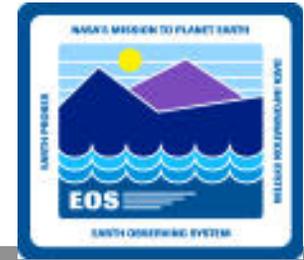


Acceptance Test Status

Andy Miller

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

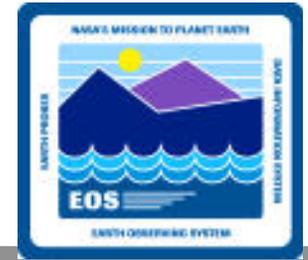
Post-Acceptance Test Plan

- External Engineering Tests
- IST Delivery
- FOT Plans

Post-B Development/ Sustaining Engineering/

- Approach
- Schedule

FOS Test Phase



Started after Test Readiness Review (late May)

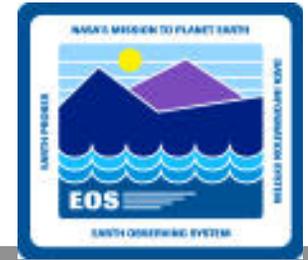
ECT-2 Dry-Run/ECT-2 (late June)

Dry-Runs (June through August)

- **Ensure test procedures and software is ready for Acceptance Test**
 - **Software**
 - **Test Procedures**
 - **System Configuration**

Acceptance Test (late July through August)

Acceptance Test Objectives



Execute Release B Test Cases

- Verify test cases
- Verify Level 4, RBR & IRD Requirements
- Verify NCRs

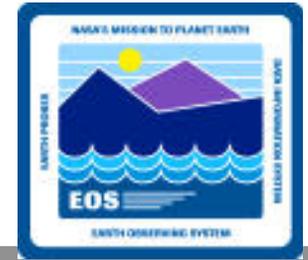
Document Results of Acceptance Test Conduct

- Test Logs
- Requirements Check-off matrix
- NCRs database of opened, closed, and verified NCRs

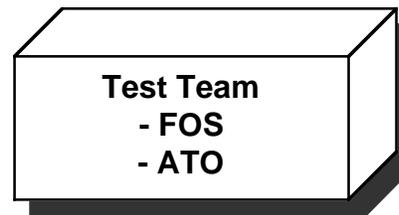
EOC Test Process

- Daily Test Status & Schedules

FOS Acceptance Testing



Conduct Tests



Witness Tests

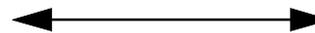


Monitor Tests



Execute Test Cases

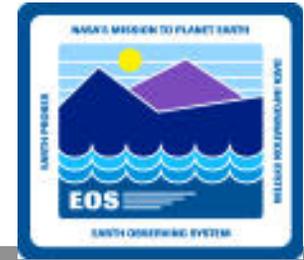
- Maintain Test Logs
- Prepare FCA Material



Verification

- Verify RBRs + L4 Requirements
- NCR Verification

FOS Test Status Reporting Overview



Test Status States

Pass



- All functions are operable
- All test success criteria, as defined for the test procedure, have been successfully met

Partial



- Major functionality is operable
- Not all success criteria has been met

Fail



- Some functions are inoperable
- Testing the major functions for the test has been impeded

<Test Title>

Functionality
▣ Description of key functionality that has been verified

<Test Title>

Functionality
▣ Description of key functionality that has been verified

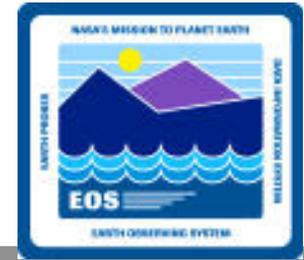
- Description of key functionality that has not been verified

Issues
List key issue(s) that remain re: this test

<Test Title>

Functionality
• Description of key functionality associated with this test case

FOS Test Case Summary



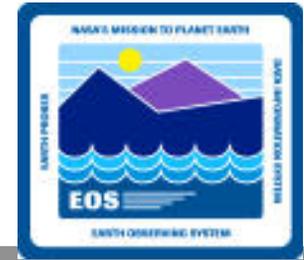
Test Case Change Summary

- **Added Year 2000/Leap Year Test**

Test Results

- **102 test case in baseline**
- **84 test cases executed**
 - **46 test cases passed**
 - **38 test cases partial**
- **18 test cases not performed**

Test Groups



Infrastructure

- Database(DBS)
- User Interface(FUI)
- Events (EVT)

Command

- Planning and Scheduling (PAS)
- Command Management (CMS)
- Command (CMD)

Telemetry

- Telemetry (TLM)
- Analysis (ANA)

External Interfaces

- SAS
- ASTER (ASTR)
- EDOS
- FDF
- NCC

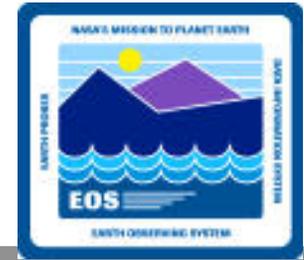
End-to-End

- Contacts (CONT)
- IST
- System (SYS)
- End-to-End (ETE)

Operations

- Hardware (HRD)
- Operational (OPR)

Infrastructure Tests (24)



User Interface (16)

- Screen Management
- User Customization
- Data Mover
- Display Builder (Alphanumerics)
- ECL Directives
- Procedure Builder
- Procedure Control & Execution
- Room Builder
- OASIS/CSTOL Conversion
- User Authentication & Display
- Display Builder (Graphs & Tables)
- Display Builder (Schematics)
- Document Reader
- E-mail
- Quick Message Generator
- On-Line Help

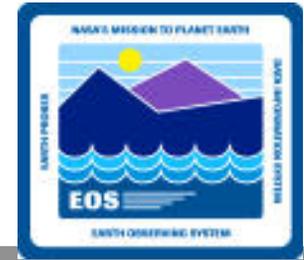
Data Base (4)

- Database Ingest, Validation & ODF Generation
- Database Backup & Restore
- Database Reporting
- Database Editing

Events (4)

- Event Message Display & Graphical Timeline
- Event Message Filtering
- Event History Request & Reporting
- Alarm Message Handling

User Interface Status (1 of 2)



Screen Mgt

Functionality

- ▣ ECL directive proc
- ▣ Window/room mgt
- ▣ 3-line event
- ▣ Mouse control
- ▣ Cmd line editing

Issues

Room mgt
Retrieve 20 recent directives

User Custom

Functionality

- ▣ Color schema
- ▣ Fonts for pages
- ▣ Default directories
- ▣ Default printers

Issues

No confirmation for default definitions

Data Mover

Functionality

- ▣ Transfer files from local to system directories and vice-versa
- ▣ Delete files from local storage areas

Display (Alpha)

Functionality

- ▣ Create, save, modify, and delete display pages
- ▣ Add, modify, and delete items on display pages
- ▣ Display ground and telemetry parameters

ECL Directives

Functionality

- ▣ Verify ECL directives for syntax
- ▣ Execute from Unix shell command
- ▣ Verify privileges and exec within 0.5 sec's

Issues

ECL syntax (minor)

Proc Builder

Functionality

- ▣ Create, update, and save procedures
- ▣ Verify proc constructs & ECL syntax

Issues

Entering binary and hex values
ECL syntax (minor)

Proc Control

Functionality

- ▣ Execution & control within the proc control window

Issues

Intermittent problems executing procs from cmd control window (aligning commands with execution status)

OASIS/CSTOL

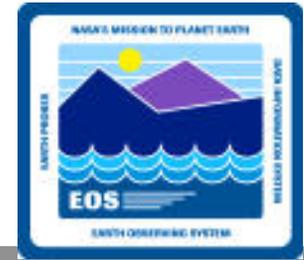
Functionality

- ▣ Convert AM-1 CSTOL procedures to ECL syntax
- ▣ Provide details for conversion incompatibilities

Legend:

- Green
- Yellow
- Red

User Interface Status (2 of 2)



User Authen

Functionality

- ☒ Ensure valid user login
- ☒ Selection of user roles
- ☒ Add, modify, and delete users from the system

Issues
Invalid user roles can be performed

Room Builder

Functionality

- ☒ Define, modify, save, & delete a room
- ☒ Add, delete, and resize windows in a room
- ☒ Allow a room to consist of 0 to 12 windows

Issues
Can't permanently save a room (current session only)

Display Graph

Functionality

- ☒ Create, save, modify, & customize graphs
- ☒ Display at least 6 mnemonics in graph
- ☒ Display at least 50 tlm values in a table

Issues
Customization of graphs

Display Schem

Functionality

- ☒ Build, save, and modify a schematic
- ☒ Display tlm points & schematics that have points, lines, icons, text, circles, rectangles, ellipses, and polygons

Doc Reader

Functionality

- ☒ Browse on-line doc
- ☒ Search on-line doc
- ☒ Manipulate hypertext documentation

E-mail

Functionality

- ☒ Create, save, and delete e-mail messages
- ☒ Send e-mail messages

Issues
Can't perform search on e-mail messages

Quick Msg

Functionality

- ☒ Send messages to the event display
- ☒ Severity levels include Info, Warning, Alarm, and Fatal

OnLine Help

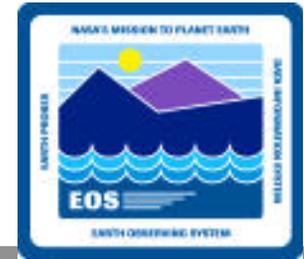
Functionality

- ☒ Functional descriptions of help for the users via Netscape

Legend:

- ☐ Green
- ☐ Yellow
- ☐ Red

Data Base Status



DB Ingest, Val, & ODF Gen

Functionality

- Ingest tlm and cmd definitions
- Validate tlm and cmd data
- Generate operational data files error free

DB Backup & Restore

Functionality

- Backup Unvalidated, Validated, and Ops databases
- Restore databases

Issues

DB Reporting

Functionality

- Generate, view, and print entire or partial PDB, load catalog, and FDF reports using the Web pages

Issue

Cannot get selective report by tlm mnemonic

DB Editing

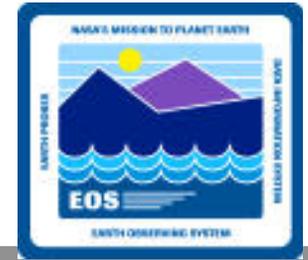
Functionality

- Edit PDB definition files using the Database Web pages
- Modify, add, or delete a command, telemetry, or an event definition

Legend:

- Green
- Yellow
- Red

Events Status



Evt Msg Display & Graph Timeline

Functionality

- ▣ Generate and display events
- ▣ Filter events by multiple ways using selection filter
- ▣ Display scrolling events based on time range selected

Evt Msg Filtering

Functionality

- ▣ Display global and local events
- ▣ Manipulate events via filtering options

Evt His Request & Reporting

Functionality

- ▣ Retrieve all requested events
- ▣ Specify start/stop times event types, events id, s/c and instrument id
- ▣ Retrieve filtered events
- ▣ Store event history request for future use

Alarm Msg Handling

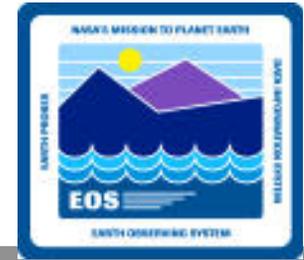
Functionality

- ▣ Acknowledge messages that have a severity level of 'alarm' by pressing the 'ACK' button

Legend:

-  Green
-  Yellow
-  Red

Command Tests (27)



Planning & Scheduling (11)

- Activity Definer Tool
- BAP Definer Tool
- General Scheduler
- EOC Timeline- Display & Manip
- EOC Timeline - Management
- Contact Scheduler
- Activity Constraint Definitions
- Scheduling Load Uplink Activities
- Receive & Sched Late Change Requests
- What-If Planning & Scheduling
- DAS Generation

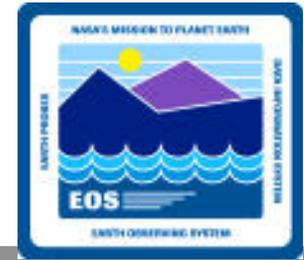
Command Management (8)

- Memory Dump Image
- Table Load Validation & Gen
- Microprocessor & Flight Software Load Gen & Validation
- ATC Load Gen & Validation
- ATC Load Management
- Validate & Generate RTS Load
- RTS Load Management
- Table Load Management

Command (8)

- Command Authorization
- Command Generation
- Ground Script Control
- Ground Script Commanding
- Manual Commanding
- Uplink Loads
- Command Modes, Transmission, and Uplink
- Telemetry and Command Receipt Verification

Planning & Scheduling Status (1 of 2)



Activity Definer

Functionality

- ☒ Create an activity for s/c or instrument
- ☒ Include cmd sequence with relative times & params, modes
- ☒ Save, open, close, and delete for auth users

Issues
Define activity w/procs

BAP Definer Tool

Functionality

- ☒ Create BAP for s/c or instrument
- ☒ Defined sequence contains off-set times
- ☒ Save, open, close, & delete for aut users

Issues
Define activity w/procs

General Sched

Functionality

- ☒ Sched activities, BAPs, commands and procs against master mission plan
- ☒ Sched in impact, non-impact, and over-subscribe modes
- ☒ Delete or unschedule activities

EOC Timeline - Display & Manip

Functionality

- ☒ Display activities & events with associated detailed info
- ☒ Manipulate config, viewing area, and display colors

EOC Timeline - Mgt

Functionality

- ☒ Manage multiple plans concurrently, setting up user permissions in accordance with resources & ownership

Issues
Users role anomalies

Contact Scheduler

Functionality

- ☒ Create contact activities & sched on mission plan
- ☒ TDRSS & Ground Contact activities
- ☒ Batch scheduling to verify multiple sched

Issues
Several workarounds were required

ActivityConstraint Definitions

Functionality

- ☒ Define activity constraints
- ☒ Develop 'hard' & 'soft' constraints with order and time spacing conditions
- ☒ Timeline will show graphical rep of timeline violations

Sch Load Uplink Activities

Functionality

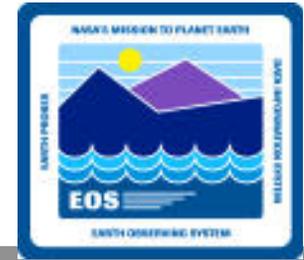
- ☒ Gen DAS & ATC loads
- ☒ ATC loads are sched and verified against requested and valid uplink periods

Issues
User-specified uplink window intermittently overridden

Legend:

- Green
- Yellow
- Red

Planning & Scheduling Status (2 of 2)



**Receive & Sch
Late Changes**

Functionality

- ☒ Schedule activities on the timeline
- ☒ Identify any constraint violations
- ☒ Create a DAS and regenerate a DAS with requested changes

**What-If Planning
& Sched**

Functionality

- ☒ Create what-if plans on the timeline
- ☒ View, save, and delete options
- ☒ What-if capability and its impact on the Master Plan

DAS Generation

Functionality

- ☒ Create activities to build ATC load, validate command constraints, populate a DAS period
- ☒ Notification of constraint violations
- ☒ Hard constraints prohibit DAS generation

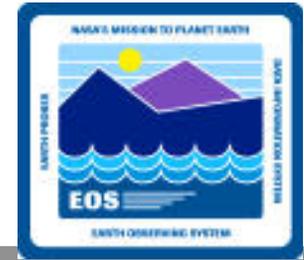
Issues

- Procs in DAS
- Gen DAS with uplink loads

Legend:

-  Green
-  Yellow
-  Red

Command Management Status



Memory Dump Image

Functionality

- ▣ Dump & store S/C memory
- ▣ Verify dump compare
- ▣ Enable user to overwrite ground reference image with the dump contents

Issues

Reverse eng'g of dump
RTS & Table ground ref

Table Load Valid & Generation

Functionality

- ▣ User generation of Table Load file
- ▣ Pre-defined templates are provided to define tables per database
- ▣ Storage of uplink load data, load image, load report, and load catalog entry

Microprocessor & FSW Load Gen

Functionality

- ▣ Generate instrument loads from micro-processor load contents
- ▣ Update load catalog with an entry for the uplink load

ATC Load Gen & Validation

Functionality

- ▣ Generate ATC load from DAS
- ▣ Generate ground script
- ▣ Manage erroneous DAS input

ATC Load Mgt

Functionality

- ▣ Create partitioned ATC load
- ▣ Manipulate the ATC buffer display

Validate & Gen RTS Loads

Functionality

- ▣ Generate RTS load, image load file, load report
- ▣ Check for hard and soft constraints

Issues

Have not verified all constraints (ATC-only)

RTS Load Mgt

Functionality

- ▣ Modeling of RTS buffer for the 128 locations on the ground
- ▣ View all available RTS loads
- ▣ Store RTS loads in the load catalog

Table Load Mgt

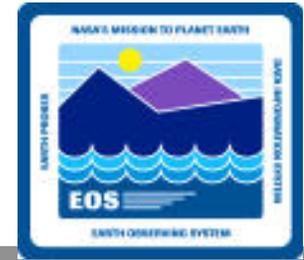
Functionality

- ▣ Modeling of table loads
- ▣ View all available table loads
- ▣ Store table loads in the load catalog

Legend:

- Green
- Yellow
- Red

Command Status



Cmd Authorization

Functionality

- Support user request for command authority
- Deny command priv to unauthorized users

Cmd Generation

Functionality

- Encase packets in CLTU
- Monitor S/C CLCWs for command receipt verif
- Generate FARM control commands
- Apply pertinent gap between CLTUs

Ground Script Control

Functionality

- Ground script control characteristics including suspend, resume, jump, and stop
- Display status of executing ground script

Issues

Intermittent ground script errors

Ground Script Commanding

Functionality

- Process critical cmds, cmds with subnmem, prerequisite state check
- Manage override of critical commands and prerequisite state failures

Manual Commanding

Functionality

- Process manually entered commands
- Validate subnmem's, hazardous, critical, and prerequisite state check commands

Uplink Loads

Functionality

- Uplink RTS, Table, instrument, & flight s/w loads
- Verify successful dispatch of loads via telemetry

Issues

Load verif not possible w/current AM1 DB

Cmd Modes, Transmission

Functionality

- Select command rates
- Select active CTIU
- Transmit cmd's to S/C
- Enable retransmissions

Issues

Intermittent issue with selecting CTIU

Tim Ver & Cmd Uplink Verif

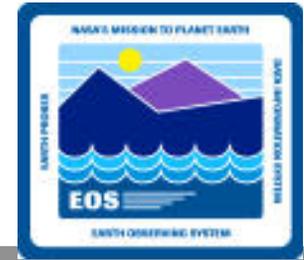
Functionality

- Verify command receipt
- Provide status of each uplinked command
- Provide telemetry verification status

Legend:

- Green
- Yellow
- Red

Telemetry Tests (26)



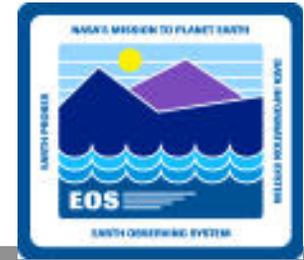
Telemetry(15)

- Decom H&S/Standby Tlm
- Decom Housekeeping
- Decom - Context Dependent Tlm
- EU Conversion
- User Adjustment of EU
- Conversions
- MultiByte Parameter Processing
- Derived Parameters
- Data Quality Determination
- Red/Yellow Limits
- Delta Limits
- Info Window
- Real-time Data Dropout
- Real-Time Telemetry Archive
- Multiple Source Tlm Data Receipt and Display
- Telemetry Replay Processing & Display

Analysis (11)

- Dataset Generation
- Standing Order Manager
- S/C Clock Correlation (RDD)
- S/C Clock Correlation (USCCS)
- Special Processing Algorithms
- Time Order Downlink Report
- Parameter Out of Limits Report
- Analysis Products - Cross DB
- System Generated Stats
- User Specified Stats
- Analysis Request Mgt

Telemetry Status (1 of 2)



Decom - H&S, Standby Tlm

Functionality

- Decommutate and display health and safety and standby telemetry

Decom - H/K Tlm

Functionality

- Decommutate and display housekeeping telemetry

Decom - Context Dependent Tlm

Functionality

- Decommutation of context dependent telemetry

EU Conversion

Functionality

- Conversion of raw telemetry to engineering units using 7th order polynomial equations, line segments, and exponential

User Adjustment of EU Conversions

Functionality

- User modification of polynomial coefficients
- Selection of specific EU equation to use for limit checking

Multi-Byte Parameter Proc

Functionality

- Processing of telemetry parameters that are non-contiguous in a packet

Derived Parameters

Functionality

- Processing of derived parameters based on a database defined equation consisting of telemetry parameters and/or constants and simple math functions

Data Quality Determination

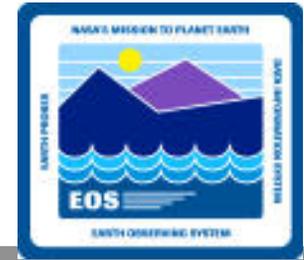
Functionality

- Determination of packet data quality

Legend:

- Green
- Yellow
- Red

Telemetry Status (2 of 2)



Red/Yellow Limits

Functionality

- ▣ Determine if tlm values are within red & yellow limit set range
- ▣ Check of multiple limits sets
- ▣ Display of limit set check status

Issues

User adjustment of limits

Delta Limits

Functionality

- ▣ Check of telemetry parameters to determine if they are within the db-defined delta range

Info Window

Functionality

- Tool to provide db information re: tlm parameters including limit set values, delta values, EU equations

Real-Time Data Dropout

Functionality

- ▣ Detection of tlm data dropout (e.g., at LOS)

Real-Time Tlm Archive

Functionality

- ▣ Archive of real-time tlm for housekeeping, health & safety, and standby on both the I and Q channels

Multiple Source Tlm Receipt

Functionality

- ▣ Concurrent flow of telemetry from both the I and Q channels

Tlm Replay Proc & Display

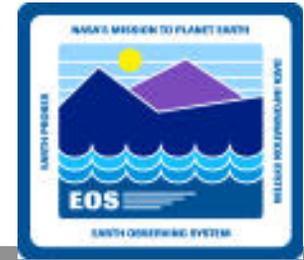
Functionality

- ▣ Dedicated replay of archive telemetry for housekeeping, health & safety, and standby telemetry

Legend:

-  Green
-  Yellow
-  Red

Analysis Status (1 of 2)



Dataset Generation

Functionality

- ▣ Generation of datasets based on archived tlm
- ▣ Display & print datasets
- ▣ Gen of carryout files

Issues

Workaround to print file
Carryout format has minor error

Standing Order Manager

Functionality

- Create routine analysis requests to execute at user-specified periodic times

Clock Correlation - RDD

Functionality

- Perform S/C clock correlation using the Return Data Delay method

Clock Correlation - USCCS

Functionality

- Perform S/C clock correlation using the USCCS method

Special Proc Algorithms

Functionality

- Allow users to create their own algorithms which can be applied against archived tlm
- Allow users to use FFT, data smoothing, etc. functions

Custom Reports

Functionality

- Allow user to produce customized reports using a combination of graphs, tables, and report data

Parameter Out Of Limit Report

Functionality

- Reports for telemetry parameters that are out of limit range

Analysis Products DB Crossover

Functionality

- ▣ Generation of dataset products based on telemetry archive data that crosses over the time frame when different databases are active

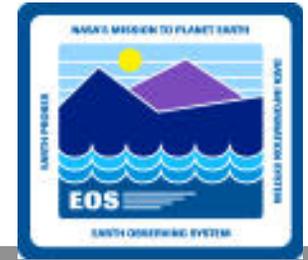
Issues

Display workaround required

Legend:

- Green
- Yellow
- Red

Analysis Status (2 of 2)



System Gen Statistics

Functionality

- Generation of system statistics
- System statistics are automatically accumulated based on receipt of back-orbit telemetry

User Specified Statistics

Functionality

- Generation of stats report based on user requested data time and telemetry parameters

Issues

Workaround to display stats data

Analysis Request Management

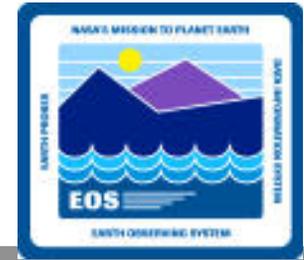
Functionality

- Enable distributed processing of analysis requests using multiple analysis workstations

Legend:

-  Green
-  Yellow
-  Red

External Tests (11)



ASTER (1)

- ASTER Scheduling & IST Access

FDF (1)

FDF Interface

NCC(3)

- NCC GCMR Processing
- UPD Receipt & Archive
- Ground Telemetry Replay

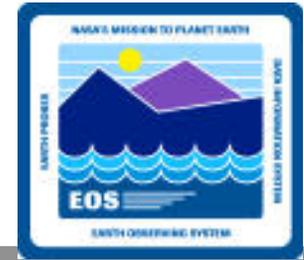
EDOS(5)

- CODA Processing & Archive
- Ground Telemetry Analysis
- Test Command/Command Echo Exchange
- SCS Summary Report
- Receive & Forward Trash Buffer

SAS (1)

- Remote Access & Carry-Out File Transfer

External Test Status (1 of 2)



ASTER Sched & IST Access

Functionality

- ▣ Perform ASTER sched
- ▣ Receipt, constraint check ASTER STS, ODS
- ▣ Integration of ASTER data into Master Plan

Issues

Preliminary Resource Sch to ASTER has a few ICD discrepancies

FDF Interface

Functionality

- ▣ Ingest of FDF products, validation, and population into the db
- ▣ Process FDF products including table load gen, orbital event gen

Issues

Analysis products
Validation report

NCC GCMR Processing

Functionality

- ▣ Send GCMRs to NCC
- ▣ Process GCM status and GCM disposition messages

UPD Receipt & Archive

Functionality

- ▣ Send User Performance Data (UPD) messages to the NCC
- ▣ Receive, archive and display UPD status data from NCC

Ground Tlm Replay

Functionality

- Replay of NCC UPD data and EDOS CODA data, which was archived
- Display of replayed UPD and CODA data on user-defined pages

CODA Processing & Archive

Functionality

- ▣ Receive, archive, and display CODA data sent from EDOS

Ground Telemetry Analysis

Functionality

- Creation of analysis statistics based on
- UPD data and CODA data received by FOS
- Generation of analysis reports based on user requests on the ground telemetry data

Test Cmd/Cmd Echo Exchange

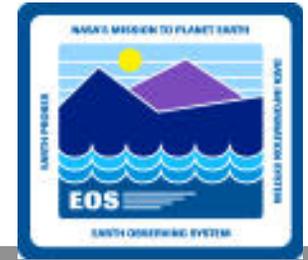
Functionality

- Transmission of cmd test blocks to EDOS
- Receive related cmd echo blocks (CEB) from EDOS
- ▣ User specify timeout value for CEB receipt

Legend:

- Green
- Yellow
- Red

External Test Status (2 of 2)



SCS Summary Report

Functionality

- Receipt & processing of the SCS Summary Report received from EDOS
- Display capability for the users of the processed report

Receive & Forward Trash Buffer

Functionality

- ▣ Receipt of SSR trash buffer from EDOS
- ▣ Transfer trash buffer to the SAS

Issues

User notification

Remote Access & CarryOut File Transfer

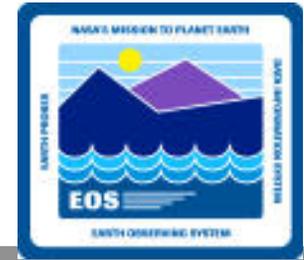
Functionality

- ▣ Transfer of carry-out

Legend:

-  Green
-  Yellow
-  Red

End-to-End Tests (12)



Contacts (4)

- DSS
- S/C Activity Log
- SSR Monitoring
- S/C State Check

End-to-End (3)

- Concurrent Ops/Perf Monitor
- ECT-2 Scenario
- Year 2000/Leap Year

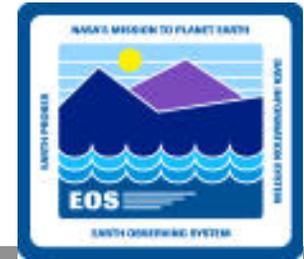
IST (2)

IST Pool Management
IST Functionality

System(3)

- FOS Startup/Shutdown
- Logical String Config Control & Termination
- Failure Recovery & Status Monitoring

End-to-End Test Status (1 of 2)



Decision Support

Functionality

- ▣ Monitor telemetry quality via correlation of CODA, UPD, and housekeeping tlm
- ▣ Detect and recognize ACE/SAD misconfig while in safe-hold and cmd decoder anomalies

S/C Activity Log

Functionality

- ▣ Receipt of S/C activity log entries embedded in housekeeping tlm
- ▣ Dump of S/C activity log table and log into contiguous archive
- ▣ History report of s/c activity data

SSR Monitoring

Functionality

- SSR buffer data predicts
- Correlate SSR dumps using UPD, CODA, and telemetry
- Recommend actions to operators re: SSR mgt

S/C State Check

Functionality

- ▣ Creation of command list for expected values of commands executed in back-orbit (s/c state check tlm values)
- ▣ Compare and report actual s/c state check tlm values vs. expected

IST Pool Mgt

Functionality

- Manage max # of IST connections
- Manage max # of concurrent users for a specific instrument

IST Functionality

Functionality

- ▣ Planning & Sched
- ▣ Load management
- ▣ Real-time monitoring of tlm and command
- ▣ Event reporting
- ▣ User interface tools

Issues

By-product of other EOC issues
Some file cfg items; HP

Concurrent/Ops Perf Monitor

Functionality

- ▣ Concurrent ops (sched, real-time, and off-line activities)
- ▣ Computer performance analysis for all nodes
Real-time tlm and cmd rates

Issues

Telemetry performance

ECT-2 Scenario

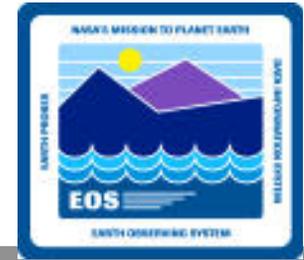
Functionality

- ▣ Schedule activities
- ▣ Build table, RTS, and ATC loads
- ▣ Uplink loads & procs
S/C dumps and compares
- ▣ Real-time tlm & cmd monitoring

Legend:

- Green
- Yellow
- Red

End-to-End Test Status (2 of 2)



Year 2000 Time Test

Functionality

- ☒ Ensure all FOS functionality handles Year 2000 transition
- Ensure all FOS functionality handles leap year conversions

Issues

Leap year unverified

FOS Startup/Shutdown

Functionality

- ☒ Startup and shutdown procedures for FOS servers and workstations

Logical String Cfg Control & Termination

Functionality

- ☒ Establish logical strings for ops, test, and training modes
- ☒ Create and disable mirrored and tailored logical strings

Issues

Iterative enabling/disabling of tailored logical strings

Failure Recover & Status Monitoring

Functionality

- ☒ Automated failover of logical strings for real-time server
- ☒ Ensure ground script operation is maintained during failure recovery
- ☒ Status monitoring of system resources

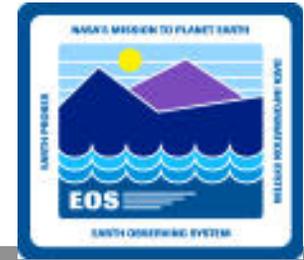
Issues

Did not verify failover of LANs and file server

Legend:

- Green
- Yellow
- Red

Operations Status



Operations (2)

- Hardware
- Functional Requirement Analysis

Hardware

Functionality

▣ Hardware components including servers and workstations, file servers, and peripherals

Issues

Requirements need some minor refinement

Functional Reqt Analysis

Functionality

▣ Requirements that are operational or verified via design analysis

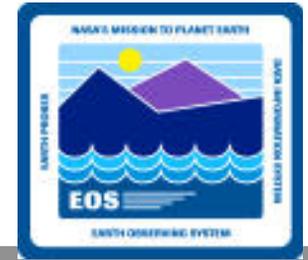
Issues

Requirements need some minor refinement

Legend:

-  Green
-  Yellow
-  Red

IST Status



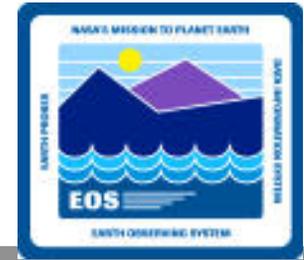
Verified Functionality

- **Planning & Scheduling**
- **Real-Time monitoring**
- **Events**
- **Display Builder**

Unverified Functionality

- **Command Management**
- **Command Request**
- **Procedure Builder**
- **Pool Management**

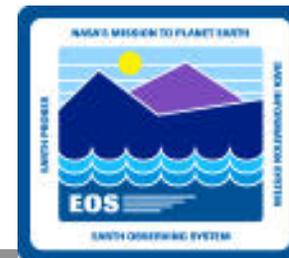
Performance Results



ETE-2000B Test Case - Concurrent Ops/Performance Monitor

- **Objective**
 - **Benchmark performance data based on realistic, concurrent operational scenarios**
 - **Identify current performance status and identify areas within system that need attention**
 - **Identify status of FOS performance vs. performance requirements**
- **Real-Time Contact Sessions (3)**
 - **NCC UPD and EDOS CODA processing**
 - **Telemetry monitoring and commanding**
- **Off-line Scenario**
 - **Display page and procedure generation**
 - **Scheduling and load generation**
 - **Analysis Requests**
 - **Telemetry Replay**

Performance Results Overview



- [REDACTED]
- 4 EOC delay of approximately 500 milliseconds associated with building and sending simple commands.

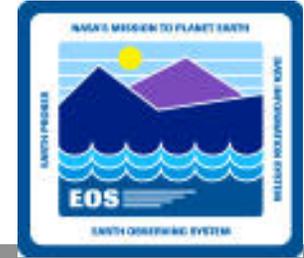
Delay for the first FS1 command with submnemonics was over 7.5 seconds, far short of the 500 millisecond requirement. Subsequent commands were not subject to this delay.

- [REDACTED]
- 4 Few missed Packets at 16 and 25 Kbps Housekeeping on the I and Q compared to the number of dropped packets during ECT-2.

- [REDACTED]
- UserStations and Sybase Server exceeded 50% utilization requirements during periods of telemetry receipt
 - Poor quality of data resulted in numerous limit violation error messages, making the User Stations unusable until they subsided.

Performance Results

Response Times

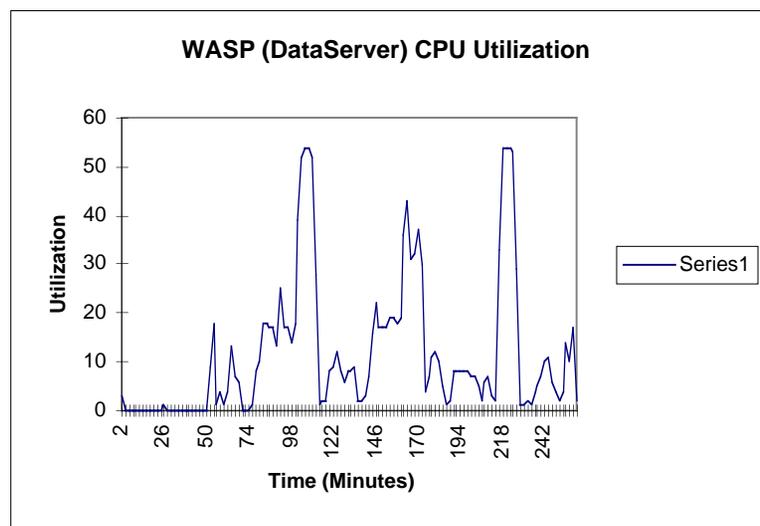
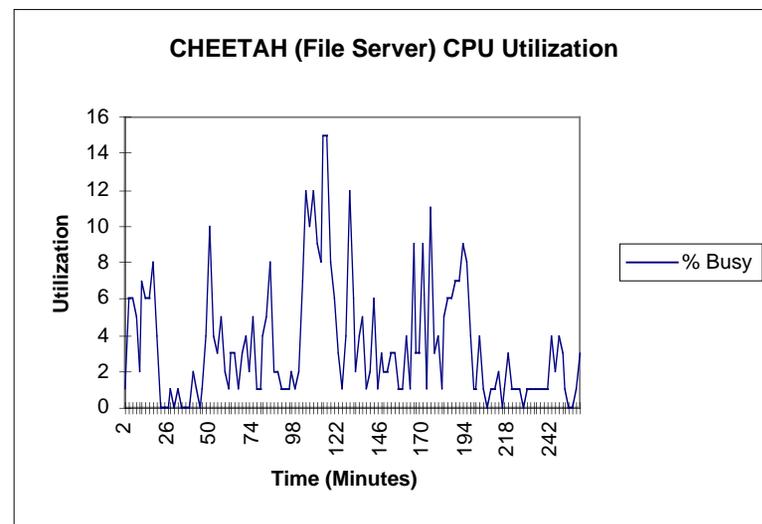
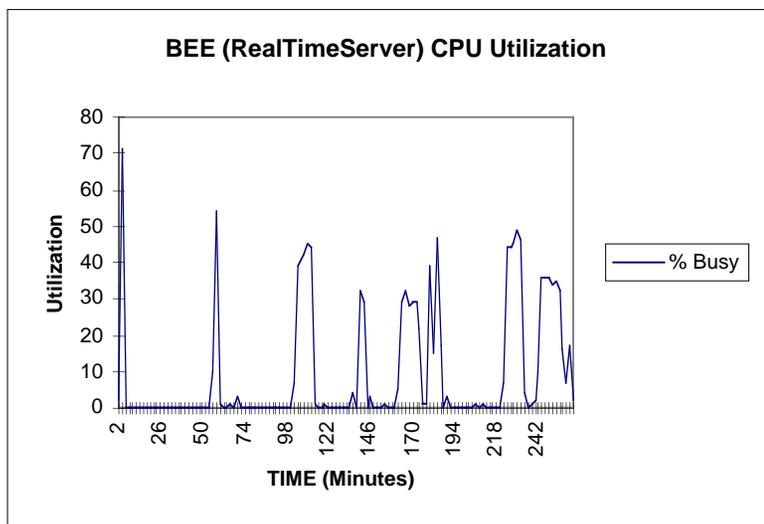


Startup Scripts	Completion Time
Data Server	3:01
Real Time Server	3:02
	2:25
	2:42
User Station - PAS (telemetry online)	3:00
	3:15
	3:32
	3:45
	6:24
User Station - No PAS	1:31
	1:31
	1:35
	2:07

User Activities	Completion Time
Connect to String	2:21
	2:22
	2:33
	2:21
	1:28
Bring up Command Control Window	:32
	:31
Bring up Display Page (no telemetry online)	1:04
	1:09
Bring up Display page (telemetry online)	Did Not Appear Did Not Appear
Initialize RTS Load Builder	:27
Initialize Table Load Builder	:07
Initialize Binary Load Builder	:02
Initialize Procedure Builder	:25

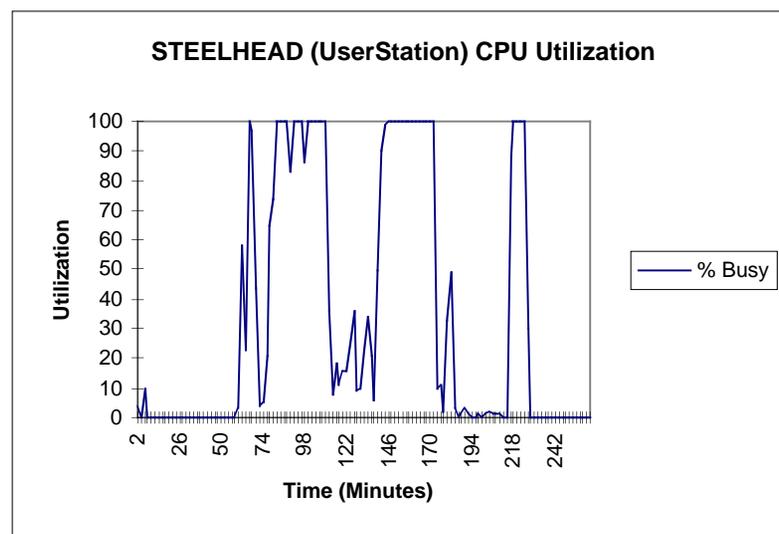
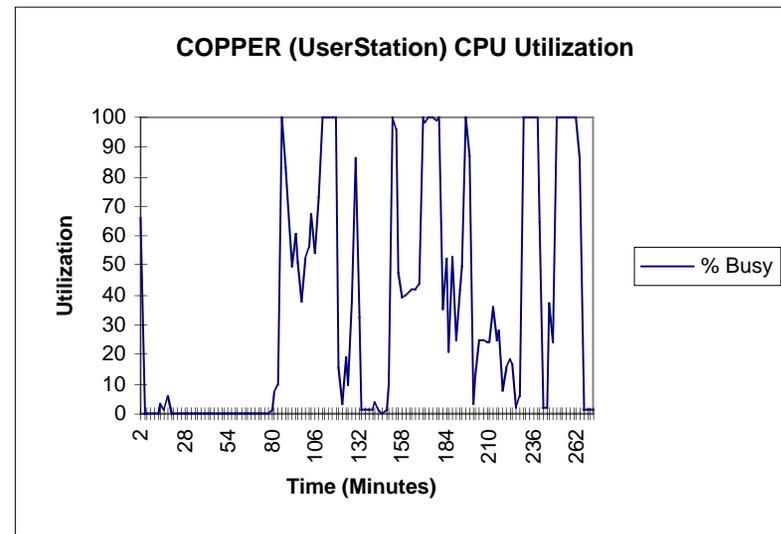
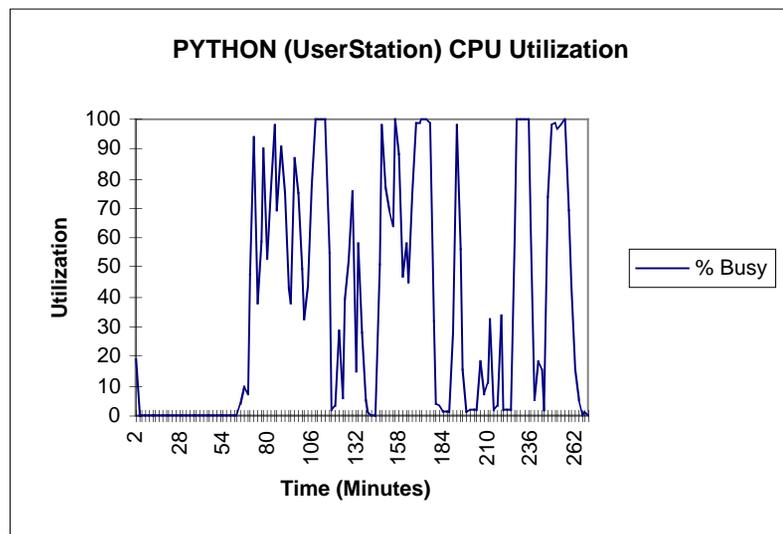
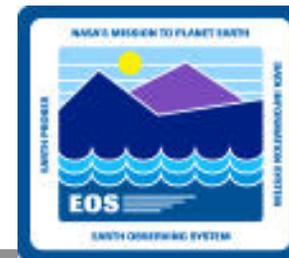
Performance Results

CPU Utilization (1 of 3)



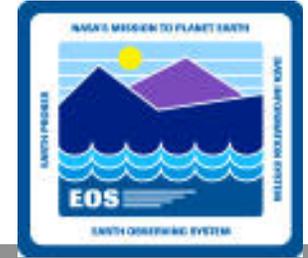
Performance Results

CPU Utilization (2 of 3)

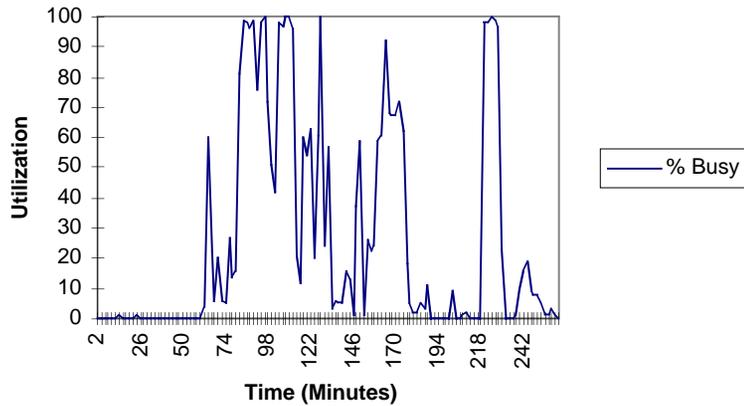


Performance Results

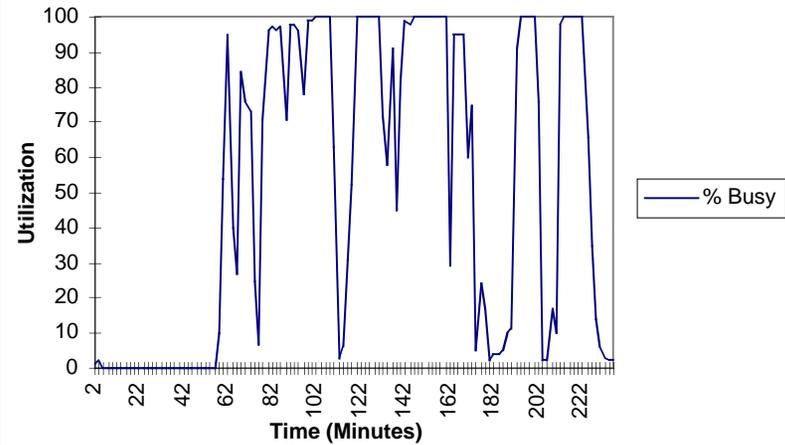
CPU Utilization (3 of 3)



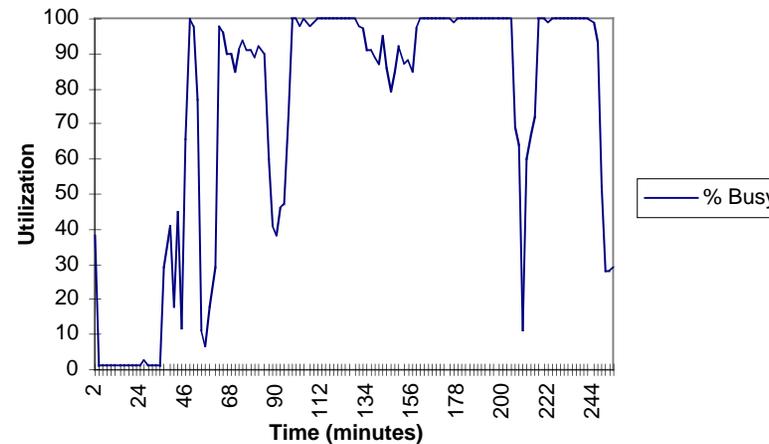
GROUPER (UserStation) CPU Utilization



ROCKFISH (UserStation) CPU Utilization

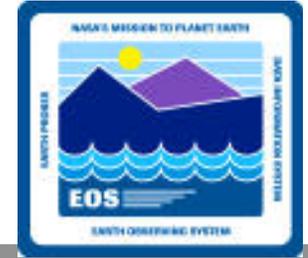


PANTHER (Sybase Server) CPU Utilization

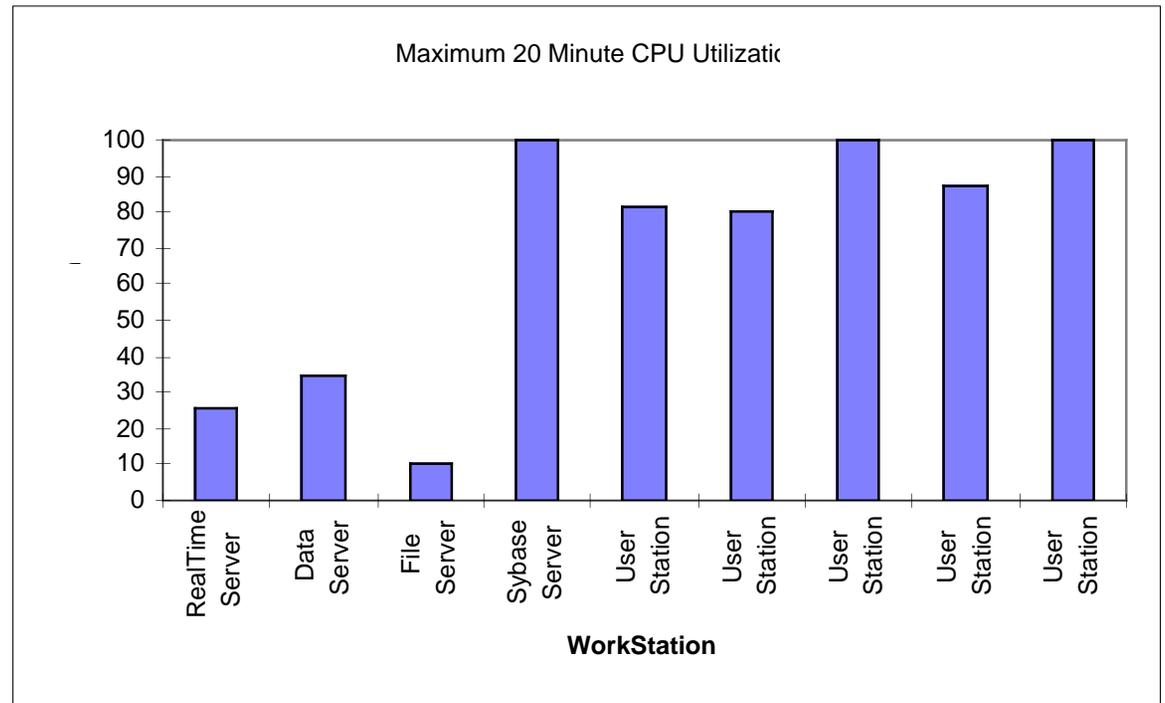


Performance Results

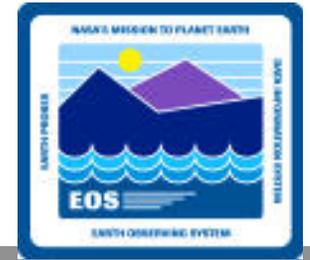
Maximum CPU Utilization



WorkStation Type	Maximum 20 Minute CPU Utilization
RealTime Server	25.9
Data Server	34.5
File Server	10.2
Sybase Server	100
User Station	81.1
User Station	80.2
User Station	100
User Station	87
User Station	99.7

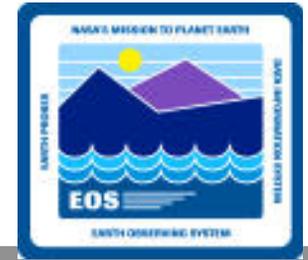


Release B NCR Summary



	Sev1	Sev2	Sev3	Total
Open	51	339	344	734
Fixed	6	24	19	49
Pending Verif	32	123	59	214
Closed/ Verif	54	219	188	461
Total	143	705	610	1,458

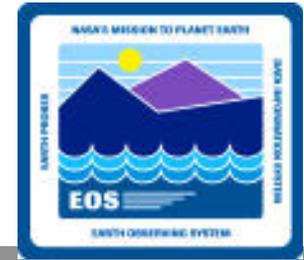
Liens (1 of 18)



Database Backup and Restore (DBS-2010B)

- **Description**
 - Backup and restore Sybase tables through Netscape browser
- **Impact**
 - Task would have to be performed manually by DBA
- **Analysis**
 - Backup has been verified
 - Need to verify restore works correctly

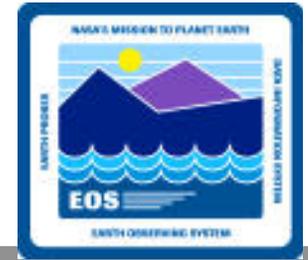
Liens (2 of 18)



SSR Monitoring (CONT-2030B)

- **Description**
 - **Monitor status of SSR playbacks during S/C contact session using telemetry, UPD, and CODA data**
 - **Update models and provide feedback to FOT**
- **Impact**
 - **FOT would have to perform manual monitoring and evaluation of SSR playbacks**
- **Analysis**
 - **Update the rules within the RTWorks Inference Engine for proper processing of Telemetry, UPD, and CODA data**
 - **Resolve interfacing issues with RTWorks and C++ processes**

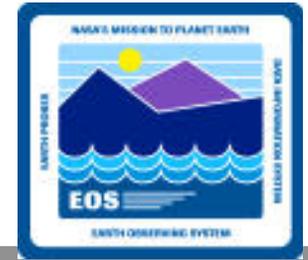
Liens (3 of 18)



User Algorithms (ANA-2040B)

- **Description**
 - Analyze archived data using user supplied algorithms conforming to published API
 - Analyze archived data using IMSL routines for curve fitting, data smoothing, FFTs, and root mean squares
- **Impact**
 - FOT would not have access to these advanced analysis capabilities
- **Analysis**
 - S/W process for reading data from internal datasets and applying algorithms requires modifications

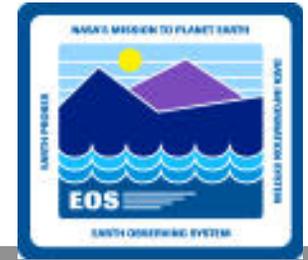
Liens (4 of 18)



Derived Parameters (TLM-2060B)

- **Description**
 - Processing of database-defined derived parameters during real-time
- **Impact**
 - Derived parameter data values not available to FOT
- **Analysis**
 - Database ODF generation processing required modifications to correctly generate ODFs for tlm processing of derived parameters

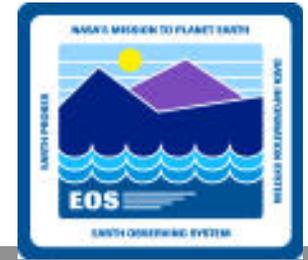
Liens (5 of 18)



IST Pool Management (IST-2000B)

- **Description**
 - **Manage the number of ISTs permitted to connect to the EOC concurrently and by site**
- **Impact**
 - **Unlimited access to EOC by IST users**
- **Analysis**
 - **Increment/decrement function within the IST pool management software needs to be corrected**

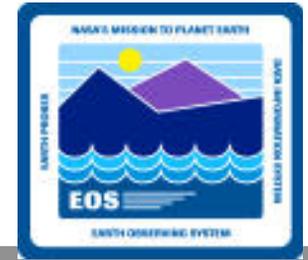
Liens (6 of 18)



Standing Order Manager (ANA-2010B)

- **Description**
 - **Submit analysis requests to be processed at user defined times and intervals**
- **Impact**
 - **FOT would be required to submit each analysis request every time they wanted it processed**
- **Analysis**
 - **Requests are being queued and forwarded at the appropriate time**
 - **Request Manager S/W requires modifications to support receipt of multiple standing orders**

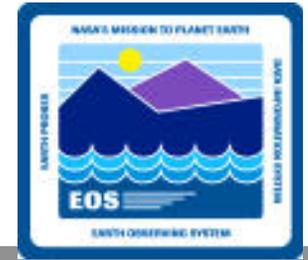
Liens (7 of 18)



Analysis Request Manager (ANA-2120B)

- **Description**
 - **Monitor the status of analysis requests in the queue**
 - **“Farm” requests to participating UserStations**
- **Impact**
 - **Cannot view the status of analysis requests or modify the priority**
 - **Requests can only be processed on UserStation initiating the request**
- **Analysis**
 - **JAVA application for monitoring/updating the queue needs to be accessible from FUI Tools menu**
 - **Farming S/W requires modifications to detect and utilize available UserStations for processing**

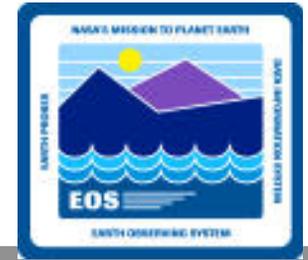
Liens (8 of 18)



Clock Correlation - RDD (ANA-2020B)

- **Description**
 - **Perform S/C clock correlation using the Return Data Delay method (S/C time, ground receipt time, equipment delays, and ranging data)**
- **Impact**
 - **S/C clock cannot currently be correlated to UTC correctly**
- **Analysis**
 - **S/W requires modifications to perform calculation at longer intervals, currently calculating every second**

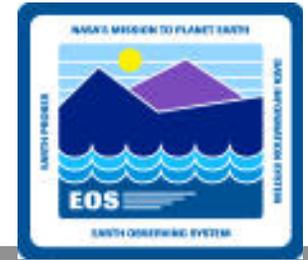
Liens (9 of 18)



Clock Correlation - USCCS (ANA-2030B)

- **Description**
 - Correlate S/C clock with UTC by use of the USCCS method (TDRSS PN ranging epochs)
- **Impact**
 - S/C clock drift cannot be corrected to UTC
- **Analysis**
 - Test tools and data not available to perform testing

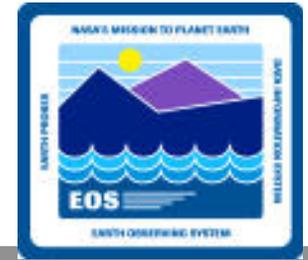
Liens (10 of 18)



SCS Summary Report (EDOS-2010B)

- **Description**
 - **Generate TDRSS session summary report following spacecraft contact session automatically**
- **Impact**
 - **TDRSS session summary data not available to FOT following the contact session**
- **Analysis**
 - **File Watcher process needs to be updated to correctly initiate processing of the summary data into the report**

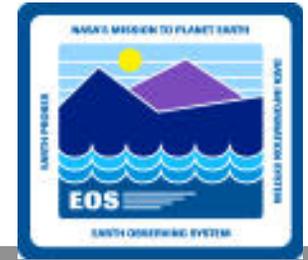
Liens (11 of 18)



Ground Telemetry Replay (NCC-2040B)

- **Description**
 - Replay CODA and UPD data from the archive
- **Impact**
 - CODA and UPD data not available to the FOT for analysis from the archive
- **Analysis**
 - Data Retriever process dropping connection with analysis software

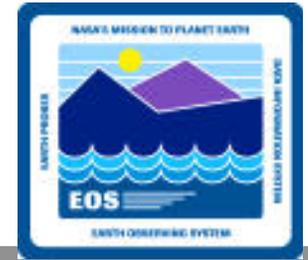
Liens (12 of 18)



Custom Report (ANA-2060B)

- **Description**
 - **User-defined Custom Reports option via the User Interface**
- **Impact**
 - **FOT unable to define Custom Report templates and apply templates to archived data**
- **Analysis**
 - **S/W not mature; requires additional development and testing**

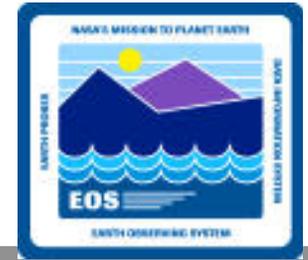
Liens (13 of 18)



System Statistics (ANA-2100B)

- **Description**
 - Automatic generation of orbital, daily, and monthly statistics when rate-buffered data arrives in the EOC
- **Impact**
 - FOT not able to access pre-processed statistical data for S/C telemetry data
- **Analysis**
 - Propagation of orbital to daily to monthly statistics requires modifications

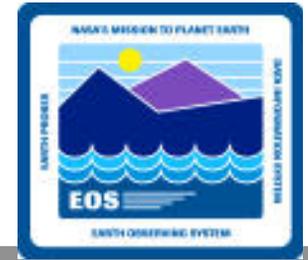
Liens (14 of 18)



Parameter Out of Limits Report (ANA-2070B)

- **Description**
 - **Generate reports indicating limit violation information for S/C telemetry data (number, times, durations)**
- **Impact**
 - **Cumulative limit violation data not available to the FOT upon demand**
- **Analysis**
 - **Requires System Stats to be correctly generated to determine limit data**

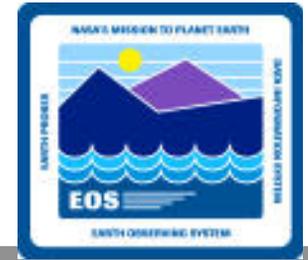
Liens (15 of 18)



Ground Telemetry Analysis (EDOS-2001B)

- **Description**
 - Analyze UPD and CODA data contained within the archive
- **Impact**
 - Archived data not available to the FOT for analysis
- **Analysis**
 - Data Retriever process dropping connection with analysis software

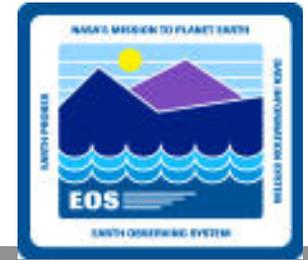
Liens (16 of 18)



Info Window (TLM-2020B)

- **Description**
 - Obtain information on telemetry data defined in the PDB (limit settings, descriptions, calibration info, etc)
- **Impact**
 - Informational data not available on-line to FOT
- **Analysis**
 - **S/W** not in mature state; requires additional development and testing

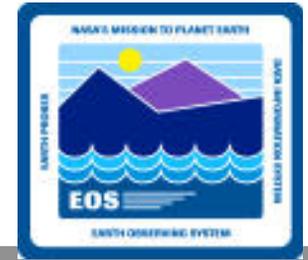
Liens (17 of 18)



Context Dependent Tlm (TLM-2020B)

- **Description**
 - **Decommutation of context dependent parameters**
- **Impact**
 - **Context dependent parameters not available for monitoring and analysis**
- **Analysis**
 - **Updates to Sybase tables and telemetry ODFs required**

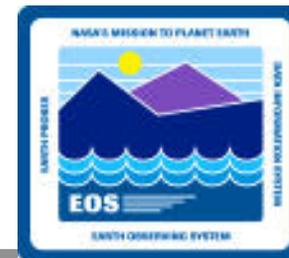
Liens (18 of 18)



CMD Echo (EDOS-2001B)

- **Description**
 - Test the status of the comm link between the EOC and EDOS through a test message
- **Impact**
 - Status of comm link unknown when traffic idle
- **Analysis**
 - Test driver for emulating EDOS requires modifications to recognize test message

Functional Criticality Assessment (from CSR-2)



HIGH

Analysis

RDD Clock Correlation
USCCS Clock Correlation

Telemetry

~~User Adjustment of EU Conv~~
Context Dependent Decom
Derived Parameters

Contact

SSR Monitoring

End-to-End

~~Concurrent Ops/Performance~~

FDF

~~FDF Interface~~

IST

IST Functionality

MEDIUM

Analysis

Parameter Out Of Limits
System Stats
Analysis Request Manager
Special Processing Algorithms

EDOS

Ground Telemetry Replay
SCS Summary Report
Ground Telemetry Analysis

IST

IST Pool Management

Data Base

DB Backup and Restore

LOW

FOS User Interface

~~Room Builder~~

Telemetry

Info Window

Analysis

Standing Order Manager
Custom Reports

EDOS/NCC

Test CMD/CMD Echo