob - list VOBs**
- **cleartool checkout - checks out a directory or file**
- **cleartool mkdir - creates a subdirectory**
- **cleartool checkin - check in a directory or file**

Importing Files into ClearCase



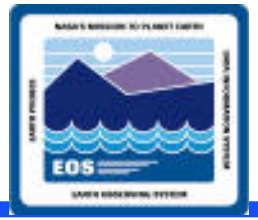
Key Assumptions

- **DAAC SA required to complete this procedure.**
- **A VOB and subdirectory has been created to hold these files.**
- **No object files or executables exist in the directory.**
- **The PGE was received with a directory structure that contains various types of files**
- **The PGE directory structure will be maintained.**

ClearCase Commands

- **cd parentdir - changes directory to the parent directory to be brought into ClearCase**
- **clearcvt-unix-r dirname - creates a conversion script**
- **cvt_script - command to run the script to place all elements under ClearCase**

Entering a Single File into ClearCase



Key Assumptions

- **A VOB and subdirectory has been created to hold the file**
- **A view has been created.**

ClearCase Commands

- **cleartool setview - launches ClearCase and displays the view.**
- **cd path - changes directory to a subdirectory in the VOB.**
- **cleartool checkout - checks out the current directory.**
- **cleartool mkelem - creates a new element/file.**
- **cleartool checkin - checks the file or directory into ClearCase.**

Entering a New Directory into ClearCase

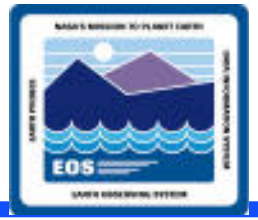
Key Assumptions

- **A VOB and subdirectory has been created to hold the file**
- **A view has been created.**

ClearCase Commands

- **cleartool setview - launches ClearCase and displays the view.**
- **cd path- changes directory to a subdirectory in the VOB.**
- **cleartool checkout - check out a directory from ClearCase.**
- **cleartool mkdir - creates the new directory.**
- **cleartool checkin - check in a directory/file from ClearCase.**
- **cleartool mkelem - creates a new element/file.**

Checking Out an Element from ClearCase



Key Assumptions

- **A VOB and subdirectory has been created to hold the file**
- **A view has been created.**

ClearCase Commands

- **cleartool setview - launches ClearCase and displays the view.**
- **cd path- changes directory to a subdirectory in the VOB.**
- **cleartool checkout - check out a directory from ClearCase**
- **cleartool uncheckout - cancels a checkout**

Entering a Modified Element into ClearCase

Key Assumptions

- **A VOB and subdirectory has been created to hold the file**
- **A view has been created.**

ClearCase Commands

- **cleartool setview - launches ClearCase and displays the view.**
- **cd path- changes directory to a subdirectory in the VOB.**
- **cleartool checkin - check out a directory from ClearCase.**

Note

- **DAAC policy may require a comment on entry of modified element into ClearCase.**

Preparation of Earth Science Data Types (ESDTs)

Building and registering ESDTs should be done before ECS is deployed.

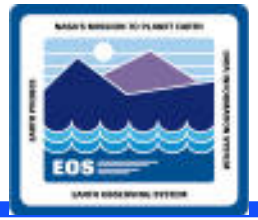
ECS Requirements:

- **ESDTs for all data collections to be input to PGEs or output from PGEs must be built and registered into ECS before any PGEs are run in PDPS.**
- **Only generic, limited services will be available in the Pre_Release B Testbed: Insert, Acquire, Search, Notify**
- **DLL code is not needed for theTestbed.**

Reasons for Inclusion in SSI&T:

- **Instrument Teams may deliver new ESDTs for new types of input files and output products from PGEs.**
- **Instrument Teams may deliver MCFs that are changed from versions delivered earlier.**

Preparation of Earth Science Data Types (ESDTs)



Science Data Engineering Office Supplied ESDT Tools.

Comparison of delivered MCF to granule level metadata attributes in ESDT descriptor file.

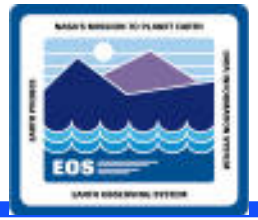
•Generation of new versions of ESDT descriptor file from delivered MCF.

•Creation of new ESDT descriptor files for limited collection level metadata with generic services.

ECS Supplied Tools.

•ESDT registration

Comparing Granule Level Metadata



Key Assumptions

- **The ESDT descriptor file is configured at ECS.**
- **A VOB and subdirectory has been created to hold the file.**
- **A view has been created.**

Commands

- **cleartool setview - launches ClearCase and displays the view**
- **MCFToDescChecker - compares granule level metadata in ESDT to delivered MCF**

Data Flow Diagram for Tool

<ESDT Descriptor> ------> | MCFTo DescChecker | --------> / Identical ?/

<MCF> ---------------------->

Generating a New Version of ESDT from Delivered MCF

Key Assumptions

- **The ESDT descriptor file is configured at ECS.**
- **A VOB and subdirectory has been created to hold the file.**
- **A view has been created.**

Commands

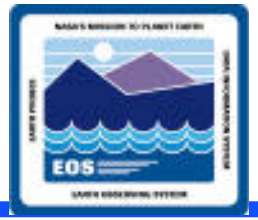
- **cleartool setview - launches ClearCase and displays the view**
- **cleartool checkout and checkin - check out/in ESDT descriptor file**
- **UpdateDesc - modifies configured ESDT descriptor file**
- **MCFToDescChecker - compares granule level metadata in ESDT to delivered MCF**

Data Flow Diagram for Tool

<ESDT Descriptor> ------> |UpdateDesc | --------> <ESDT Descriptor (new)>

<MCF> ---------------------->

Generating a Comma Delimited Text File from a Spreadsheet



Key Assumptions

- **MSWindows and MSExcel are available.**

Commands

- **SSIT Manager - provides access to Office Automation Tools**

MSWindows/MS Excel - provides spreadsheet capability for text file

Data Format for Attribute Columns in Spreadsheet

ShortName - ESDT collection metadata ShortName

LongName - ESDT collection metadata LongName

VersionID - ESDT collection metadata CollectionDescription

CollectionDescription - ESDT collection metadata CollectionDescription

ProcessingCenter - ESDT collection metadata ProcessingCenter

ArchiveCenter - ESDT collection metadata ArchiveCenter

Permanent - Flag: “Yes” = permanent/static file, “No” = dynamic

Generating a New ESDT Descriptor File

Key Assumption

- **A VOB and subdirectory has been created to hold the file.**
- **A view has been created.**

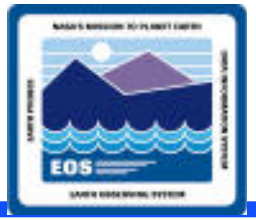
Commands

- **cleartool setview - launches ClearCase and displays the view**
- **cleartool checkout and checkin - check out/in ESDT descriptor file**
- **cleartool mkelem - create new element/file to be checked in**
- **DescGen - genertes a new ESDT descriptor file from metadata text file**

Data Flow Diagram for Tool

<Metadata text file> ----------> |DescGen| ------> <ESDT Descriptor>
<MCF(dynamic only)> ----------> /
<Services template> ----------> |
<Collection level template(static|dynamic)>

Registering an ESDT



Key Assumptions

- **PDPS configuration is setup and path is known to SSI&T.**
  - **SSI&T personnel have permissions and privileges to register ESDTs.**

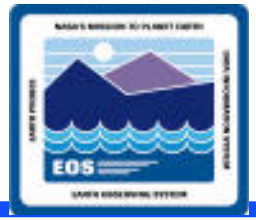
Commands

- **test_esdt - registers ESDT by creating new ESDT subdirectory in configured area and copying ESDT into this subdirectory**

Information entered for registration:

- **archive path - UNIX directory path to ECS archive**
- **ShortName - ESDT collection metadata attribute**
- **DescFilename - file name for ESDT descriptor, same as ShortName**

Validating Successful ESDT Registration



Key Assumptions

- **PDPS archive configuration is properly setup, path is known to SSI&T. SSI&T personnel have permissions and privileges to register ESDTs.**
- **A VOB and subdirectory has been created to hold the file.**
- **A view has been created.**

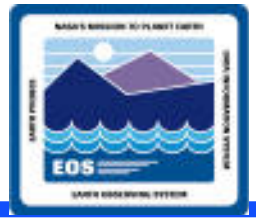
Commands

- **cd, ls, diff - UNIX commands to change directory, list, and difference**
- **cleartool setview - launches ClearCase and displays the view**

Criteria for success

- **The new ESDT subdirectory has been created in the correct path and the new ESDT descriptor is copied to this location.**
- **The contents of the ESDT descriptor file are identical to ESDT in VOB.**

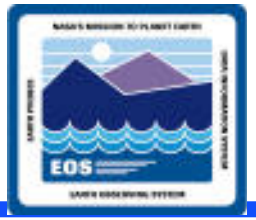
SS IT Manager



Provides a common interface to the SS I&T software tools and manages their operation

- **Setup SSI&T Manager and checklist**
- **Open xterm session**
- **Code Analysis**
- **Office Automation Tools**
- **Standards Compliance**
- **Product Examination using EOSView and IDL**
- **File Comparison in HDF, binary or ASCII format**
- **Edit Text file**
- **Initialize PDPS database**
- **Data Server Access**

Setup of SSIT Manager



Configuration of Environment

- **SSIT Manager runs only on Sun platforms.**
- **User makes a local copy of PCF for SSIT Manager and sample checklist.**
- **Following environment variables must be added to user's .cshrc file.**
- **DPATMGR_HOME - home directory on AIT Sun of SSIT Manager**
- **PGS_PC_INFO_FILE - full path name and filename of user copy of PCF**
- **PGSHOME- full path name to SDP Toolkit directory on AIT Sun**
- **PGSMSG- set to $PGSHOME/message**
- **DISPLAY - set to machinename:0.0 only if same machine always used**
- **Following source command must be added to .cshrc file.**
- **$DPATMGR_HOME/bin/sun5/DpAtEnv.csh**

Setup of Checklist for SSIT Manager

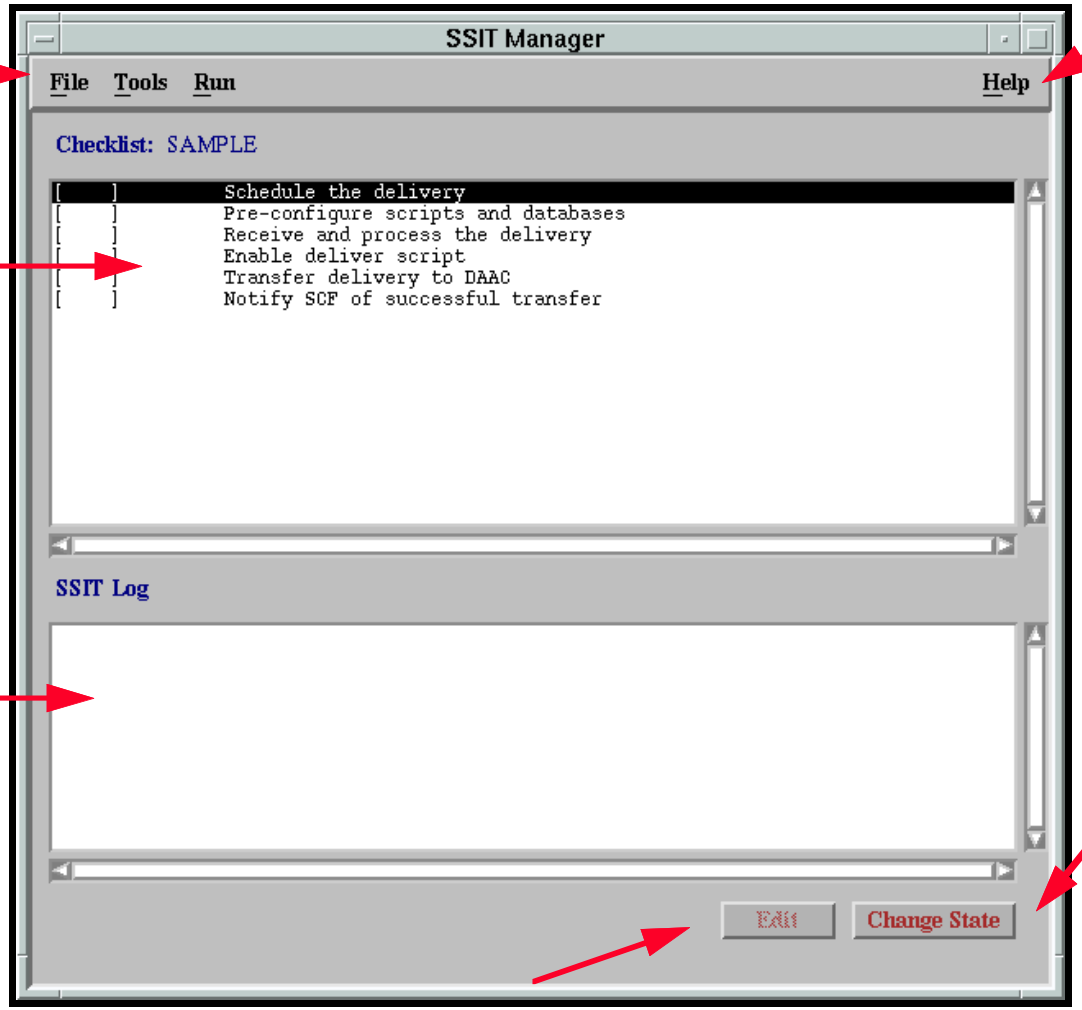
Steps to Setup the SSIT Manager Checklist for Use in SSI&T

- **User copies checklist.sample from $DPATMGR_HOME/data/, the home directory of the SSIT Manager.**
- **User edits local copy of the checklist in home directory.**
- **Edit line CHECKLIST=title with user choice of title, which will be displayed on title bar on GUI screen.**
- **Edit line DATABASE=/home/user/userchecklist, which will result in creation of two database files when SSIT Manager is run.**
  - **userchecklist.dir**
  - **userchecklist.pag**
- **Edit ITEM=checklist_step with SSI&T procedure or activity step. Enter as many ITEM lines as needed.**

Edit local copy of SSIT Manager PCF to change line:

603|DpAtMgrLogDatabaseInit|home/user/userchecklist

SS IT Manager GUI



Menu Bar: Allows access to SSI&T Tools

Checklist Pane: List set of steps to be completed

Log Pane: Log of activities accomplished

Help: Provides access to help features

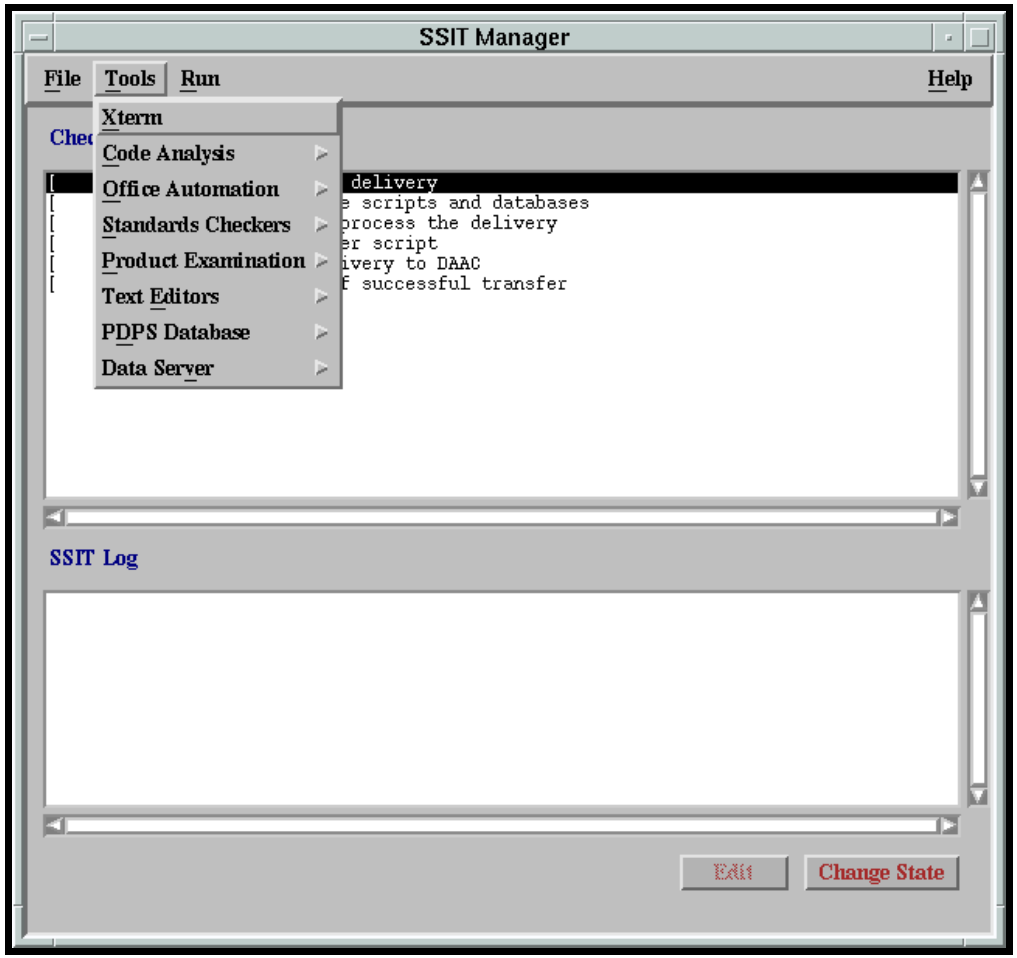
Change State: Button allows Checklist state to Toggle

Edit: Button allows Checklist to be edited

SS I&T Manager Tools

Tools:

1. **Xterm:** Starts an Xterm window session
2. **Code Analysis:** Performs static code analysis
3. **Office Automation:** MS Windows, MS Office
4. **Standards Checkers:** Prohibited Function Checker
5. **Product Examination:** File Comparison Tools
6. **Text Editors:** Emacs or Xedit Tools
7. **PDPS Database:** PCF ODL Template Tool
8. **Data Server:** Copy Tools



Standards Checking

Purpose: Verify that the source files of a PGE are compliant with the ESDIS Data Production SCF Standards and Guidelines.

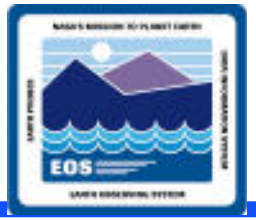
Key Terms:

- **SDP Toolkit**
  - **provides an interface to the ECS system**
  - **allows science software to be portable to different platforms**
  - **reduces redundant coding at the SCF**
  - **provides value added functionality for science software development**

Standards Checking (cont.)

- Mandatory SDP Toolkit tools
  - Error and Status Message Facility (SMF)
  - Process control Tools
  - Generic Input/Output Tools
  - Memory Allocation Tools
- Optional Tools
  - Ancillary Data Access
  - Celestial Body Position Coordinate System Conversion
  - Constant and Unit Conversion
  - IMSL

Standards Checking (cont.)



Steps for Standards Compliance

FORTRAN 77 - On the AIT Sun

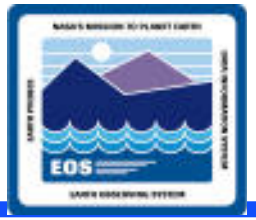
- **Source FORCHECK setup file**
- **Create FORCHECK run script**
- **Invoke FORCHECKrun script**
- **Examine the list file**

Fortran 90 and C - On the SDPS SGI

- **Set environment to appropriate SDP Toolkit**
- **Compile the PGE using compiler flags**
- **Examine the list file**

Ada - Compile using COTS Verdix Ada Development System or GNU C Compiler, gcc

Prohibited Function Checker



•Used to check source files for the occurrence of functions that are prohibited in the ECS DAAC production environment.

Key Procedure Commands

- SS IT Manager
  - Tools Æ Standards Checkers Æ Prohibited Function Checker

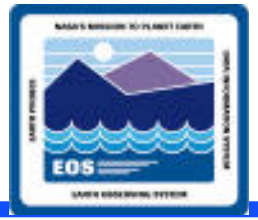
Run the Analyze from GUI

- Highlight files to be analyzed
- Run checker
- Generate report
- Save and examine report

Alternatively, run the analysis from the command line

- Create a text file with a list of files to be checked
- Direct output to results text file and examine

Checking Process Control Files



Key Procedure Commands

- **SS IT Manager**
  - **Tools Æ Standards Checker Æ Process Control File Checker**

Run the PCF Checker GUI

- **Select the directory**

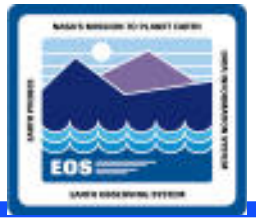
The PCFs must be checked to verify that they are syntactically correct and contain all the information for the PGEs to run within the ECS DAAC production environment

- **Select one PCFand select the Check PCF button**
- **Save or print the results file and examine results**

Run the Process Control File Checker from the command line

- **Input the path and PCF filename**
- **Direct results into file and examine**

Extracting Prologs



The Prolog Extractor will search recursively for files with valid filename extensions. The beginning and end delimiters are:

!F77 !F90 !C !Ada !F77-INC !F90-INC !C-INC !PROLOG

!END

Key Procedure Commands

- **SS IT Manager**
  - **Tools Æ Standards Checker Æ Prolog Extractor**

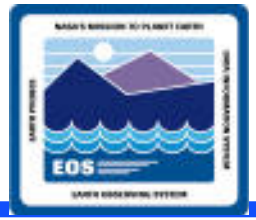
Run the Prolog Extractor GUI

- **Select the directory with source files**
- **Save or print the output Prologs files**

Run the Prolog Extractor from the command line

- **Go to the dirctory with source files**
- **Direct results to file and examine**

Compiling and Linking Science Software

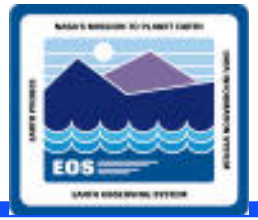


Science software developed at SCFs using the SDP Toolkit provided by ECS needs to be compiled and linked first with SCF Toolkit version to compare results at each facility. Then the science software needs to be compiled and linked with the DAAC Toolkit.

Preparation for compile and link

- **Source correct SDPToolkit library version - total of 6 versions**
  - **Location Type: SCF or DAAC**
  - **Computer Language Type: FORTRAN 77, Fortran 90, C, Ada**
  - **Object Type: 32-bit mode or 64-bit mode**
- **Update PCF for execution of PGEs at the DAAC**
- **Compile Status Message Files**

Updating a PCF



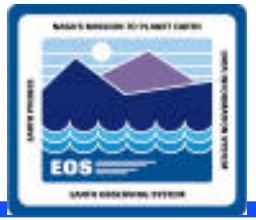
PCF sections

- **System Runtime Parameters**
- **Product Input**
- **Product Output**
- **Support Input**
- **Support Output**
- **User-defined Runtime Parameters**
- **Intermediate Input**
- **Intermediate Output**
- **Temporary I/O**

Update appropriate path names where necessary

- **Add 10111|ShmMem|~/runtime||||1**

Compiling SMF



Status Message Facility (SMF) Files - Also known as Error Status Message

Provides

- **An error and status message handling mechanism**
- **A method to send log files, informational messages and output data files to DAAC personnel or remote users.**

SMF files need to be compiled with science software into message files and include files.

These files will be used by science software during runtime.

smfcompile

Process Steps

•Set ClearCase view (if source code is in ClearCase)

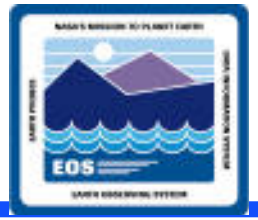
•Se t up SDP Toolkit environment

•Go to SMF directory for the PGE

•Run the SMF compiler

•Move created files to proper directories

Compiling a PGE and Linking with SCF or DAAC Version of SDP Toolkit



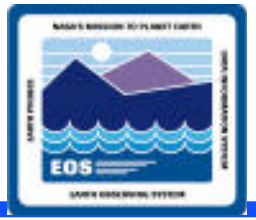
Compiling and Linking of Science Software will vary according to the instructions from the Instrument Software Development Teams.

Compiling and linking with SCFand DAAC versions differs only in the set Toolkit environment.

The following procedural steps are required.

- **Read all instructional information supplied with the delivery.**
- **Log into the SDPS SGI and set up the proper SDP Toolkit environment.**
- **Set the CLearCase view is software is already in ClearCase.**
- **Compile Status Message Facility files first.**
- **Examine the make or build file and alter if necessary.**
- **Using the make or build file, perform the build.**
- **If make file has been changed, check in modified version.**

Running a PGE in a Simulated SCF Environment



Running a PGE at the DAAC in a simulated SCF environment should produce identical results as those at the SCF.

The following procedural steps are required:

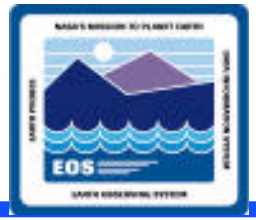
- **Set up the SCF SDP Toolkit environment.**
- **Set the environment variable PGS_PC_INFO_FILE to path and file name of PCF for the PGE.**
- **If the PGE has been run before in the same directory, remove old log files.**
- **Run the PGE from the command line.**

To capture PGE runtime statistics for the PDPS Database, perform profiling using the DpPrRusage Program. Statistics needed:

wall clock time user time system time amount of memory used

number of page faults number of input and output blocks

Examining PGE Produced Log Files



PGEs produce three log files during runtime:

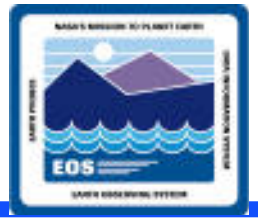
- **Status Log - captures all error and status information**
- **User Log - captures a subset of more informational messages**
- **Report Log - captures arbitrary message strings**

Log file messages are written by both SDP Toolkit and science software using the Status Message Facility (SMF).

Procedure steps to follow:

- **Examine PCF to get location of log files.**
- **With SCF version of Toolkit, location and filenames can be set as desired.**
- **Look for errors or warnings, anomalous messages**

File Comparison and Data Visualization



An important activity for SSI&T is comparing the output data products from the PGE runs to test files delivered with the PGE.

The comparison may consist of display of metadata in HDF files, display of differences in data values, or display of images of the data products.

Searches are performed for any differences beyond specified tolerances.

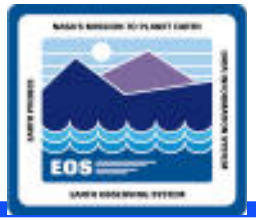
Data product files can be compared by a variety of tools accessible by the SSIT Manager GUI.

- **Tools Æ Product Examination Æ File Comparison Æ HDF or ASCII or Binary**

Data visualization tools are accessible by the SSIT Manager GUI.

- **Tools Æ Product Examination Æ IDL or EOSView**

Updating the PDPS Database and IMF Data Server



Integration of Science Software with ECS requires that information about PGEs be made known to the PDPS in its database.

•PDPS needs information to plan, schedule, and run science software

•PDPS Database and IMF Data ServerTools are accessible from SSIT Manager GUI

- **Tools Æ PDPS Database Æ PCF ODL Template**
  Æ SSIT Science Metadata Update
  Æ SSIT Opnl Metadata Update
- **Tools Æ Data Server Æ Register Subscription**
  Æ Insert Static
  Æ Insert Test Dynamic
  Æ Insert EXE TAR

Updating the PDPS Database with ESDT Metadata

PDPS needs basic information on every type of file associated with the PGEs.

- **Metadata is first prepared in Object Definition Language (ODL), one for each ESDT.**
- **Determine IMF Data Server ShortName for ESDT corresponding to file.**
- **Search ESDT directory for ESDT ODL file. If file exists, there is no need to make another one for this ESDT.**
- **If not, copy the ESDT ODL template from configured area to user space.**
- **Add required metadata to ODL file via text editor.**
- **ShortName in ODL file must match ShortName of file itself and ShortName in PDPS PGE metadata ODL file.**
- **Copy the ESDT ODL file to configured area.**

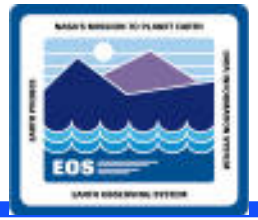
Updating the PDPS Database with PGE Metadata

PDPS needs basic information or metadata on the PGE.

Order for Activity: All ESDT metadata ODL files associated with the PGE must be prepared and put into the configured area before or after this step.

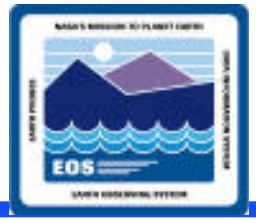
- Invoke PCF ODL Template Tool.
- This tool prompts the user for the following information:
  - Configuration file - use default ConfigFile path and filename for DAAC
  - Process Control File - Path and filename of PCF, default path is current
  - PGE Name - Name of PGE associated with PCF
  - PGE Version - PGEversion, default is 1
- Many PCF ODL files can be made on same invocation until user quits.
- Program outputs a file with name PGE_PGEname#PGEversion.tpl.
- Go to full path from which SSIT Manager is run and change filename extension to ".odl" or copy template into file with same name and ".odl".

Updating the PDPS Database with PGE Metadata (2)



- Edit PGE_PGEname#PGEversion.odl file to add metadata.
- From SSIT Manager select Tools Æ SSIT Science Metadata Update or run program DpAtPdpsDbUpdateScience.sh from command line.
- The program prompts for the following information:
  - ConfigFile - use default for path and filename at each DAAC
  - mode - use default or type mode which will eventually be ssit
  - PGE name - name of PGE that will be registered
  - PGE version - PGEversion to be registered
- Quit out of program

Updating the PDPS Database with Operational Metadata



Assumption: All ESDT metadata ODL files associated with the PGE must already be prepared and put into the configured area and the PGE must be registered using the Science Metadata Update Tool.

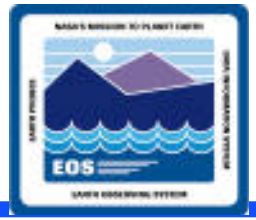
- **Invoke the PDPS/SSIT Database Update GUI Tool.**
- **Select the PGE name and version.**
- **Select new PGE and Done.**

PDPS needs basic operational metadata on the PGE to plan resources.

- **Select Profile and enter values in fields under Performance Statistics:**

Wall clock time	**CPU time**
Max memory used	**Block input ops**
Block output ops	**Swaps**
Page faults	

Updating PDPS with Operational Metadata



- Select Resource Requirements and enter values:
  - Max disk space used during PGE run
- Select Proc. String. Only one should be listed. No. Processors should be 1
- Apply to update the PDPS database.
- To start over, use RESET button.

The performance statistics collected by running the PGE under DpPrRusage initialize the PDPS database so that the Planning for DPRs can be performed. The actual values entered need only to be approximate.

Placing Dynamic Data Granules on the IMF Data Server

A granule of data is the smallest aggregation of data that is individually managed and archived in the ECS. When products are requested through PDPS, the PGE will be run using the required input data granules acquired from the IMF Data Server.

- **Dynamic test data granules are delivered with the PGE for input at runtime**
- **Insert of dynamic test data is done by a Data Server Program**
- **DAPs contain MCF templates or samples for output products, not input**
- **PGEs, through the SDP Toolkit, generate target MCFs for each data granule produced using the source MCF ODL files delivered with the PGE**
- **The target MCFs produced by the PGE are used by the Data Server to insert data products, thus they are called database load ODL files**
- **SSI&T will have to create target MCFs (database load ODL files) for input test data granules**

Creating a Target MCF for a Dynamic Data Granule

Assumption: All ESDT metadata ODL files associated with the PGE must already be prepared and put into the configured area and the PGE must be registered using the Science Metadata Update Tool.

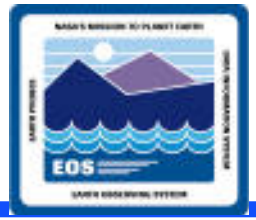
Steps to place dynamic data granules on the Data Server

•If a source MCF template is not available for the dynamic data granule, then make one by editing a template provided for SSI&T

•Creating a target MCF for dynamic data granule

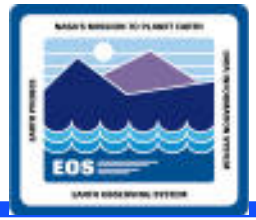
- **Go to the directory where the source MCF resides**
- **Invoke SrcToTargetMCF program from command line**
- **Enter source MCF filename (.mcf) and target MCF filename (.met)**
- **Edit TargetMCFfilename.met**
- **For all Data_Location="PGE" attribute in Source MCF, enter data values provided by Instrument Teams on delivery of the DAP, then save the file**

Inserting Dynamic Data Granules to the IMF Data Server



- **Inserting Dynamic Data Granules to the IMF Data Server**
  - **Go to the directory where the dynamic data granule resides**
  - **From the SSIT Manager GUI Æ**
    Tools Æ Data Server Æ Insert Test Dynamic
  - **The Insert Test Dynamic program will be running**
  - **Enter the following information:**
    Config Filename - take default
    ESDT ShortName - ESDT ShortName corresponding to data granule
    Filename to Insert - Filename of data granule to be inserted
    Associated ASCII metadata (target MCF) filename to Insert -
    Filename of target MCF just created, has ".met" entension
- **A command line version of the program is available.**

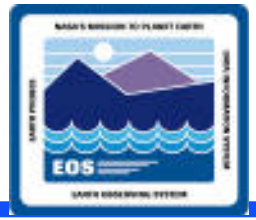
Placing Static Data Granules on the IMF Data Server



Staticdata granules are those whose temporal locality is static over long periods of time. Examples are calibration files which change with a new version of the PGE.

- **Static test data granules are delivered with the PGE.**
- **Insert of static test data is done by a Data Server Program.**
- **DAPs contain MCF templates for output products, not input static files.**
- **PGEs, through the SDP Toolkit, generate target MCFs for each data granule produced using the source MCF ODL files delivered with the PGE.**
- **Target MCFs or Metadata ODL files are needed to insert static data granules to the Data Server.**
- **SSI&T will have to create target MCFs (database load ODL files) for static test data granules.**
- **A template for static Metadata ODL files is provided for SSI&T.**
- **The static version has parameters unlike those for dynamic data granules.**

Creating a Metadata ODL File for a Static Data Granule



Assumption: All ESDTs associated with the PGE, including either a single ESDT for static type files or an ESDT for each static file, must already be registered. PGE must be registered using Science Metadata Update Tool.

Steps to place static data granules on the Data Server

- **A template metadata ODL file which can be edited is provided for SSI&T**
- **Creating a metadata ODL file for a static data granule**
  - **Go to the directory where the metadata ODL template resides**
  - **Copy StaticODLmet.tpl to the user working directory as *filename*.met**
  - **Edit the *filename*.met and enter the following information and save:**

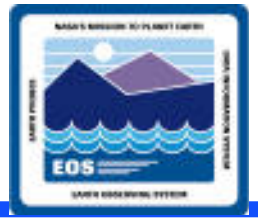
    ShortName - ESDT ShortName

    VersionID - ESDT VersionID

    ParameterName - name of static file in InformationContentContainer

    ParameterValue - Cn: C = coefficient file, M = MCF; n = 1,2,...

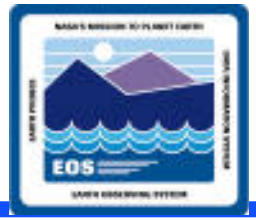
Inserting Static Data Granules to the IMF Data Server



- **Inserting Statc Data Granules to the IMF Data Server**
  - **Go to the directory where the dynamic data granule resides**
  - **From the SSIT Manager GUI Æ**

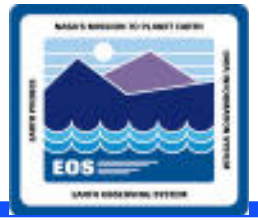
    Tools Æ Data Server Æ Insert Static
  - **The Insert Static program will be running**

Inserting Static Data Granules to the IMF Data Server (2)



- Enter the following information:
  - Config Filename - take default
  - Mode - take default mode “ops” or enter “ssit”
  - ESDT ShortName - ESDT ShortName corresponding to data granule
  - Science Group - Cn: C = coefficient file, M = MCF; n = 1,2,…
  - PGE Name - Name of PGE registered
  - PGEVersion - PGE version or take default of 1
  - Filename to Insert - Filename of data granule to be inserted
  - Associated ASCII metadata (target MCF) filename to Insert - Filename of target MCF just created, has “.met” entension
- The static granule will be inserted. The program can run again until the user quits.
- A command line version of the program is available.

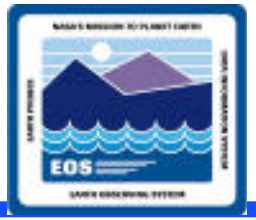
Inserting Science Software Executable on the Data Server



All science software executables must be inserted on the IMF Data Server to be run by the PDPS. The executable package is called a SSEP or EXE Tar. The steps of this procedure involve three activites:

- **Assembling a Science Software Executable Package:**
  - **Make a new directory to hold the contents of the SSEP**
  - **Copy all files to go into the SSEP into this directory: PGE executables, shell scripts, SDP Toolkit message files, Bourne shell profile (if app)**
  - **Use UNIX tar to make the package**
- **Copy over the Target MCF template to *filename*.met, edit and save:**
  The PGE name is PGEEXE. Enter PGE version and parameter values according to program prompt.
- **From the SSIT Manager GUI Tools Æ Data Server Æ Insert EXE TAR**
- **Enter PGE Name, SSWVersion, SSEPFileName, ExecFileName**

PGE Planning and Processing

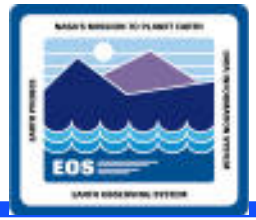


After the PGE has been linked to the DAAC Version of the SDP Toolkit, all associated ESDT andPGE information has been entered into the PDPS Database, all operational metadata has been entered, and the PGEhas been registered, then the PGE is ready to be run in PDPS under AutoSys.

The major steps in the PGE Planning and Processing are the following:

- **Using the Production Request Editor, enter processing information and submit a Production Request**
- **Using the Planning Workbench, create a new productiion plan and review the planning timeline**
- **Register a subscription for test output files**
- **Monitor production**
- **Using the QA monitor, acquire the test output file from the Data Server**

Using the Production Request Editor



The Production Request Editor is a GUI tool which provides the capbilities of submitting a Production Request (PR), looking at production requests in the system, and viewing at Data Production Requests (DPRs) which have been expanded from the original PR.

It is invoked from the command line with

PIPREditor ConfigFile /*path*/PIPREditor_*daac.*CFG ecs_mode *mode*

where /*path* to the PR Editor, *daac* is one of (GSFC,EDC,LARC,NSIDC), and *mode* is the operations mode.

Only one PR can be submitted at a time by saving a PR file which is then known to the Planning, Scheduling and Production System. When a PR is submitted, the windows are re-initialized and another PR can be submitted.

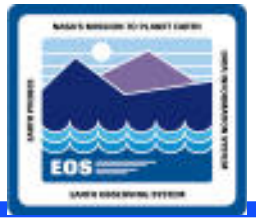
Using the Production Request Editor

There are five tabs to select at the top of the GUI:

Planning - Displays a list of the four capabilities provided by PR Editor
PR Edit - Define and edit Production Requests
PR List - Displays a list of all PRs entered into the system
DPR View - Displays detailed information for a selected DPR
DPR List - Displays all DPRs associated with a selected PR

Selecting any of these brings up a screen for the associated function.

Using the PR Edit GUI



Selecting the PR Edit tab at the top of the main Production Editor GUI.

The following information must be entered on the PR Edit screen:

- **PR Name - enter as New when PR is being done**
- **Satellite Name - Name of spacecraft**
- **Instrument Name- Name of Instrument for which data is being processed**
- **PGE Name - Name of the PGE registered in the system**
- **PGE Version - Version of the PGE corresponding to PGE name**
- **Originator - Name on Instrument Team or data provider**
- **Priority - Priority to be assigned to this production request**
- **StartDate - Start date for data coverage**
- **StartTime - Start time for data coverage**
- **EndDate - End date for data coverage**
- **EndTime - End time for data coverage**

Using the PR Edit GUI (2)

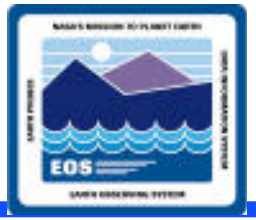
The PGE information is not entered directly into the PR Edit screen. To enter the PGE information, a pull down GUI is available by selecting "PGE…". Selecting a PGE from this GUI, enters the related information into the PR Edit screen.

If PGE Parameters are to be examined or changed, a pull down GUI is available by selecting "PGE Parameters…". The new value may be entered in the override box in this GUI.

Entry of a comment is optional.

When the PR is complete, the "File" tab at the top is selected and a PR filename is entered in the "Save As" box.

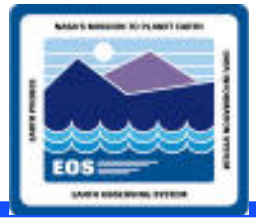
Creating a New Production Plan



The Planning Workbench is launched to bring up the Planning Workbench GUI. The following information is entered:

- **File - set to New**
- **Plan Name - User name for plan**
- **Rollover Time - MM/DD/YY**
- **Comment - Comments are optional**
- **Production Request - Select one from the list**
- **Schedule/Unschedule - select to schedule PR**
- **File - Save the file under user specified name**
- **Activate - Select to activate plan**
- **Baseline - Select to create a new baseline plan**

Review a Production Plan Timeline



Launch the Planning Workbench and view the production plans.

Select the File and Open.

This shows a list of Candidate, Active, and Baseline Production Plans.

Select the desired Production Plan to view.

The timeline for the selected Production Plan is displayed.

Registering a Subscription for Test Output Files

The Data Subscription Management application is used to manage the receipt of a subscription notification from the IMF Data Server.

Invoke the Subscription Editor from the SSIT Manager.

From the SSIT Manager GUI Æ

Tools Æ Data Server Æ Register Subscription

Register a subscription for each of the input files and output product files associated with the PGE.

Monitoring Production

Monitor the PGE executions using AutoSys.

- **Launch AutoSys Monitor from the SSIT Manager**
- **Select the DPRs to be displayed in the AutoSys Job Activity Console Window.**
- **View details of a single DPR**
- **View the existing Event Report on the selected DPR**
- **View processing alarms for a DPR**
- **View job dependencies**
- **Exit the AutoSys Monitor**

Post Processing Activities

Production History Log Files from PGEs Run Within PDPS

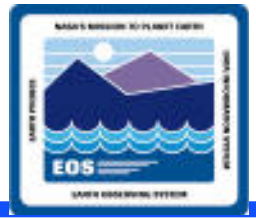
- **Change directory to IMF Data Server Production History Archive**
- **Select the Production History tar file and copy to user area**
- **Untar the file**
- **Examine the Status, User, and Report Logs**

From the SSIT Manager GUI Æ

Tools Æ Product ExaminationÆ File Comparison

Æ EOSView or IDL

Trouble Shooting and General Investigation



Detection of Science Software Problems and ECS Problems

•Investigate errors in Production History File

• Use File comparison tools, EOSView and IDL to examine data product problems

• Examine the PDPS Database with the Web Browser

• Submit problems using DDTS

Troubleshooting and General Investigation (2)

Examining PGE-produced log files.

- **LogStatus (captures all error and status information concerning a program).**
- **LogUser (captures a subset of messages of level or type "_U_" or "_N_").**
- **LogReport (captures arbitrary message strings sent by PGE software).**