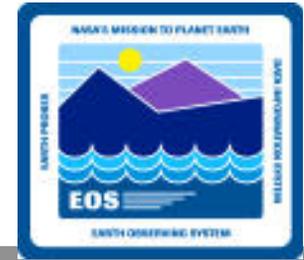


Functional Overview

Debbie Dunn

2 September 1997

FOS RRR Roadmap



Overview Material

FOS Overview

- RRR Objectives
- FOS Status & Schedule

FOS CSR Action Items

- CSR Action Item Status

Functional Overview

- List of FOS capabilities

FOS Acceptance Test Status

Acceptance Test Status

- Test Results
- Technical Liens & Issues
- External Interface Test Status

FOS Audits

Audit Results

- Physical Cfg Audit (PCA)
- Functional Cfg Audit (FCA)

FOS Next Steps

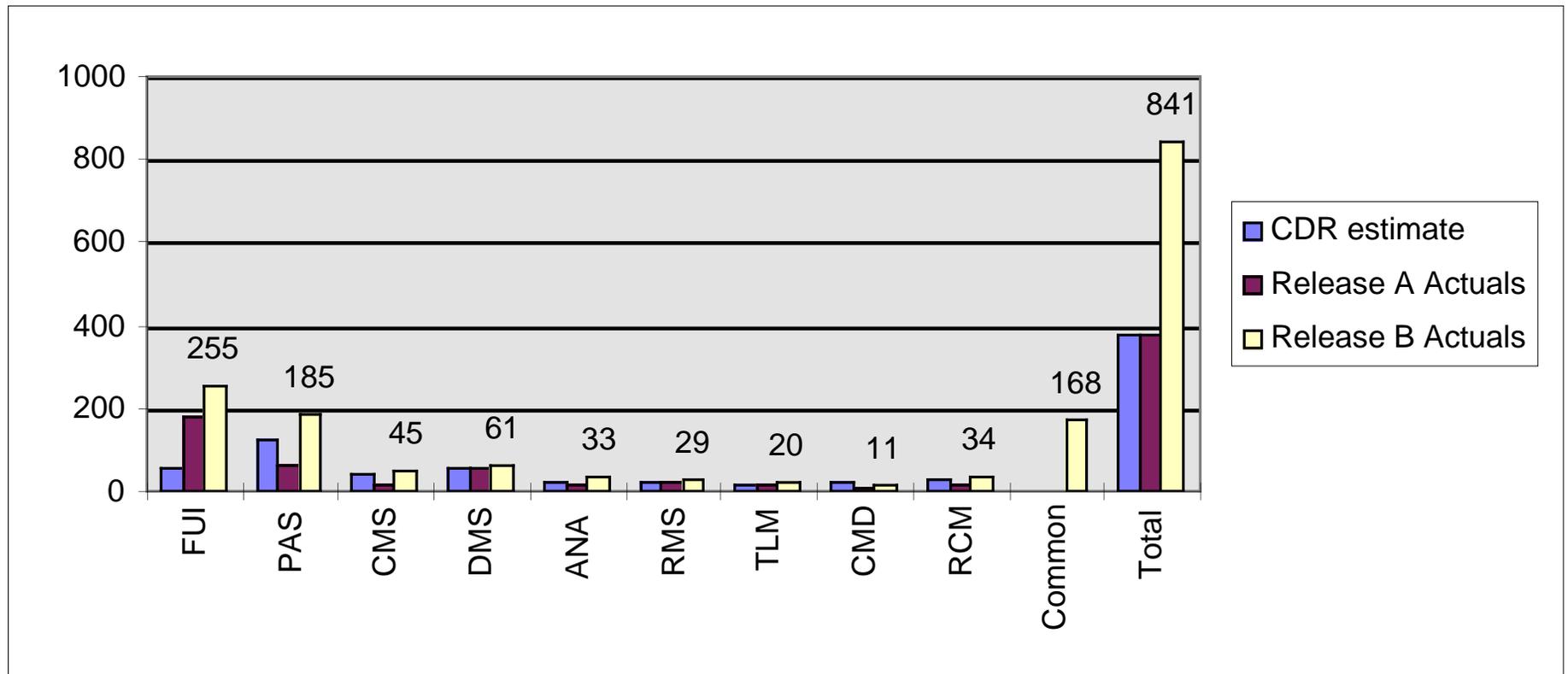
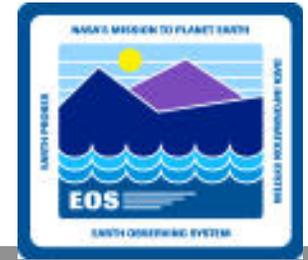
Post-Acceptance Test Plan

- External Engineering Tests
- IST Delivery
- FOT Plans

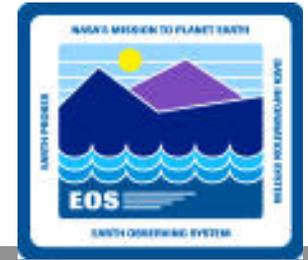
Post-B Development/ Sustaining Engineering/

- Approach
- Schedule

FOS KLOC Summary

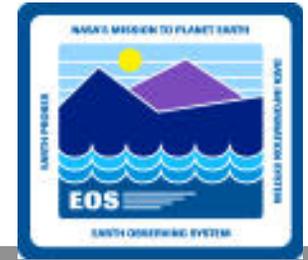


FOS Release B Functionality/Issues



- 4 **System**
- 4 **Planning & Scheduling**
- 4 **Command Management**
- 4 **Resource Management**
- 4 **Telemetry**
- 4 **Command**
- 4 **Real-Time Contact Management**
- 4 **Analysis**
- 4 **User Interface**

System Functionality (1 of 2)



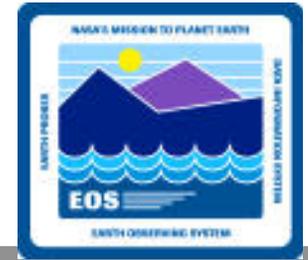
System Configuration

- **Data Server Startup/Shutdown**
- **Data Server Failover**
- **Real-Time Server Startup/Shutdown**
- **User Station Startup/Shutdown**

Database

- **Project Database Ingest and Validation**
- **Operational Database Generation**
- **Database Reporting**
- **Database Backup & Restore (TBD)**

System Functionality (2 of 2)



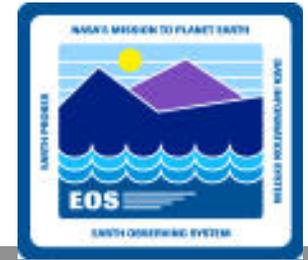
Events

- Event Message Display
- Event Message Filtering
- Event History
- Alarm Processing

IST

- IST Startup/Shutdown
- Planning and Scheduling
- Telemetry
- Events

System Functional Issues



System Configuration

- Real-time Server and Data Server on the DEC's

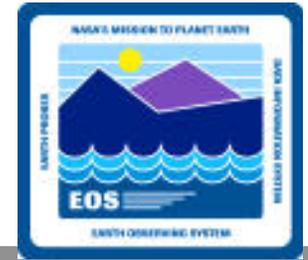
Database

- Database Backup & Restore

IST

- HP IST checkout
- Command Management
- Analysis
- IST Pool Management

Planning & Scheduling Functionality (1 of 4)



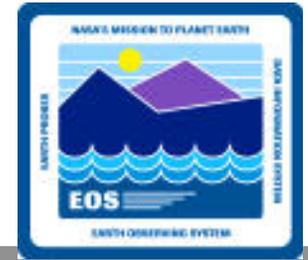
Activity Definition

- Create modify and delete spacecraft or instrument activities
- Supports ATC Commands, ECL directives and modes
- Establishes relative time off-sets and parameters
- Authorized access to activities

BAP Definition

- Create, modify and delete spacecraft or instrument Baseline Activity Profiles
- Establishes periodicity for activities by events or time frequency
- Authorized access to BAPs

Planning & Scheduling Functionality (2 of 4)



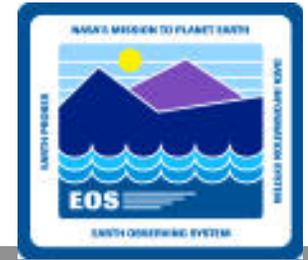
Constraint Definition

- Create, modify and delete spacecraft and instrument constraint definitions
- Support for “hard” and “soft” constraints

Activity Scheduling

- Schedule activities, BAPs, commands and procedures against mission plans
- Supports impact, non-impact and over-subscribe modes
- Remove and modify scheduled activities
- Support for late changes

Planning & Scheduling Functionality (3 of 4)



Timeline Management

- Display activities, modes and events with associated information
- Management of multiple plans
- Display mission consumables, such as power and data volume
- Identify “hard” and “soft” constraint violations
- MISR Local Mode Tool
- CERES Events

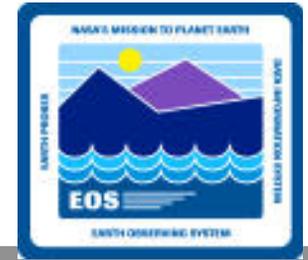
What-If

- Create what-if plans on the timeline

ASTER I/F Filter

- Receive one-day and short-term schedule and integrate into master mission plan
- Send ASTER preliminary resource schedule

Planning & Scheduling Functionality (4 of 4)



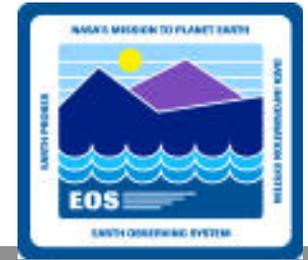
Planning Aids Management

- Receive planning aids from FDF
- Populate orbital event pool

TDRSS Scheduling

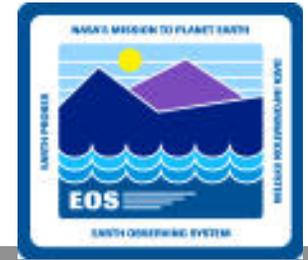
- Create contact activities and schedule on mission schedule
- Support for both TDRSS and Ground Contact activities

Planning & Scheduling Functional Issues



None

Command Management Functionality (1 of 4)



ATC Load Generation

- **Generate ATC loads from Detailed Activity Schedule**
- **Perform command level constraint checking on ATC loads**
- **Partition ATC loads for uplink to spacecraft**
- **Generate ATC Load Report for each ATC load generated**

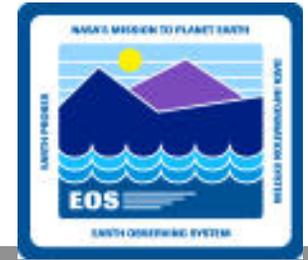
RTS Load Generation

- **Generate RTS load contents from user input**
- **Accept RTS load contents from valid external I/F**
- **Generate RTS loads from load contents**
- **Generate RTS Load Report for each RTS load generated**

Table Load Generation

- **Build table load contents from user input and table definitions in PDB**
- **Generate table loads from valid table load contents**
- **Generate table Load Report for each table load generated**

Command Management Functionality (2 of 4)



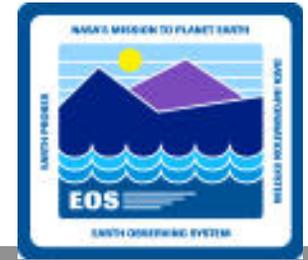
Microprocessor Loads

- **Accept and validate microprocessor load contents**
- **Generate microprocessor loads from microprocessor load contents**
- **Generate Microprocessor Load Reports**

Flight Software Loads

- **Accept and validate flight software load contents**
- **Generate flight software loads from flight software load contents**
- **Generate Flight Software Load Reports**

Command Management Functionality (3 of 4)



ATC Load Management

- **Maintain a reference image of the contents of the ATC buffer**
- **Update reference image when ATC loads successfully uplinked**
- **Generate Memory Map Reports**

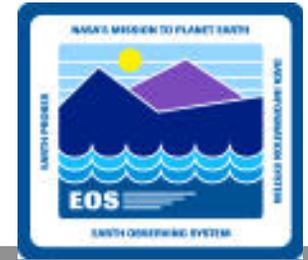
RTS Load Management

- **Maintain catalog of RTS loads available for uplink**
- **Generate RTS Catalog Report**
- **Maintain RTS memory map**
- **Generate RTS Memory Map Report**

Table Load Management

- **Maintain catalog of table loads available for uplink**
- **Generate Table Catalog Report specifying available loads**
- **Generate Table Map Report specifying load contents currently loaded**

Command Management Functionality (4 of 4)



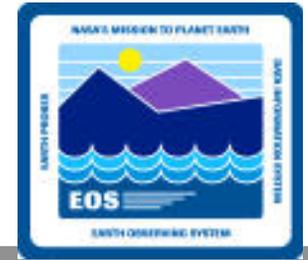
Ground Script Generation

- **Generate ground scripts based upon Detailed Activity Schedule**
- **Perform constraint checking of ground directives**
- **Include as comments spacecraft commands scheduled to execute**

Memory Management

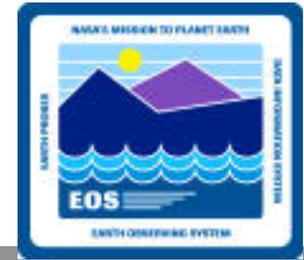
- **Maintain a ground reference image of spacecraft memory**
- **Create memory dump image from collected dump data**
- **Perform dump compare and report all discrepancies**

Command Management Functional Issues



None

Resource Management Functionality (1 of 2)



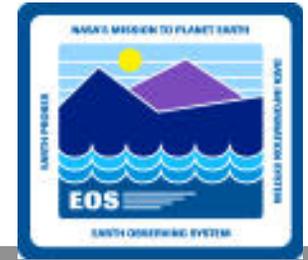
String Configuration

- **Create Logical Strings (default logical strings/ operator requested logical strings)**
- **Connect to Logical Strings/Disconnect from Logical Strings**
- **Delete Logical Strings**
- **String Failover**

Command Authority

- **Take/Switch Command Authority**
- **Validate User and Workstation for Command Authority**
- **Deny Command Authority for unauthorized User or Workstation**

Resource Management Functionality (2 of 2)



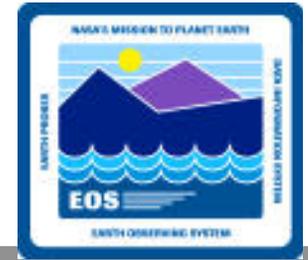
Ground Control Privilege

- **Take/Switch Ground Control**
- **Validate User and Workstation for Ground Control**
- **Deny Ground Control for unauthorized User or Workstation**

Resource Monitoring

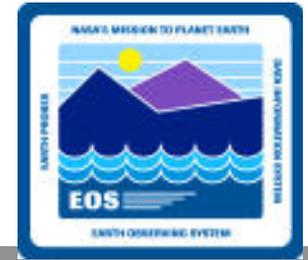
- **Monitor of Software Components in the EOC**
- **Data Server Failover**

Resource Management Functional Issues



None

Telemetry Functionality (1 of 2)



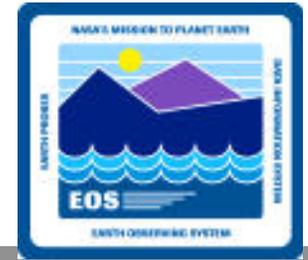
Decom

- Housekeeping (16 Kbps)
- Health & Safety (1 Kbps)
- Diagnostic (1Kbps)
- Processing of duplicate CERES Housekeeping data
- EU Conversions
- Red/Yellow Limits
- Delta Limits
- Data Dropout Detection

Archive

- Real-Time Telemetry
- Receipt of Rate-buffered Telemetry

Telemetry Functionality (2 of 2)



Replay

- **Dedicated Replay**

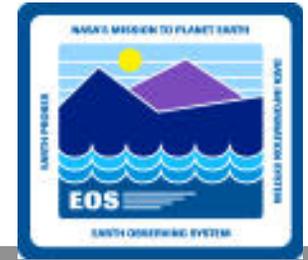
Configuration

- **Selective Decom**
- **Limits adjustments**
- **EU coefficient adjustments**

Spacecraft State Check

Memory Dump Processing

Telemetry Functional Issues



Decom

- **Context Dependent Telemetry**
- **Derived Parameters**

Archive

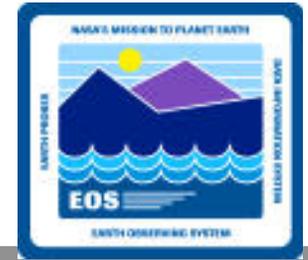
- **Merge**
- **Long-term Archive**

Replay

- **Shared Replay**

Info Window

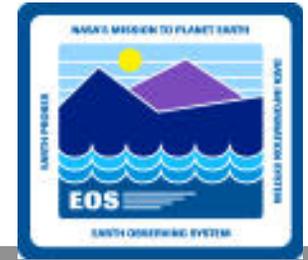
Command Functionality (1 of 2)



Real-Time Commanding

- **Command Generation and Validation**
- **Command Submnemonic processing**
- **Command Uplink**
- **Prerequisite State Checking and Override**
- **Critical Command Allow/Cancel**
- **Hazardous Command Processing**
- **Receipt Verification**
- **CCSDS COP-1 Command Retransmission**
- **Execution Verification (Real-Time and Stored Commands)**

Command Functionality (2 of 2)



Command Configuration

- Supports all required uplink rates (125bps, 1kbps, 2kbps, 10kbps)
- CCSDS FOP Configuration

Automated Commanding

- Ground Script Commanding
- Procedure Definition and Execution

Load Processing

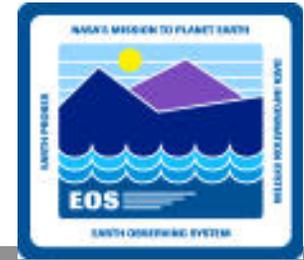
- Uplink of ATC, RTS, and Table Loads

Command Functional Issues



Command Request Processing

Real-Time Contact Management Functionality



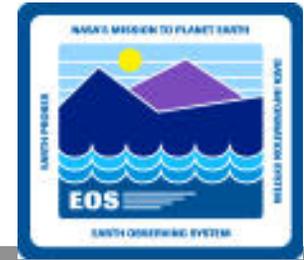
NCC Interface

- GCMR Processing
- UPD Processing and Display
- UPD Archive

EDOS Interface

- CODA Processing and Display
- CODA Archive

Real-Time Contact Management Functional Issues



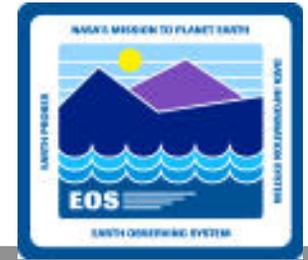
NCC Interface

- UPD Replay and Analysis

EDOS Interface

- CODA Replay and Analysis
- SCS Summary Report

Analysis Functionality (1 of 3)



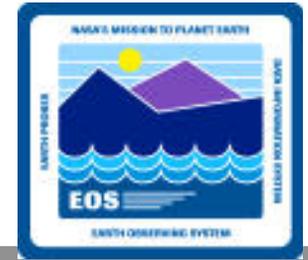
Dataset Generation

- **Generate datasets for archived spacecraft telemetry data in both raw and EU values**
- **Generate datasets for user specified statistical data**
- **Generate datasets in carryout format**
- **Generate datasets utilizing the appropriate PDB for the requested time interval**

User Selectable Statistics

- **Generate user requested data products of statistical data, including:**
 - **MMM data**
 - **Standard deviations**
 - **Numbers of samples**

Analysis Functionality (2 of 3)



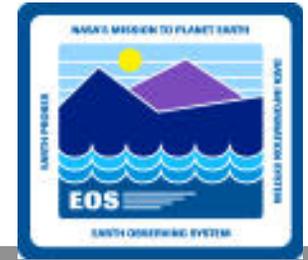
Spacecraft Activity Log

- **Monitors R/T telemetry and reports entries into the spacecraft activity log**
- **Performs dump collection and formatting of the spacecraft activity log data**
- **Analyzes dump data and reports new entries**

Decision Support System

- **Infrastructure integrated into the system**
 - **RTWorks based**
- **3 applications provided**
 - **Monitor telemetry quality using CODA, UPD, and HK tlm data**
 - **Detect and recognize ACE and SAD misconfigurations**
 - **Command decoder anomalies**

Analysis Functionality (3 of 3)

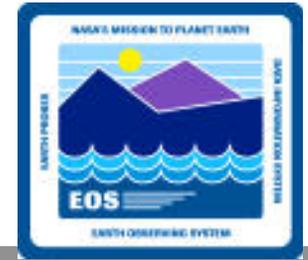


SSR Management Tool

- **Creates SSR playback requests prior to each contact session based upon predicts**
- **Monitors and displays SSR record and playback counters**
- **Evaluates CODA and UPD data to determine downlink status of SSR playbacks**
- **Provides SSR buffer volume updates to models following contact session**

Analysis

Functional Issues (1 of 2)



Dataset Display

System Statistics

- System generated telemetry statistics
- FDF statistics

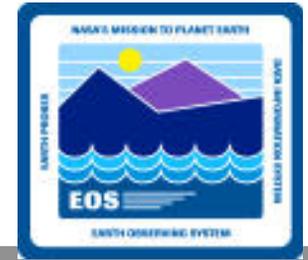
Reports

- Time Ordered Downlink Report
- Parameter Out-of-Limits Report

Spacecraft Clock Correlation

- RDD method
- USCCS method

Analysis Functional Issues (2 of 2)



Standing Orders

- Standing order browser
- End to end processing

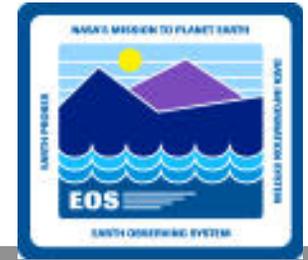
Special Processing Algorithms

EDOS/NCC Statistics

User Algorithms

- Dataset generation using user supplied algorithms

User Interface Functionality (1 of 4)



Directive Processing

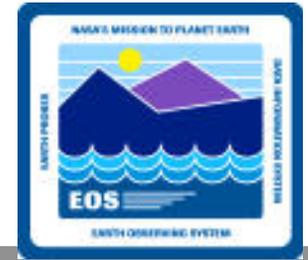
- Syntax checking
- Directive execution

Screen Management

- Control window capability
 - Directive entry/editing/execution
 - 3 line event display
 - Tool access
 - Help access
- Window and room management

User Interface Functionality

(2 of 4)



Displays

- **Alphanumeric, Tables, and Graph Displays**
- **Schematic Displays**

User Customization

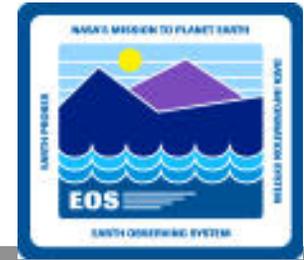
- **Define color schema, fonts, default directories and printers**

Procedures

- **Create, update and save procedures**
- **Execute and control procedures**

User Interface Functionality

(3 of 4)



Data Mover

- Transfer files from local to system directories
- Transfer files from system to local directories
- Delete files from local directories

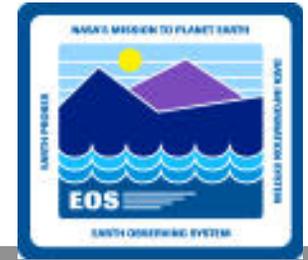
OASIS/CSTOL Conversion

- Convert AM-1 CSTOL procedures to ECL
- Flag conversion incompatibilities

User Authentication

- Authenticate user login
- Provide selection of user role
- Add, modify, delete users from system

User Interface Functionality (4 of 4)



Document Reader

- Browse on-line documentation

Email

- Create, save, send, delete email messages

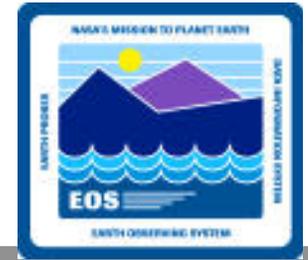
Quick Message Generator

- Send messages to events display

On-Line Help

- Access to on-line help documentation

User Interface Functional Issues



Custom Reports