

March 17, 2000
Ref. No.: EOS/ETS-031700-C08

National Aeronautics and
Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Attention: Mr. Willie Fuller
Code 581
Building 32, Room N212D

Subject: Contract No.: NAS9-98100
CSOC SODA Task Order Number GM36
EOSDIS Test System (ETS) Multimode Portable Simulator for PM-1
(MPS/PM-1) Delivery of the Release 4.0 Software

Dear Mr. Fuller:

We are pleased to deliver Release 4.0 of the ETS Multimode Portable Simulator for the PM-1 spacecraft (MPS/PM-1). This is the fourth major delivery using our Scalable, Integrated Multimission Simulation Suite (SIMSS) infrastructure and architecture with EOS PM-1 (Aqua) extensions.

A number of new requirements have been implemented in this release, including the capability to transmit telemetry data encapsulated within Virtual Channel Data Units (VCDUs) over a serial clock and data link. We have also added a scripting capability and setting of telemetry points in response to commands received. Attachment B to this letter provides a complete list of the new capabilities.

A draft copy of the SIMSS/PM-1 User's Guide for Release 4 will be available to users shortly, and an updated copy will be delivered to you.

This delivery package contains 12 attachments as listed below. A completed Mission Systems Configuration Management (MSCM) form is included in Attachment L. If you have any questions concerning this delivery, please call me at 301-805-3653.

Sincerely yours,

Estelle S. Noone
CSOC ETS Task Leader

Delivery Package Reviewed and Approved by:

Janice Swope

CSOC ETS Customer Service Representative

EOSDIS Test System (ETS) Multimode Portable Simulator for PM-1 (MPS/PM-1)

Delivery of the Release 4.0 Software

December 17, 1999 Ref. No.: EOS/ETS-031700-C08

The following attachments contain the details of the MPS software.

- Attachment A - describes the delivery contents for this release
- Attachment B - describes the operational changes
- Attachment C - contains the instructions to build and install the software
- Attachment D - contains any special operating instructions
- Attachment E - contains a list of the resolved DRs
- Attachment F - contains a list of the unresolved DRs
- Attachment G - contains the matrix of requirements addressed by this release
- Attachment H - contains the known system limitations
- Attachment I - contains the release history summary matrix
- Attachment J - contains a listing of the delivery media contents
- Attachment K - contains documentation references
- Attachment L - contains the Mission Systems Configuration Management (MSCM) form

Distribution: (* - Letter Only)

<u>NASA</u>	<u>ATSC</u>	<u>Lockheed Martin</u>	<u>Raytheon</u>	<u>CSC</u>
Caulfield, M. *	Bradbury, T. *	Cordier, G	Gradishar, G.	Babil, S. *
Johns, A. *	Luo, C. *		Klem, K.	Blackwell, S.
Kelly, A.				Burrows, P.
Krimchansky, A.*	<u>CRC</u>			Carlson, J.
Lehtonen, K. *	Lavery, K.		<u>Averstar</u>	Fernandes, V. *
Ondrus, P. *			Messerly, R.	Hepfer, L.
Perkins, D. *	<u>Unisys</u>		Shein, H.	Noone, E.
ESDIS Library	Thompson, S.			Parlock, W.
				Quintin, E.
				Swope, J. *
				Task File

Attachment A – Description of Delivery Contents

The MPS/PM1 Release 4.0 consists of custom software executables that are being delivered on one CD-ROM. Two copies are being provided.

Enterprise Oracle and Oracle Programmer for Windows NT are necessary for operation of this release. These products were provided with a previous release. The license to use Oracle belongs to the CSOC contract. Therefore, Oracle and Oracle Programmer may be installed only on CSOC computers.

A soft copy of this MPS/PM1 Release 4.0 delivery letter and set of attachments is also being delivered. The attachments have been formatted on a 3.5” IBM PC diskette utilizing the MS WORD word processing tool.

Attachment B – Summary of Operational Changes

Operational Capabilities of MPS/PM-1 Release 4.0

(New or modified capabilities with this release are noted in *Italics*.)

Telemetry:

- *Transmit telemetry in IP or Serial (clock/data) mode*
- *Pack telemetry packets and CLCWs into CADUs when in Serial mode*
- *Generate two streams of CADUs (I & Q) when in Serial mode*
- *Generate one stream of telemetry formatted as EDUs when in IP mode*
- *Start or stop one or two telemetry stream(s)*
- *Ingest the PM-1 PDB files*
- *Generate telemetry packets from information contained in the PM-1 PDB*
- *Maintain telemetry nodes from information contained in the PM-1 PDB*
- *Populate telemetry packets with data values from information contained in the PM-1 PDB*
- *Generate correct secondary headers for SC, GIRD, and SUROM-TIE (no secondary header) telemetry packets using information from the PDB*
- *Generate instrument telemetry packets using secondary key information from the PDB*
- *Display EDU data when in IP mode*
- *Display CADU data when in Serial mode*
- *Set values into telemetry nodes by mnemonic*
- *Display telemetry node values by mnemonic*
- *Reset packet count for the telemetry stream*
- *Packet data will be static (incrementing byte counts) until overridden by operator entry*
- *Static packet data can be overwritten (by byte location) and by modification of telemetry mnemonic*
- *Incrementing packet sequence counters per APID*
- *Generation of individual APIDs can be inhibited*
- *Telemetry logs will be created (viewable by offline utility)*
- *Packet Headers and Packet Data are updated*
- *Packet data can be shown in hexadecimal or octal format and addressed in hexadecimal or decimal form*
- *Packet Sequence Counters can be reset*
- *Packet Sequence Counters can be modified*
- *Packet Version field can be modified*
- *Packet APID field can be modified*
- *Packet Type field can be modified*
- *Packet SH Flag field can be modified*
- *Packet Length field can be modified*
- *CUC can be modified*
- *Packet rate may be controlled*

- CLCW transmitted via EDUs *when in IP mode*
- IP packets are transmitted with variable lengths
- CLCW can be overridden by the operator
- Transmission of CLCW can be inhibited *when in IP mode*
- *Scenario file (script) capability to set telemetry nodes and buffers*

Command:

- *Ingest command-related PM-1 PDB files*
- *Identify commands using information from the PDB*
- *Display event messages with command mnemonics and submnemonics*
- *Set telemetry points in response to commands received (end-item verification) using information from the PDB*
- *Recognize spacecraft Command Loads*
- *Display Command Load data*
- Ingest type AD, BC, and BD commands
- Display Total CLTUs count
- Reset Total CLTUs count
- Display Rejected CLTUs count
- Reset Rejected CLTUs count
- Display Instrument commands count
- Reset Instrument commands count
- Display Spacecraft commands count
- Reset Spacecraft commands count
- Display BC commands count
- Reset BC commands count
- Display BD commands count
- Display current Spacecraft CLCW
- Update current CLCW
- Display current Instrument CLCW
- Validate commands based on individual, all, or none of the following validation criteria: CLTU Start and Tail Sequences, BCH Error Code, Transfer Frame Header Fields, FARM (Valid Frame Sequence), User Command Packet Header
- Generate event messages based on ingest
- Log raw commands (viewable by offline utility)
- Display raw command in hexadecimal or octal format addressed in either hexadecimal or decimal fashion
- Display command packet headers for instrument commands
- Display command packet headers for spacecraft commands

Time:

- Maintain and update SC time (GIRD)
- Maintain and update GMT time
- Synchronize SC and GMT times

Attachment C – Release 4.0 Installation Instructions

This attachment contains the instructions for installing the MPS/PM-1 Release 4.0 Server and Client, and re-ingesting the Project Data Base (PDB) into Oracle.

NOTE

Release 4.0 is capable of using more information from the PDB than previous releases. For this reason the PDB must be re-ingested into Oracle prior to initializing the simulator. The PDB database created by the new scripts is useable by previous versions of the simulator but will cause excessive error messages.

Instructions for installation of the PM-1 Server and Client software:

1. Insert the delivery media into the appropriate drive.
2. To install the PM-1 Client:
 - a) On the desktop, click on the Start button, and then select Run from the resulting menu.
 - b) When the Run window appears select the Browse... button.
 - c) From the Browse Window, select the Removable drive that contains the installation disk
 - d) Click on the Client folder.
 - e) From within the Client folder, double click on the Setup.exe icon.
 - f) The screen will be filled with a PM-1 Client background and a smaller window with the title "Welcome to PM-1 Client 4.0" will appear. Click on the Next button to proceed to the next step.
 - g) The next window will contain the licensing agreement. Click on Yes to accept the agreement and proceed.
 - h) After all of the files are copied, a window with the title "Setup Complete" will appear. Click on the Finish button to end.
 - i) A PM-1 Client icon will now be installed on the desktop.
3. To install the PM-1 Server:
 - a) On the desktop, click on the Start button, and then select Run from the resulting menu.
 - b) When the Run window appears select the Browse... button.
 - c) From the Browse Window, select the Removable drive that contains the installation disk
 - d) Click on the Server folder.
 - e) From within the Server folder, double click on the Setup.exe icon
 - f) A window with the title "Run Window" will appear. Click on the Okay button to proceed to the next step.

- g) The screen will then be filled with a PM-1 Server background and a window with the title of “Welcome to PM-1 Server 4.0” will appear. Click the Next button to proceed.
- j) The next window will contain the licensing agreement. Click on Yes to accept the agreement and proceed.
- h) Next a window will show the completion status as the files are copied. When the copying is complete click on the Finish button to finish the installation.
- i) A PM-1 Server icon will be installed on the desktop.

The next step is to reload the PDB and modify that database to a form that is useable by the simulator. This process involves the following steps:

1. Ensure that the directory structure shown below exists. Limitations in the SQL scripts used to ingest the PDB into Oracle make it necessary to create the folders exactly as shown.

d:	\pm1_db	\pdb_data
		\scripts
		\<PDB flat files in folders, separated by version>

2. Copy the contents of the “Database” folder from the PM-1 Simulator CD to the “scripts” folder, overwriting any existing files.
3. If necessary, retrieve the desired version of the PDB from Toronto into the desired “PDB flat files...” folder.
4. (This step is required by limitations in the SQL scripts.) Copy the PDB files into generic-named files in the “pdb_data” folder, overwriting existing files. If doing the copy in a DOS window use the following syntax example (NOTE that the PDB file has an imbedded date but the generic file doesn't):

cp tlm_packet_110899.pdb D:\pm1_db\pdb_data\trlm_packet.pdb

If using the drag and drop method, the files must be renamed after they are copied.

5. Perform the following steps to execute a SQL script in *SQL*Plus* to add the tables required for PM-1.
 - Select Start->Programs->Oracle for Windows NT->SQL*Plus 8.0 to start *SQL*Plus*¹
 - Enter *stest* for USER NAME and *etsmps1* for PASSWORD then click on OK. HOST STRING is not required.
 - Type the following to run the first SQL script: *@D:\pm1_db\scripts\pm1bld*

6. Perform the following steps to execute a .BAT file to load the PDB files using *SQL*Loader*.
 - Open Windows Explorer and navigate to the *d:\pm1_db\scripts* folder.
 - Double-click on the .BAT file, *PMILoader.BAT*, to execute it.

7. Perform the following steps to execute two more SQL scripts in *SQL*Plus* to perform final configurations on the PDB data.
 - Select Start->Programs->Oracle for Windows NT->SQL*Plus 8.0 to start *SQL*Plus*¹
 - Enter *stest* for USER NAME and *etsmps1* for PASSWORD then click on OK. HOST STRING is not required.
 - Type the following to run the second SQL script:
@D:\pm1_db\scripts\second_pass
 - Type the following to run the third SQL script:
@D:\pm1_db\scripts\gen_full_fixed
 - Type exit to close the *SQL*Plus* window.

The database is now fully configured and loaded. To verify that the installation was successful, run the PM-1 simulator. Verify that messages appear in the event log indicating that the application was able to successfully connect to the database and retrieve packet and telemetry data.

¹ Note that the exact selection path to *SQL*Plus* may be different than the path shown here.

Attachment D – Special Operating Instructions

This attachment contains the special operating instructions for MPS/PM-1 Release 4.0.

Standard operating procedures are included in the User's Guide for MPS/PM-1. The User's Guide will be available from the ETS home page at <http://esdis-it.gsfc.nasa.gov/ETS/ets.html>.

LOADING A NEW VERSION OF THE PDB

When a new version of the PDB is released, the current contents of the database must be erased and the new data loaded. This is very similar to the initial process described in Attachment C except that the PM-1 database already exists. You must erase the data, load the new PDB, and then configure it. This process involves the following steps:

<u>NOTE</u>
Limitations in the Sequel scripts require that the PDB files be placed in a specific directory for ingest into Oracle.
That directory is D:\pm1_db\pdb_data

1. Create a folder under the "pm1_db" folder to hold the new PDB flat files. A folder name something like "PDB_of_<date>" is suggested.
2. Copy the new PDB flat files from Toronto into the new folder.
3. Next, copy the new PDB files into generic-named files in the exact location shown below. If doing the copy in a DOS window use the following syntax example (NOTE that the PDB file has an imbedded date but the generic file doesn't):

```
cp tlm_packet_110899.pdb D:\pm1_db\pdb_data\trlm_packet.pdb
```

If using the drag and drop method, the files must be renamed after they are copied.

4. Select Start->Programs->Oracle for Windows NT->SQL*Plus 8.0 to start *SQL*Plus*¹
5. Enter *stest* for USER NAME and *etsmps1* for PASSWORD then click on OK. HOST STRING is not required.
6. Type the following to run the first SQL script: `@D:\pm1_db\scripts\truncate`

¹ Note that the exact selection path to SQL*Plus may be different from the path shown here.

7. Open Windows Explorer and navigate to the *d:\pm1_db\scripts* folder.
8. Double-click on the .BAT file, *PMILoader.BAT*, to execute it.
9. If you did not leave *SQL*Plus* running, select Start->Programs->Oracle for Windows NT->SQL*Plus 8.0 to start *SQL*Plus*.
10. Enter *stest* for USER NAME and *etsmps1* for PASSWORD then click on OK. HOST STRING is not required.
11. Type the following to run the second SQL script: *@D:\pm1_db\scripts\second_pass*
12. Type the following to run the third SQL script: *@D:\pm1_db\scripts\gen_full_fixed*
13. Type exit to close the *SQL*Plus* window.

The new database is now fully loaded and configured. To verify that the installation was successful, run the PM-1 simulator. Verify that messages appear in the event log indicating that the application was able to successfully connect to the database and retrieve packet and telemetry data.

Attachment E – Resolved Discrepancy Reports

The following Discrepancy Reports (DRs) and Change Requests (CRs) have been closed by and are being delivered with SIMSS/PM-1 Release 4.0. The DRs/CRs are listed in the table below, which provides the DR/CR Number, Status, Severity, and a short description. A full description of each DR/CR follows the summary table. Complete information on all DRs/CRs may be accessed via the Internet at address <http://iree.gsfc.nasa.gov/ddts/>.

Summary of Closed Discrepancy Reports

Critical (Severity 1)	Urgent (Severity 2)	Routine (Severity 3)	Change Requests	Total
0	4	8	4	16

Status Definitions

N - New	A - Assigned Analysis	R - Analysis Entered
V - Assigned Verification	T - Tested	C - Closed
W - Withdrawn	P - Postponed	X - Duplicate

ETS No.	SMO No.	Type	Status	Severity	Version Fixed In	Description
ETS0365	SMOdr05957	DR	A	2	3.1	MPS clock drifting
ETS0366	SMOdr05958	DR	A	2	3.1	Sim crashes on high-rate of commands
ETS0374	SMOdr06203	DR	A	2	3.1	MPS handling of packet lengths
ETS0376	SMOdr06279	CR	A	2	4.0	Need to enhance MPS/PM-1 to properly handle instrument telemetry
ETS0380	SMOdr06359	DR	A	2	4.0	Command identification is unacceptably slow Improvement only
ETS0342	SMOdr05705	CR	A	3	3.1	Defaults for input & output modules
ETS0355	SMOdr05856	DR	A	3	3.1	MPS outputting incorrect times Duplicate of ETS0365
ETS0356	SMOdr05857	DR	A	3	4.0	Improper Primary Header
ETS0357	SMOdr05859	CR	A	3	4.0	Modifying APID data

ETS0358	SMOdr05860	DR	A	3	4.0	Improper secondary header
ETS0360	SMOdr05921	DR	A	3	3.1	Cannot modify Instrument CLCW values through the GUI window
ETS0362	SMOdr05923	DR	A	3	3.1	PB-5 time in EDOS Service Header is 2 days in the past
ETS0375	SMOdr06220	DR	A	3	4.0	Scroll bar problems
ETS0377	SMOdr06291	DR	A	3	3.1	Incorrect packet lengths
ETS0383	SMOdr06364	DR	A	3	4.0	Setting MPS time past 19:00:00
ETS0385	SMOdr06370	CR	A	3	4.0	Addition of a serial telemetry capability

Title: PB-5 time in EDOS Service Header is 2 days in the past

SUBMITTAL INFORMATION	ANALYSIS INFORMATION
Project: ETS	Assignee1/Org: Ernest Quintin
Rel/Ver: 3.0	Phone: 301-805-3649
Subsystem: MPS-PM/Aqua	Email: equintin@csc.com
Test Phase: acceptance test	Assignee2/Org:
Severity: 3	Phone:
Date found: 991217	Email:
Location: GSFC	Date due (Sev=1,2):
Submitter: Ernest Quintin	
Organization: ETS Dev Group	
Phone number: 301-805-3649	
Email: equintin@csc.com	

***** Problem (Added 991217 by equintin) *****
The PB-5 time in the EDOS Service Header is 2 days in the past.

A workaround exists. The user should call up the Ground Station display/set GMT screen and set the GMT to two days in the future.

***** Admin Comment (Added 000117 by eshurie) *****
Per 01/14/2000 DRB meeting, this will be fixed in release 3.1.

Severity: 2 Phone:
Date found: 000114 Email:
Location: Denver Date due (Sev=1,2):
Submitter: Vince Ruland
Organization: EMOS
Phone number: 720-895-4068
Email: vhruland@west.raytheon.com

***** Problem (Added 000118 by vruland) *****

The PM-MPS needs to be changed so that when it uses the MIN_PKT_LENGTH and MAX_PKT_LENGTH fields from TLMPACKET.pdb it interprets these as being the min and max lengths of the data zone minus one for the corresponding APID. Currently the MPS interprets these as being the entire data zone.

***** Admin Comment (Added 000128 by eshurie) *****

Per developer at 01/28/2000 DRB meeting, this fix will be included in Release 3.1, planned for delivery today.

DR: ETS0375 Related NCR: Submitted: 000119
Status: ASSIGNED-ANALYSIS Class: ETS Asgnd-Analysis: 000128

Title: Scroll bar problems

SUBMITTAL INFORMATION

Project: ETS
Rel/Ver: 3.0
Subsystem: MPS-PM/Aqua
Test Phase: unit test
Severity: 3
Date found: 000118
Location: Denver
Submitter: Vince Ruland
Organization: EMOS
Phone number: 720-895-4068
Email: vhruland@west.raytheon.com

ANALYSIS INFORMATION

Assignee1/Org: Ernest Quintin
Phone: 301-805-3649
Email: equintin@csc.com
Assignee2/Org:
Phone:
Email:
Date due (Sev=1,2):

***** Problem (Added 000119 by vruland) *****

The scroll bar of the bottom window of the main screen where telemetry/command messages are displayed does not remain at the bottom. When new messages come through, the scroll bar moves up and does not display the latest or most recent message. You have to manually move the scroll button down to view new messages.

DR: ETS0376 Related NCR: Submitted: 000128
Status: ASSIGNED-ANALYSIS Class: ETS Asgnd-Analysis: 000131

Title: Need to enhance MPS/PM-1 to properly handle instrument telemetry

SUBMITTAL INFORMATION

Project: ETS
Rel/Ver: 3.0
Subsystem: MPS-PM/Aqua
Test Phase: dev informal integ
Severity: 2
Date found: 000112
Location: GSFC
Submitter: Ernest Quintin
Organization: ETS Dev Group
Phone number: 301-805-3649
Email: equintin@csc.com

ANALYSIS INFORMATION

Assignee1/Org: Ernest Quintin
Phone: 301-805-3649
Email: equintin@csc.com
Assignee2/Org:
Phone:
Email:
Date due (Sev=1,2):

***** Problem (Added 000128 by equintin) *****
The MPS/PM-1 simulator needs to be enhanced to properly handle instrument telemetry. Instrument telemetry generation aboard the PM-1 spacecraft is described by a secondary key as well as APID. The secondary key governs which telemetry parameters appear in a given instance of the APID.

An email from Ernest Quintin to Estelle Noone, et al, dated 1/13/2000, titled "Synopsis of Telecon with Raytheon on 1/12/00" provides all known details.

***** Admin Comment (Added 000131 by eshurie) *****
At 01/28/2000 DRB meeting, this Change Request was approved for Analysis, at Severity Level 2, in advance of its (same-day) submittal.

Project: ETS Assignee1/Org: Ernest Quintin
Rel/Ver: 3.1 Phone: 301-805-3649
Subsystem: MPS-PM/Aqua Email: equintin@csc.com
Test Phase: unit test Assignee2/Org:
Severity: 3 Phone:
Date found: 000205 Email:
Location: Denver Date due (Sev=1,2):
Submitter: Vince Ruland
Organization: EMOS
Phone number: 720-895-4068
Email: vhruland@west.raytheon.com

***** Problem (Added 000209 by vruland) *****

It is not possible to set the MPS clock to times past 19:00:00, when setting the clock to hours past 19:00 it reverts back to 00:**:*. The clock appears to accept all times up to 19:00 just fine and the drift problem appears to have been corrected.

DR: ETS0385 Related NCR: Submitted: 000211
Status: ASSIGNED-ANALYSIS Class: ETS Asgnd-Analysis: 000215

Title: Addition of a serial telemetry capability.

SUBMITTAL INFORMATION

Project: ETS
Rel/Ver: 4.0
Subsystem: MPS-PM/Aqua
Test Phase: unit test
Severity: 2
Date found: 000211
Location: GSFC
Submitter: Ernest Quintin
Organization: ETS Dev Group
Phone number: 301-805-3649
Email: equintin@csc.com

ANALYSIS INFORMATION

Assignee1/Org: Ernest Quintin
Phone: 301-805-3649
Email: equintin@csc.com
Assignee2/Org:
Phone:
Email:
Date due (Sev=1,2):

***** Problem (Added 000211 by equintin) *****

Add a serial telemetry transmit capability to the MPS/PM-1 simulator. This is to enable the MPS/PM-1 to simulate the 16-Kbit serial transmit stream of the PM-1 spacecraft.

The capability will include building of VCDUs from telemetry packets, packaging the VCDUs into CADUs, adding Reed-Solomon encoding and Randomization, and transmission over a serial interface.

Attachment F – Unresolved Discrepancy Reports

All open MPS-PM/Aqua Discrepancy Reports (DRs) and Change Requests (CRs) are listed in the following table. The table includes the DR/CR Number, Status, Severity, and a short description. A full description of each DR/CR follows the summary table. Complete information on all DRs/CRs may be accessed via the Internet at <http://iree.gsfc.nasa.gov/ddts/>.

Summary of Open Discrepancy Reports

Critical (Severity 1)	Urgent (Severity 2)	Routine (Severity 3)	Change Request (CR)	Total
0	1	6	2	9

Status Definitions

N – New

V - Assigned Verification

W – Withdrawn

A - Assigned Analysis

T – Tested

P – Postponed

R - Analysis Entered

C – Closed

X – Duplicate

ETS #	SMO No.	Type	Status	Severity	Description
ETS0338	SMOdr05701	CR	A	3	PM MPS sim window management
ETS0343	SMOdr05706	CR	A	3	Removing links
ETS0359	SMOdr05920	DR	A	3	Server crashes on exit
ETS0361	SMOdr05922	DR	A	3	Packet contents do not reflect initial telemetry values
ETS0363	SMOdr05924	DR	A	3	Telemetry data values entered by operator are not validated
ETS0364	SMOdr05925	DR	A	3	Enabling an APID changes the transmit frequency
ETS0378	SMOdr06292	DR	A	3	Packet Sequence count anomaly
ETS0379	SMOdr06294	DR	A	2	Cannot use two output modules for same output

DR: ETS0338 (SMODr05701) Related NCR: Submitted: 991103
Status: ASSIGNED-ANALYSIS Class: ETS Asgnd-Analysis: 991217

Title: PM MPS sim window management

SUBMITTAL INFORMATION

Project: ETS
Rel/Ver: 2.1
Subsystem: MPS-PM/Aqua
Test Phase: unit test
Severity: 3
Date found: 991101
Location: Denver
Submitter: Vince Ruland
Organization: ETS
Phone number: 720-895-4068
Email: vhruland@west.raytheon.com

ANALYSIS INFORMATION

Assignee1/Org: Ernest Quintin
Phone: 301-805-3649
Email: equintin@csc.com
Assignee2/Org:
Phone:
Email:
Date due (Sev=1,2):

***** Problem (Added 991103 by vruland) *****

Any window brought up or opened will disappear behind the main project screen as soon as it's clicked on. In order to have access to these windows, we have to ensure that a portion of the windows are visible outside of the main screen so they can be clicked on. Suggest a better window management akin to a "start" menu bar in windows that allows the user to select any window at any time, whether it is buried under other windows or not.

***** Analysis Info (Added 991221 by eshurie) *****
Information provided by E. Noone 12/17/99:

Window management is controlled by Win NT. Clicking on the icon in the task bar (which is usually at the bottom of the screen) will get the window to pop to the front.

Initial indication is that no software change may be required.

DR: ETS0343 (SMODr05706) Related NCR: Submitted: 991103
Status: ASSIGNED-ANALYSIS Class: ETS Asgnd-Analysis: 991109

Title: removing links

SUBMITTAL INFORMATION

Project: ETS
Rel/Ver: 2.1
Subsystem: MPS-PM/Aqua
Test Phase: unit test
Severity: 3
Date found: 991029
Location: Denver
Submitter: Vince Ruland
Organization: ETS
Phone number: 720-895-4068
Email: vhruland@west.raytheon.com

ANALYSIS INFORMATION

Assignee1/Org: Ernest Quintin
Phone: 301-805-3649
Email: equintin@csc.com
Assignee2/Org:
Phone:
Email:
Date due (Sev=1,2):

***** Problem (Added 991103 by vruland) *****

There should be an easier way to remove an incorrect link or a link made in error rather than going into the design mode to delete it. After the link is deleted, the create links mode has to be re-entered in order to continue creating links.

***** Admin Comments (Added 991109 by eshurie) *****

Per DRB meeting (11/8/99), the developers stated that the changes needed for this enhancement will be very involved.

DR: ETS0359 (SMOdr05920) Related NCR: Submitted: 991217
Status: ASSIGNED-ANALYSIS Class: ETS Asgnd-Analysis: 000117

Title: Server crashes on exit

SUBMITTAL INFORMATION

Project: ETS
Rel/Ver: 3.0
Subsystem: MPS-PM/Aqua
Test Phase: acceptance test
Severity: 3
Date found: 991213
Location: GSFC
Submitter: Ernest Quintin
Organization: ETS Dev Group
Phone number: 301-805-3649
Email: equintin@csc.com

ANALYSIS INFORMATION

Assignee1/Org: Ernest Quintin
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Date due (Sev=1,2):

***** Problem (Added 991217 by equintin) *****

Normal shutdown of the MPS/PM-1 simulator is to disconnect the client (GUI) from the server, exit the client, then exit the server. The server crashes when it is disconnected from the client, or when the client is exited.

There is no operational impact because the crash only happens during shutdown.

DR: ETS0361 (SMOdr05922) Related NCR: Submitted: 991217
Status: ASSIGNED-ANALYSIS Class: ETS Asgnd-Analysis: 000117

Title: Packet contents do not reflect initial telemetry values

SUBMITTAL INFORMATION

Project: ETS
Rel/Ver: 3.0
Subsystem: MPS-PM/Aqua
Test Phase: acceptance test
Severity: 3

ANALYSIS INFORMATION

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Project: ETS Assignee1/Org: Ernest Quintin
Rel/Ver: 3.0 Phone: 301-805-3649
Subsystem: MPS-PM/Aqua Email: equintin@csc.com
Test Phase: acceptance test Assignee2/Org:
Severity: 3 Phone:
Date found: 991217 Email:
Location: GSFC Date due (Sev=1,2):
Submitter: Ernest Quintin
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***** Problem (Added 991217 by equintin) *****
When you enable or disable an APID with the Control Packet panel, the transmission frequency also gets modified to whatever value is in the panel. If the panel's default value (0.0) is still displayed, the transmission rate gets changed to 0.1 (ten per second). To avoid this behavior, the user must know what the current rate is (from PDB files or database) and then set the rate to the desired value. Should be able to enable or disable an APID without worry about the transmission rate.

***** Admin Comment (Added 000117 by eshurie) *****
(Per 01/14/2000 DRB meeting, workaround requires knowing the transmit rates and setting them manually.)

DR: ETS0378 (SMODr06292) Related NCR: Submitted: 000131
Status: ASSIGNED-ANALYSIS Class: ETS Asgnd-Analysis: 000202

Title: Packet Sequence count anomaly
SUBMITTAL INFORMATION ANALYSIS INFORMATION
Project: ETS Assignee1/Org: Ernest Quintin
Rel/Ver: 3.0 Phone: 301-805-3649
Subsystem: MPS-PM/Aqua Email: equintin@csc.com
Test Phase: unit test Assignee2/Org:
Severity: 3 Phone:
Date found: 000128 Email:
Location: Denver Date due (Sev=1,2):
Submitter: Vince Ruland
Organization: ECS
Phone number: 720-895-4068
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***** Problem (Modified 000202 by eshurie) *****
When an APID's sequence count is manually edited, the next packet output from the MPS simulator contains the edited number incremented by one instead of the number entered in the edit field.

***** Admin Comment (Modified 000202 by eshurie) *****
(At 01/28/2000 DRB meeting, this DR was approved for Analysis in
advance of its imminent submittal to the DRTT.)

DR: ETS0379 (SMODr06294) Related NCR: Submitted: 000131
Status: ASSIGNED-ANALYSIS Class: ETS Asgnd-Analysis: 000215

Title: Cannot use two output modules for same output

SUBMITTAL INFORMATION	ANALYSIS INFORMATION
Project: ETS	Assignee1/Org: Ernest Quintin
Rel/Ver: 3.0	Phone: 301-805-3649
Subsystem: MPS-PM/Aqua	Email: equintin@csc.com
Test Phase: IV&V	Assignee2/Org:
Severity: 2	Phone:
Date found: 000128	Email:
Location: GSFC	Date due (Sev=1,2):
Submitter: Hillary Shein	
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***** Problem (Added 000131 by hshein) *****
I attempted to send duplicate telemetry to the PM EMOS system by
configuring two output modules to transmit the telemetry stream
coming from the simulator module.

When two output modules (with the same output stream) were present,
neither output module transmitted data. When the second output
module was removed, the original output module transmitted data
as expected.

This does not cause a problem with two output modules in the
"normal" configuration (one for telemetry and one for CLCW's).

Attachment G – Requirements Matrix

PM-1 Requirement	Release	SIMSS/PM-1 Requirement Description
PMCMD-01	1	SIMSS/PM-1 shall be capable of receiving command data as UDP command blocks.
PMCMD-02		SIMSS/PM-1 shall be capable of configuring command receipt processing in IP mode.
PMCMD-02.01	1	SIMSS/PM-1 shall be capable of configuring IP mode command receipt to UDP MULTICAST mode.
PMCMD-02.02	1	SIMSS/PM-1 shall be capable of configuring IP mode command receipt to any valid UDP MULTICAST IP address.
PMCMD-02.03	1	SIMSS/PM-1 shall be capable of configuring IP mode command receipt to any valid UDP MULTICAST Port number.
PMCMD-02.04	1-U	SIMSS/PM-1 shall be capable of configuring IP mode command receipt to any block length between one and 6000 bytes.
PMCMD-03		SIMSS/PM-1 shall accept operator directives that enable or disable the following elements of the command validation process: Codeblock BCH Parity Validation, Transfer Frame Header Validation, FARM Protocol Validation, and User Command Packet Header Validation.
PMCMD-03.01	1	When the Codeblock BCH parity validation element is enabled, the command subsystem will verify for each codeblock of each received CLTU that the BCH parity byte matches a computed value and that the spare bit is equal to zero. If any codeblock of a CLTU fails validation, an event message will be generated and that entire CLTU will be discarded. When this element is disabled, the parity byte will be assumed to be valid.
PMCMD-03.02	1	When the Transfer Frame Header validation element is enabled, the command subsystem will verify that all of the fields of the Transfer Frame header, except the sequence number, match expected values and ranges as defined in the ICD. If the Transfer Frame Header validation fails, an event message will be generated and the entire Transfer Frame will be discarded. If applicable, the CLCW corresponding to that Transfer Frame's virtual channel will be updated with error information. When this element is disabled, the Transfer Frame header values will be assumed to be valid.
PMCMD-03.03	1	When the FARM validation element is enabled, the command subsystem will verify that the Transfer Frame sequence number is valid as expected for FARM-1 protocol as defined in the ICD. If the FARM validation fails, an event message will be generated and the entire Transfer Frame will be discarded. If applicable, the CLCW corresponding to that Transfer Frame's virtual channel will be updated with error information. When this element is disabled, the Transfer Frame sequence number will be assumed to be valid.
PMCMD-03.04	1	When the Command Packet Header validation element is enabled, the command subsystem will verify that the Command Packet Header fields contain valid values as defined in the ICD. If the Command Packet Header validation fails, an event message will be generated and the Command Packet will be discarded. This requirement is applicable to the spacecraft command packet format and the instrument command packet format. When this element is disabled, the Command Packet Header is assumed to be valid.
PMCMD-04	2	SIMSS/PM-1 shall accept operator directives to change all fields of the spacecraft and instrument CLCWs.
PMCMD-05		SIMSS/PM-1 shall simulate spacecraft command acceptance according to the COP-1 protocol.
PMCMD-05.01		SIMSS/PM-1 shall perform Type AD spacecraft command acceptance checks in accordance with the FARM-1 protocol if FARM-1 protocol checking is enabled.
PMCMD-05.01.1	2	SIMSS/PM-1 shall reject Type AD spacecraft commands and post a command rejected event message if the Lockout bit is set in the spacecraft CLCW.

Attachment G – Requirements Matrix

PM-1 Requirement	Release	SIMSS/PM-1 Requirement Description
PMCMD-05.01.2	2	SIMSS/PM-1 shall reject Type AD spacecraft commands, post a command rejected message, and set the Lockout bit in the spacecraft CLCW if (1) the Frame Sequence Count in the Transfer Frame header is more than 90 counts greater than or more than 90 counts less than (modulo 256) the Report Value field of the spacecraft CLCW <u>and</u> (2) FARM-1 protocol checking is enabled.
PMCMD-05.01.3	2	SIMSS/PM-1 shall reject Type AD spacecraft commands, post a command rejected message, and set the Retransmit bit in the spacecraft CLCW if (1) the Frame Sequence Count in the Transfer Frame header is between one and 90 counts greater than (modulo 256) the contents of the Report Value field of the spacecraft CLCW <u>and</u> (2) FARM-1 protocol checking is enabled.
PMCMD-05.01.4	2	SIMSS/PM-1 shall reject Type AD spacecraft commands and post a command rejected message if (1) the Frame Sequence Count in the Transfer Frame header is between one and 90 counts less than (modulo 256) the contents of the Report Value field of the spacecraft CLCW <u>and</u> (2) FARM-1 protocol checking is enabled.
PMCMD-05.01.5	2.0	SIMSS/PM-1 shall clear the spacecraft CLCW Lockout bit upon receipt of an UNLOCK Control Command (Type BC) containing the spacecraft VCID.
PMCMD-05.01.6	2.0	SIMSS/PM-1 shall set the spacecraft CLCW Report Value field to the data value contained within the third byte of a SET V(R) Control Command (Type BC) containing the spacecraft VCID.
PMCMD-05.01.7	2	SIMSS/PM-1 shall increment the Report Value field (modulo 256) of the spacecraft CLCW upon receipt of a Type AD spacecraft command whose Frame Sequence Count matches the current spacecraft CLCW Report Value field contents, provided that FARM-1 protocol checking is enabled.
PMCMD-05.02		SIMSS/PM-1 shall perform Type AD instrument command acceptance checks in accordance with the FARM-1 protocol if FARM-1 protocol checking is enabled.
PMCMD-05.02.1	2	SIMSS/PM-1 shall reject Type AD instrument commands and post a command rejected event message if the Lockout bit is set in the instrument CLCW.
PMCMD-05.02.2	2	SIMSS/PM-1 shall reject Type AD instrument commands, post a command rejected message, and set the Lockout bit in the instrument CLCW if (1) the Frame Sequence Count in the Transfer Frame header is more than 90 counts greater than or more than 90 counts less than (modulo 256) the Report Value field of the instrument CLCW <u>and</u> (2) FARM-1 protocol checking is enabled.
PMCMD-05.02.3	2	SIMSS/PM-1 shall reject Type AD instrument commands, post a command rejected message, and set the Retransmit bit in the instrument CLCW, if (1) the Frame Sequence Count in the Transfer Frame header is between one and 90 counts greater than (modulo 256) the Report Value field of the instrument CLCW <u>and</u> (2) FARM-1 protocol checking is enabled.
PMCMD-05.02.4	2	SIMSS/PM-1 shall reject Type AD instrument commands and post a command rejected message if (1) the Frame Sequence Count in the Transfer Frame header is between one and 90 counts less than (modulo 256) the Report Value field of the instrument CLCW <u>and</u> (2) FARM-1 protocol checking is enabled.
PMCMD-05.02.5	2.0	SIMSS/PM-1 shall clear the instrument CLCW Lockout bit upon receipt of an UNLOCK Control Command (Type BC) containing the instrument VCID.

Attachment G – Requirements Matrix

PM-1 Requirement	Release	SIMSS/PM-1 Requirement Description
PMCMD-05.02.6	2.0	SIMSS/PM-1 shall set the instrument CLCW Report Value field to the data value contained within the third byte of a SET V(R) Control Command (Type BC) containing the instrument VCID.
PMCMD-05.02.7	2	SIMSS/PM-1 shall increment the Report Value field (modulo 256) of the instrument CLCW upon receipt of a Type AD instrument command whose Frame Sequence Count matches the current instrument CLCW Report Value field contents, providing that FARM-1 protocol checking is enabled.
PMCMD-06	1	SIMSS/PM-1 shall provide the capability to monitor and display command processing status.
PMCMD-07	1	Upon operator request, SIMSS/PM-1 shall store received commands for posttest review subject to specified storage capacities.
PMCMD-08	3.1	SIMSS/PM-1 shall use information from the PDB to perform command identification processing. The Command subsystem shall match command bit patterns received to stored bit patterns to locate command mnemonics in the PDB.
PMCMD-09	4	SIMSS/PM-1 shall provide the capability to respond to that subset of spacecraft commands that are defined in the PM-1 PDB Command Execution Verification (CEV) file. If the PDB CEV file contains end-item verifier telemetry mnemonics associated with the identified command, the associated telemetry point(s) will be set to the corresponding value(s) defined in the CEV file.
PMCMD-10		SIMSS/PM-1 shall generate a simulator event message whenever a command is received.
PMCMD-10.01	3.1	SIMSS/PM-1 shall generate a simulator event message to display the command mnemonic whenever a valid command is decoded.
PMCMD-10.02	3.1	SIMSS/PM-1 shall generate a simulator event message to display the values of command submnemonics whenever a command containing submnemonics is decoded.
PMCMD-11	1	SIMSS/PM-1 shall generate a simulator event message whenever a command error is detected
PMCMD-11.01	3.1	SIMSS/PM-1 shall generate a simulator event message indicating the command error detected whenever a command in error is decoded, provided that command validation is enabled.
PMCMD-11.02	3.1	SIMSS/PM-1 shall generate an event message indicating that an unknown command has been received whenever a command cannot be matched to any PDB entry.
PMCMD-12	5	SIMSS/PM-1 shall execute operator directives that set the expected values within the Command Data Block (CDB) header.
PMCMD-13	4P,5	SIMSS/PM-1 shall receive spacecraft memory and table loads from an external source and shall store the load data in simulated spacecraft memory.
PMCMD-14	5	SIMSS/PM-1 shall perform a CRC validation in the load data and shall set a pass/fail indicator in telemetry. More information is needed.
PMCMD-15	5	SIMSS/PM-1 shall process commands that request or configure for a Spacecraft Controls Computer memory dump.
PMCMD-16	1	SIMSS/PM-1 interface with EOC shall comply with the command interface formats and protocols specified in the EDOS to EGS Elements interface document

Attachment G – Requirements Matrix

PM-1 Requirement	Release	SIMSS/PM-1 Requirement Description
PMCMD-17	5	SIMMS/PM-1 shall be capable of updating multiple command counters in telemetry. The command counters to be updated shall be as agreed upon with PM-1 project representatives. <i>More information is needed.</i>
PMCMD-18	1	SIMMS/PM-1 shall interpret VCID 0 (spacecraft), VCID 1 (instrument), and VCID 16 and 17 (TIE critical) commands.
PMCMD-19	5	SIMMS/PM-1 shall interpret multipart commands. <i>More information is needed.</i>
PMCMD-20	1	SIMSS/PM-1 shall be capable of logging up to 8 MB of received commands during a testing session.
PMCMD-21	5	SIMSS/PM-1 shall receive spacecraft commands in a CLTU bitstream through the serial interface at rates from 125 bps to 2 Kbps.
PMGEN-01	1	The SIMSS/PM-1 simulator shall be Year 2000 compliant
PMGEN-02	1	The SIMSS/PM-1 GUI shall set the simulated spacecraft time as directed by the operator.
PMGEN-03		The SIMSS/PM-1 simulator shall be capable of executing a scenario script file.
PMGEN-03.01	4	The SIMSS/PM-1 simulator shall be capable of executing operator directives via a scenario script to update telemetry parameters by mnemonic.
PMGEN-03.02	5	The SIMSS/PM-1 simulator shall be capable of executing operator directives via a scenario script to retrieve and display the value of any telemetry parameter by mnemonic.
PMGEN-03.03	5	The SIMSS/PM-1 simulator shall be capable of executing operator directives via a scenario script to start and stop telemetry transmission.
PMGEN-03.04	5	The SIMSS/PM-1 simulator shall be capable of executing operator directives via a scenario script to start and stop transmission of CLCW packets.
PMGEN-03.05	5	The SIMSS/PM-1 simulator shall be capable of executing operator directives via a scenario script to enable and disable all elements of command validation that are under operator control. See “PMCMD” requirements for those command validation elements that are controllable by the operator.
PMGEN-04	5	SIMSS/PM-1 shall be capable of providing files of received or generated test data on electronic and physical media.
PMGEN-05	1	SIMSS/PM-1 GUI shall acknowledge an operator request within 2 seconds of its entry.
PMGEN-06	1	SIMSS/PM-1 GUI shall start execution of an operator request within 5 seconds of its entry.
PMGEN-07	1	SIMSS/PM-1 shall be capable of maintaining an internal time code to a resolution of 200 milliseconds.
PMGEN-08	1	SIMSS/PM-1 shall comply with the set of display guidelines specified in DSTL-92-007, Human-Computer Interface Guidelines, August, 1992.
PMGEN-09	1	SIMSS/PM-1 shall comply with security provisions specified in the NASA Automated Information Security Handbook, NHB 2410.9A.
PMGEN-10	1	SIMSS/PM-1 shall comply with the NASA Communications (Nascom) Access Protection Policy and Guidelines.
PMGEN-11	1	SIMSS/PM-1 shall provide a hard disk drive with sufficient capacity to store the program bootstrap, executable files, and other simulation environment files, such as the Project Data Base and scenario files used during tests, and a TBD percent reserve.

Attachment G – Requirements Matrix

PM-1 Requirement	Release	SIMSS/PM-1 Requirement Description
PMGEN-12	1	SIMSS/PM-1 shall provide a physical media storage device that can be used to support the exchange of small amounts of information with external systems and for system backups and data logging.
PMGEN-13	1	SIMSS/PM-1 shall be portable.
PMGEN-14	1	SIMSS/PM-1 shall provide an Ethernet interface that conforms to 10BaseT of the IEEE 802.3 standard.
PMGEN-15	1	SIMSS/PM-1 shall interface with the EOC through the Ethernet interface using the Internet Protocol (IP) suite, including TCP/IP and UDP/IP.
PMGEN-16	1	SIMSS/PM-1 shall receive CLTUs in command data blocks from the EOC and output EDUs (packets and CLCWs) to the EOC through the Ethernet interface. All data transfers through this Ethernet interface are based on UDP/IP protocol.
PMGUI-01	1-U	The SIMSS/PM-1 simulator shall accept and validate all operator directives.
PMGUI-02	1	The SIMSS/PM-1 GUI shall provide the capability to display command packets received.
PMGUI-03	1	The SIMSS/PM-1 GUI shall provide the capability to display telemetry and CLCW packets transmitted.
PMGUI-04	1	The SIMSS/PM-1 GUI shall provide the capability to display command and telemetry status.
PMGUI-05	1	The SIMSS/PM-1 GUI shall provide the capability to display the current receive and transmit network configuration to the operator.
PMGUI-06	1	SIMSS/PM-1 shall accept and execute operator directives that set spacecraft time and GMT.
PMGUI-07	1	SIMSS/PM-1 shall provide the capability to display the EDOS Service Header appended to transmitted telemetry packets.
PMGUI-08	1	SIMSS/PM-1 shall provide the capability to display the Telemetry Packet Header of a selected APID.
PMGUI-09	1	SIMSS/PM-1 shall provide the capability to display GMT and Spacecraft Times.
PMGUI-10	2	SIMSS/PM-1 shall provide the capability to display the current values of the spacecraft and instrument CLCWs.
PMGUI-11	1	SIMSS/PM-1 shall provide the capability to display event messages.
PMGUI-12	1	SIMSS/PM-1 shall provide the capability to display telemetry and CLCW transmit status.
PMGUI-13	1	SIMSS/PM-1 shall provide the capability to display command receipt status.
PMGUI-14	1	SIMSS/PM-1 shall be capable of updating all displays periodically.
PM-INIT-01		SIMSS/PM-1 shall be capable of selecting a desired version of the PDB at operator request during initialization.
PM-INIT-01.01	5	During initialization, the SIMSS/PM-1 simulator shall be capable of querying an Oracle database to determine which versions of the PM-1 PDB are available. The version information returned from the database shall be displayed to the operator.
PM-INIT-01.01	5	During initialization, the SIMSS/PM-1 simulator shall provide the operator with the capability to select one version of the PM-1 PDB from among those that are resident within the Oracle database.
PM-INIT-01.01	5	During initialization, if the operator does not select a version of the PM-1 PDB, the SIMSS/PM-1 simulator will default to the most recent version available in the database.
PMMDL-01	5	SIMSS/PM-1 shall provide a telemetry parameter orbit modeling capability. The purpose of this capability is to simulate the behavior of a limited set of telemetry parameters on an orbit basis. <i>More information is needed.</i>
PMMDL-02	5	SIMSS/PM-1 shall turn on and off selected orbit modeling under operator control.

Attachment G – Requirements Matrix

PM-1 Requirement	Release	SIMSS/PM-1 Requirement Description
PMMDL-03	5	SIMSS/PM-1 shall be capable of changing between static, table, or algorithm models under operator control
PMMDL-04	5	SIMSS/PM-1 shall execute modeling directives that enable or disable selected orbit modeling.
PMMDL-05	5	SIMSS/PM-1 shall execute modeling directives that associate any telemetry parameter with any predefined model.
PMMDL-06	5	SIMSS/PM-1 shall execute modeling directives that change between static, table, or algorithm models.
PMMDL-07	5	SIMSS/PM-1 shall provide the operator with an offline capability to access model functions and coefficients.
PMMDL-08	5	SIMSS/PM-1 shall provide the operator with an offline capability to translate ASCII-formatted files containing static, table, and algorithm orbit modeling information into a binary form readable by SIMSS/PM-1 simulator.
PMTLM-01	4	SIMSS/PM-1 shall be capable of switching between IP and serial modes of operation for command receipt and telemetry transmission.
PMTLM-02	1,3	SIMSS/PM-1 shall provide the capability to transmit one stream of telemetry when in IP mode.
PMTLM-03		SIMSS/PM-1 shall be capable of independently configuring telemetry and CLCW transmit when in IP mode.
PMTLM-03.01	2,3	SIMSS/PM-1 shall be capable of transmitting packets containing CLCWs independently of telemetry transmission when in IP mode
PMTLM-03.01	1	SIMSS/PM-1 shall be capable of independently configuring IP mode telemetry and CLCW transmission to UDP MULTICAST mode when in IP mode.
PMTLM-03.02	1	SIMSS/PM-1 shall be capable of independently configuring IP mode telemetry and CLCW transmission to any valid UDP MULTICAST IP address when in IP mode.
PMTLM-03.03	1	SIMSS/PM-1 shall be capable of independently configuring IP mode telemetry and CLCW transmission to any valid UDP MULTICAST Port number when in IP mode.
PMTLM-03.04	1	SIMSS/PM-1 shall be capable of independently configuring IP mode telemetry and CLCW transmission to any block length between one and 6000 bytes when in IP mode.
PMTLM-03.05	1	SIMSS/PM-1 shall be capable of independently configuring IP mode telemetry transmission to variable block length when in IP mode.
PMTLM-04	4	SIMSS/PM-1 shall be capable of transmitting two streams of CADUs (simulating the I and Q channels) when in serial mode.
PMTLM-04.01	4	When in serial mode, SIMSS/PM-1 shall build S-band CADUs as described in the PM-1 Spacecraft to Ground ICD.
PMTLM-04.02	4	When in serial mode, SIMSS/PM-1 shall build and transmit Fill CADUs as described in the PM-1 Spacecraft to Ground ICD when there is not enough telemetry data available to fill a CADU.
PMTLM-05	3	SIMSS/PM-1 shall accept and execute operator directives that set the value of any telemetry parameter by mnemonic.
PMTLM-06	5	SIMSS/PM-1 shall accept and execute operator directives that set the value of any location in the PM-1-simulated spacecraft memory.
PMTLM-07	3-U	SIMSS/PM-1 shall accept and execute operator directives that request the value of any telemetry parameter for display in raw data units.
PMTLM-08	1	SIMSS/PM-1 shall accept and execute operator directives that request the contents of any telemetry packet.

Attachment G – Requirements Matrix

PM-1 Requirement	Release	SIMSS/PM-1 Requirement Description
PMTLM-09	5	SIMSS/PM-1 shall accept and execute operator directives that request the value of any location or block of locations in simulated spacecraft memory.
PMTLM-10	5	SIMSS/PM-1 shall set initial telemetry parameter values from information extracted from the PM-1 PDB and user provided files.
PMTLM-11	1	SIMSS/PM-1 shall accept and execute operator directives that result in changes to telemetry packet header values.
PMTLM-12	5	SIMSS/PM-1 shall execute telemetry directives that control the PM-1 Solid State Recorder. <i>May not be needed.</i>
PMTLM-13	5	SIMSS/PM-1 shall provide for the storage of housekeeping telemetry to be used as playback data.
PMTLM-14		SIMSS/PM-1 shall use the information from the PM-1 PDB to generate and transmit telemetry packets.
PMTLM-14.01	3	SIMSS/PM-1 shall be capable of creating CCSDS-format telemetry packets from information contained in the PM-1 PDB telemetry packet specification file.
PMTLM-14.02	3-U	SIMSS/PM-1 shall provide the capability to generate and transmit telemetry packets with APIDs identical to the PM-1 spacecraft.
PMTLM-14.03	4	SIMSS/PM-1 shall use the APID and secondary key fields of the PM-1 PDB packet definition file to identify unique packets.
PMTLM-14.04	4	SIMSS/PM-1 shall generate a telemetry packet for each unique combination of APID and secondary key.
PMTLM-14.05	1,4	SIMSS/PM-1 shall accept and execute operator directives to set the packet generation rate for any APID and secondary key combination defined in the PM-1 PDB.
PMTLM-14.06	3	SIMSS/PM-1 shall populate the telemetry packet primary header fields in the following list in accordance with information obtained from the PM-1 Spacecraft to Ground ICD and applicable CCSDS documents: Version Number, Type, Secondary Header Flag, APID, Sequence Flag, Sequence Count, and Packet Length.
PMTLM-14.07	4	SIMSS/PM-1 shall place the secondary key into the telemetry packet at the offset specified by the PM-1 PDB telemetry packet specification file and shall use the number of bits specified by that file.
PMTLM-14.08	4	SIMSS/PM-1 shall generate a telemetry packet secondary header in accordance with the secondary header type (SC, GIRD, or None for SUROM-TIE packets) implied by the contents of the packet type field of the PM-1 PDB telemetry packet specification file. For each secondary header type, the contents shall be as described in applicable sections of the PM-1 Spacecraft to Ground ICD.
PMTLM-15	1	SIMSS/PM-1 shall insert simulated spacecraft time in the telemetry packet headers
PMTLM-16	3	SIMSS/PM-1 shall maintain data values for all telemetry parameters defined in the PDB telemetry parameter specification file. These data values shall be available for display to the operator and for inclusion into telemetry packets.
PMTLM-16.01	4	SIMSS/PM-1 shall be capable of inserting telemetry point values into packets using information from the PM-1 PDB telemetry description and telemetry parameter specification files.
PMTLM-16.02	4	SIMSS/PM-1 shall use the APID and secondary key fields of the PDB telemetry parameter specification file to determine the correct packet for each telemetry parameter.

Attachment G – Requirements Matrix

PM-1 Requirement	Release	SIMSS/PM-1 Requirement Description
PMTLM-17	3-U	SIMSS/PM-1 shall send out telemetry packets at specified intervals of spacecraft time. These specific intervals shall be as defined by the PDB for each APID and secondary key combination and shall be modifiable by the operator.
PMTLM-18	5	SIMSS/PM-1 shall be capable of simulating memory dumps. SIMSS/PM-1 shall build packets based on the contents of the simulated memory.
PMTLM-19	1	SIMSS/PM-1 shall execute telemetry directives that start and stop transmission of data.
PMTLM-20	1	SIMSS/PM-1 shall accept and execute operator directives that start and stop logging of telemetry and CLCWs independently.
PMTLM-21	1	SIMSS/PM-1 shall generate EDUs and EDOS data headers based on the User Datagram Protocol (UDP) format defined in the EDOS External ICD Data Format Control Document.
PMTLM-22	5	SIMSS/PM-1 shall allow modification of any field within the EDOS data header.
PMTLM-23	2	SIMSS/PM-1 shall provide the capability of transmitting the CLCW in the form of EDUs to EOC through EBnet.
PMTLM-24	2	SIMSS/PM-1 shall provide the capability to enable and disable the transmission of CLCW EDUs.
PMTLM-25	5	SIMSS/PM-1 shall provide for the storage of EDUs which will be later used during the testing session for rate buffered file transmission, provided the user selected the rate buffered file telemetry generation mode. <i>Needed?</i>
PMTLM-26	1	SIMSS/PM-1 shall transmit EDUs on an as built basis.
PMTLM-27	1	SIMSS/PM-1 shall provide the capability to transmit EDUs using the UDP protocol.
PMTLM-28	5	SIMSS/PM-1 shall provide the capability to transmit rate buffered files via FTP upon user request. <i>Needed?</i>
PMTLM-29	5	SIMSS/PM-1 shall be capable of creating signal files and transmitting them via FTP at user request. <i>Needed?</i>
PMTLM-30	1	SIMSS/PM-1 interface with the EOC shall comply with the telemetry interface formats and protocols specified in the EDOS to EGS Elements interface document
PMTLM-31	5	SIMSS/PM-1 when acting as a spacecraft shall comply with the telemetry data formats and protocols specified in the TGT to EDOS interface document.
PMTLM-32	5	SIMSS/PM-1, when acting as an EPGS, shall comply with the telemetry data formats and protocols specified in applicable interface documents for the EPGS to EDOS interface.
PMTLM-33	5	SIMSS/PM-1 shall provide the capability to accept PM-1 telemetry data by electronic transmission and by physical media.
PMTLM-34	5	SIMSS/PM-1 shall be capable of transmitting the contents of a user provided file containing PM-1 telemetry data.
PMTLM-35	1	SIMSS/PM-1 shall be capable of maintaining an internally generated time code.
PMTLM-36	1	SIMSS/PM-1 shall set, adjust, and operate the spacecraft clock as commanded.
PMTLM-37	3&5	SIMSS/PM-1 shall employ an offline utility to convert the ASCII-formatted PDB into a binary format useable by SIMSS/PM-1.

Attachment G – Requirements Matrix

PM-1 Requirement	Release	SIMSS/PM-1 Requirement Description
PMTLM-38	5	SIMSS/PM-1 shall use the PDB to define raw-to-EU conversions for telemetry parameters. SIMSS/PM-1 shall support both linear and polynomial conversions
PMTLM-39	1	SIMSS/PM-1 shall provide the capability to store up to 8MB of transmitted EDUs.

Release Legend:

n – Release in which requirement was/is to be satisfied.

nP – Partially satisfied in Release n.

U – Ongoing; upgrades/changes in required functionality necessitate recode/retest.

Attachment H – System Limitations

H.1 MPS/PM1 Release 4.0 Limitations

The following limitations apply to MPS/PM1 Release 4.0.

Problem Description	Workaround
Projects saved from a previous version of the simulator cannot be loaded under Release 4.0	All saved projects must be rebuilt and resaved using Release 4.0.
When logging more than one stream of data, the use of default log file names will corrupt logged data. This occurs because all streams will be written to the same log, since the log file default names are identical.	When logging more than one stream, rename the log files to make them unique.
Log modules do not allow a user to stop and restart logging to the same file. Each start/restart requires a new log file name or the previously logged data will be overwritten.	In order to save previously logged data, always specify a new log file before starting or restarting a log module.
The validation of the CLTU start and tail sequences cannot be disabled. A change in the design requires the simulator to parse the input buffer for CLTUs. The start and tail sequences are the delimiters.	This should not be problem unless the commands sent by the user do not have a CLTU start sequence of EB90 ₁₆ and a tail sequence of C5C5 C5C5 C5C5 C579 ₁₆ (as specified in the ICD).
There is no GUI window to view or modify telemetry data values by mnemonic.	Use the set and get directives to modify or view telemetry values by mnemonic. The syntax to view a telemetry parameter value is “get <i>mnemonic</i> ”. The retrieved value will appear in the event message display in decimal. The syntax to set a telemetry parameter value is “set <i>mnemonic</i> <integer>”. The mnemonic may be cut and pasted from a PDB flat file or from the event message window by using Ctrl-C to copy and Ctrl-V to paste.
The Serial Output module will not forward data to a Log module.	If logging of transmitted serial data is desired, attach the Log module to the PM1 Spacecraft module (SCPM1) in parallel with the Serial Output module.
The event message window can accept no more than 20 messages per second. The Scenario module can easily overrun this limit and flood the GUI with messages.	Use Sleep directives to slow scenario files to 20 directives per second or less.

Problem Description	Workaround
If a container item is to be set to zero via the directive line or from a scenario file, two zeros must be entered.	This is because the first zero is used to flag octal numbers and is then thrown away.
The Server occasionally crashes after one or two days of continuous operation.	If it is known that critical testing will take place during the day, reboot the simulator before starting the test.

H.2 Assumptions

The following assumptions have been made based upon current information available for the PM-1 spacecraft:

1. The IP input buffer for commanding for Release 4.0 is defined to be 6000 bytes long. The Command Data Block (CDB) messages may contain multiple CLTU messages.
2. Additionally, each AD Transfer Frame is assumed to contain one complete Packet.

Attachment I - Release History Summary Matrix

Attached is the release history summary matrix which reflects the MPS/PM1 Release 4.0 delivery. Please note that some of the release numbers reverted to 1.0 with the Release 3.1 delivery. This is because MPS/PM-1 is now making use of Release 1.0 of the generic SIMSS software.

Release History Summary Matrix

SYSTEM:		MPS/PM1							
RELEASE NUMBER		1.0	1.1	2.0	2.1	2.2	3.0	3.1	4.0
DELIVERY DATE		7/30/99	9/2/99	9/24/99	10/25/99	11/18/99	12/17/99	1/21/00	3/17/00
CONFIGURATION ITEM	CI NO.								
Core (client)	1.1	1.0	1.0	2.0	2.0	2.0	3.0	1.0	1.0
Core (server)	1.2	1.0	1.0	2.0	2.0	2.2	3.0	1.0	1.0
SC-PM1 (client)	1.3	1.0	1.0	2.0	2.0	2.0	3.0	3.1	4.0
SC-PM1 (server)	1.4	1.0	1.0	2.0	2.1	2.2	3.0	3.1	4.0
GS (client)	1.5	1.0	1.0	2.0	2.0	2.0	3.0	3.1	4.0
GS (server)	1.6	1.0	1.0	2.0	2.0	2.0	3.0	3.1	4.0
IP input (client)	1.7	1.0	1.1	2.0	2.0	2.0	3.0	1.0	1.0
IP input (server)	1.8	1.0	1.1	2.0	2.0	2.0	3.0	1.0	1.0
IP output (client)	1.9	1.0	1.1	2.0	2.0	2.0	3.0	1.0	1.0
IP output (server)	2.0	1.0	1.1	2.0	2.0	2.0	3.0	1.0	1.0

DQM (client) ¹	2.1								
DQM (server) ¹	2.2								
Logging (client)	2.3	1.0	1.1	2.0	2.0	2.0	3.0	1.0	1.0
Logging (server)	2.4	1.0	1.1	2.0	2.0	2.0	3.0	1.0	1.0
Scenario (client) ²	2.5								1.0
Scenario (server) ²	2.6								1.0
Serial Input (client) ²	2.7								1.0
Serial Input (server) ²	2.8								1.0
Serial Output (client) ²	2.9								1.0
Serial Output (server) ²	3.0								1.0

1 To be delivered in a future release

2 New in Release 4.0

Attachment J - Delivery Details

J.1 Hardware for MPS/PM-1 unit in GSFC, Building 32 Room S9

Qty	Common Name	Model [Serial No.]	Mfg	CSOC No.	Description
1	Computer	E-4200 001-343-8943	Gateway	C0060047	Intel Pentium II 400 Mhz w /512 Cache, 128 MB SDRAM PC100 6ns Micron, Matrox Millenium II 8MB AGP Video card, Toshiba 32x SCSI CD ROM Drive, Seagate 9.1 GB hard disk, IOMEGA 100 mb internal zip drive
1	Monitor	VX1100 811053233	Gateway	C0060041	21" Monitor
1	Mouse	Intellimouse 2570734- 10000	Gateway		
1	Keyboard	Q9045A1837	Gateway		
1	Timing Card	PCIDCC20-P	Industrial Computer Source		PCI counter/timer card

J.2 Software

A complete listing of the SIMSS/PM-1 software file names will be available upon request.

Attachment K - Documentation References

The following documents have been employed as the main sources for direction and information in producing Release 4.0 of the MPS/PM-1 simulator.

Document	Location
EOS PM-1 Spacecraft to EOS Ground System Interface Control Document, GSFC 422-11-19-03, dated December, 1999 (more commonly known as "The Space to Ground ICD")	1
Appendix Z – PM-1 Spacecraft Interface with Control Center - Supplement to the EOS PM-1 Spacecraft to EOS Ground System Interface Control Document (GSFC 422-11-19-03), - dated December, 1999	1
Data Format Control Document for the Earth Observing System (EOS) Mission Operations Segment (EMOS) Project Database Volume 1: PM-1 Users Revision -, dated January 2000	4
TRW, EOS PM-1 Spacecraft Flight Software Requirements Specification, ES-SDA-001	1
TRW, Earth Observing System Common Spacecraft Program Flight Software User's Guide, No.: D26696, latest version dated July 31, 1998	1
TRW, EOS Common Spacecraft Command Allocation Document, No.: D25099, (preliminary)	1
TRW, Earth Observing System (EOS) EOS PM-1 Telemetry Allocation Document, No.: D25100, (preliminary)	1
TRW, EOS PM-1 Spacecraft Equipment Specification for Transponder Interface Electronics, No.: EQ4-4957, latest version dated 11 February, 1999	1
TRW, Interface Control Document Between the Earth Observing System (EOS) Data and Operations System (EDOS) and the EOS Ground System (EGS) Elements CDRL B301	2
Consultative Committee for Space Data Systems, CCSDS 102.0-B-4: Packet Telemetry Blue Book, Issue 4, Nov. 1995	3
--, CCSDS 202.1-B-1: Telecommand Part 2.1 – Command Operations Procedures Blue Book, Issue 1, Oct. 1995	3
NASA, GSFC, Earth Observing System Data and Information System (EOSDIS) Test System (ETS) Functional and Performance Requirements for the PM-1 Spacecraft, Sep. 1998	-

Location Legend:

Number	Designation
1	http://www.omitron.com/eosaqua/mittrw.HTM
2	http://esdis-it.gsfc.nasa.gov:8080/servlet/DOCcat?nCatType=ICD
3	http://ccsds.org/publications.html
4	http://www.omitron.com/eosaqua/mitrefdocs.html

Attachment L — Mission Systems Configuration Management Form

This attachment contains the completed Mission Systems Configuration Management (MSCM) form for the delivery of MPS/PM1 Release 4.0.

Mission Systems Configuration Management Form

<u>1. ORIGINATOR</u> Estelle Noone	<u>2. ORGANIZATION</u> CSC	<u>3. PHONE</u> 301-805-3653	<u>4. E-MAIL ADDRESS</u> enoone@csc.com		
<u>5. ELEMENT</u> ETS (MPS/PM1)		<u>6. INSTALLATION PRIORITY</u> Routine	<u>7. TRACKING NUMBER</u> (Assigned by CM Office)		
<u>8. SOURCE CHANGE REQUEST(S):</u> ETS delivery of MPS for EOS PM-1 (MPS/PM1)		<u>9. APPROVALS</u> Element Manager _____ / / Flight Ops Director _____ / / Operations Manager _____ / /			
<u>10. DELIVERED SYSTEM</u> (Check all that apply)					
	Name	Version	Media Identification	Identification Date	
<input type="checkbox"/>	Hardware	_____	_____	_____	
<input checked="" type="checkbox"/>	Software	MPS/PM1	R4.0	CD-ROM	03/17/00
<input type="checkbox"/>	Database	_____	_____	_____	
<input checked="" type="checkbox"/>	Documentation:				
	MPS/PM1 delivery package	N/A	3.5 " Diskette	03/17/00	
	_____	_____	_____	_____	
	_____	_____	_____	_____	
<input type="checkbox"/>	Other	_____	_____	_____	
<u>11. CHANGE DESCRIPTION</u> Release 4.0 of MPS/PM-1 (SIMSS/PM-1)					
<u>12. ATTACHMENT(S):</u> Check if YES <input checked="" type="checkbox"/> Description: MPS/PM1 Release 4.0 delivery package (cover letter with attachments) dated 03/17/00					
<u>13. CM OFFICE USE</u>					
	Location (Bldg/Room)	Slot location(s)			
Hardware	_____ / _____	_____			
Media	_____ / _____	_____			
Documentation	_____ / _____	_____			
Installation date	_____ / _____ / _____	CM Office Signature _____			

Form MSCM (970327)