CASSINI

Uplink Operations Element Mission Sequence Subsystem

SEQ_GEN Category A
D8.0 User's Guide

PD 699-ULOUG-602
Final Rev J

May 8, 2002

National Aeronautics and Space Administration
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

D-13495

PD 699-ULOUG-602

CASSINI

Uplink Operations Element Mission Sequence Subsystem

SEQ_GEN Category A
D8.0 User's Guide

Final Rev J

Custodian:

_____ _____

Fred Chrisney — Date
Cassini SEQ_GEN Cognizant Engineer

Approval:

_____ _____

Kari Magee — Date
Cassini MSS Engineer

Concurrence:

_____ _____

Robert Gustavson — Date
Cassini Uplink Operations
Element Technical Manager

May 8, 2002

National Aeronautics and Space Administration
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

D-13495

DOCUMENT LOG

Date	Document ID	Pages	Status
1/2/97	PD 699-ULOUG-602	All	Preliminary - D2-L
4/15/97	PD 699-ULOUG-602	All	Final - D3-L
6/16/97	PD 699-ULOUG-602	All	Final - D4-L
7/31/97	PD 699-ULOUG-602	All	Final - D4.1-L
4/1/98	PD 699-ULOUG-602	All	Final – D5.0
8/6/98	PD 699-ULOUG-602	All	Final – D6.0
1/7/2000	PD 699-ULOUG-602	All	Final – D7.0
1/26/2001	PD 699-ULOUG-602	All	Final – D7.4
8/13/2001	PD 699-ULOUG-602	All	Final – D7.6
5/8/2002	PD 699-ULOUG-602	All	Final – D8.0

DISTRIBUTION

Belenky, R.	230-104
Boyer, J.	230-101
Burk, T.	230-104
Carter, J.	230-101
Chrisney, F.	230-101
DeVault, A.	230-101
Diehl, J.	230-250
Goo, S.	230-101
Gustavson, R.	230-301
Halverstadt, R.	301-250D
Heventhal, W.	230-101
Javidnia, S.	230-101
Khoo, W.	230-104
Lee, A.	230-104
Landry, B.	230-101
Lin, R.	230-104
Maize E.	230-104
Morales, L.	230-101
Ray, T.	230-250
Reynolds, E.	230-104
Rouse, N.	230-104
Sakamoto, L.	230-104
Weld, K.	301-250D
Wilson R.	301-250D

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Identification

This document is the User's Guide for the Cassini Project (CAS) Uplink Operations Element (ULO) Mission Sequence Subsystem (MSS) adaptation of the SEQ_GEN program set. The document is a direct response to requirement number 523-1 of the ULO MSS SEQ_GEN Software Requirements Document. The SEQ_GEN core program is a product of the Telecommunications and Mission Operations Directorate Mission Services and Applications (MS&A) Office.

1.2 Overview

This User's Guide describes the Cassini-specific interfaces and capabilities incorporated into the SEQ_GEN program through adaptation to satisfy the requirements levied on the uplink process functions allocated to SEQ_GEN. The user of the SEQ_GEN program must be familiar with the TMOD SEQ_GEN User's Guide, which contains most of the information on how to use the SEQ_GEN program. This user's guide will only address the Cassini-specific features of SEQ_GEN.

The Cassini adaptation of SEQ_GEN consists of the following types of files: spacecraft model files (SMFs), spacecraft activity type files (SATFs), context variable definition files (CVDFs), and adaptor-defined subroutines (ADSs) which integrate Cassini-unique capabilities and adaptation data files. This document provides information on the use of SEQ_GEN relative to the adaptation for Cassini. The TMOD SEQ_GEN (SST) User's Guide (TMOD SEQ_GEN UG) provides a guide for the novice to learn how to use SEQ_GEN, and it is a reference for the more experienced SEQ_GEN user.

1.2.1 Mission Planning

Mission Planning includes the activities of the Project Scheduler, who is responsible for negotiating the DSN coverage for the Project. A Deep Space Network Schedule, generated by SEG, is used as an aid during negotiations. The remaining functions are described in the Mission Planning Virtual Team (MPVT) Operations Concept Document. The MPVT is responsible for updating the Mission Plan and generating Phase Update Packages (PUP) for use by the Sequence Virtual Team (SVT) for sequence activity planning. The PUP contains phase time lines and an SASF for the time period. The sequence load boundaries are selected and preliminary system resources are allocated to the subsystems and instruments.

1.2.2 Activity Planning

Activity planning for Launch and Early Cruise involves taking the PUP, coordinating revisions to the planned sequence, incorporating the latest DSN allocation, updating the engineering activities

and science check out and maintenance activities and generating a load-specific file, called the integrated Activity Plan. Additionally, initial constraint checks and conflicts are identified, a time-ordered listing is produced, and a hard copy time line of the sequence may be produced as a review product.

1.2.3 Sequence Generation

Sequence generation includes taking the Activity Plan and extracting activities for expansion into a sub-sequence. Spacecraft commands and instrument-internal sequences are then added to the sub-sequence files. Each sub-sequence is constraint checked at the request level to ensure that the requested sequence parameters are consistent and are within range with those allowed by the command database, as well as at the command level. Individual sequence files (SASFs) are generated by each subsystem for input to sequence integration.

1.2.4 Sequence Integration

Sequence integration includes the merging of the sub-sequence files (SASFs) followed by the expansion of the merged sequence into a series of commands and calls to utility programs (spacecraft expanded blocks). This expansion, along with ground events and spacecraft model states, is contained in a file, called the Predicted Events File (PEF). The combination of the commands and spacecraft expanded blocks mimics the timing and actions of the system-level commands on the spacecraft. Software modeling allows the effects of the commands to be predicted. Modeling also flags undesirable command and resource interactions, and tracks the use of specific spacecraft and ground resources. Each sequence of commands is constraint checked at the system level against flight and mission rules.

1.2.5 Module Parameters

Science Modules are a subset of the activities available for Sequence Generation. Because there is a desire (in most Science Modules) to issue optional instrument-specific trigger commands, special array parameters were devised to supply that functionality. Since all array elements must be of the same type, these arrays are of type *string*. A string must be enclosed in double quotes. Seq_gen will convert each of these strings to a command parameter, and it will require that what is inside the quotes conforms to the required parameter type and range. Seq_gen also requires each array to be either of zero length or of a length sufficient to supply parameters to the desired command. Seq_gen will accept a zero length trigger array as an option to not issue the associated trigger command. If a trigger array fails any test, Seq_gen will issue an error message and reject the call to the activity.

The following is an example:

The array parameter CIRS supplies 7 parameters to the command 89EXE_CMD_SEQ. The parameters to be passed to this command are of type Integer, String, String, Integer, Time, Integer, and Integer respectively.

To opt for no 89EXE_CMD_SEQ command, the correct value for CIRS is the empty array [] .

To opt for an 89EXE_CMD_SEQ command with parameters:
1,"IMMED","ABS",2,2001-001T12:34:56.000,3,4
the correct value for CIRS is:
["1","IMMED","ABS","2",'2001-001T12:34:56.000","3","4"]

In the help field for the parameter CIRS, Seq_gen has the information:
0..7;IMMED,TIMED;ABS,REL;0…65535;1996-120t00:00:00.000…2015-365t23:59:59.999;0…255;0…65535

This is the list of ranges of each of the 7 parameters.

1.2.6 Module Parameter Errors

Seq_gen can issue a variety of Science Module error messages, depending on the error condition. This section will provide a list of some of them, and a prescribed correction.

*WARNING – following relation(s) evaluated to FALSE:

sizeof(CIRS)==0||sizeof(CIRS)==7

unable to expand step of activity: START_STOP_MOS,

with the following step id: stepid$1

This message is output when the length of the trigger array is not 0 or the required functional length. To correct this, verify that the array has the correct number of elements, either 0 or 7 in this case.

Parameter VIMS:[1,0], is out of range

This message is output because the parameters are of type Integer when String is required. To correct this, put double quotes around each array element, i.e. ["1","0"]

```
*WARNING – following relation(s) evaluated to FALSE:

(sizeof(VIMS)==2)?ATOIX(VIMS[1])>=1&&ATOIX(VIMS[1])<=255|TRUE

Unable to expand step of activity: START_STOP_MOS,

with the following step id: stepid$1
```

This message is output because the first parameter of the array VIMS is out of range. To correct this, change its value to something in the range "1"…"255".

1.3 Document Scope

The implementation of the Cassini ground software will be in five phases: 1) Assembly, Test and Launch Operations (ATLO); 2) Launch; 3) Early Cruise; 4) Late Cruise; and 5) Saturn Tour.

1.4 Notation

In the identification of a UNIX file system location, a path and/or file name, the use of paired less than and greater than symbols (<>) are delimiters used to designate substitution of a specific directory or file name with a generic description of the directory or file name. For example, the home directory name for a user may be referenced:

/home/<workstation name>/<user id>

where <workstation name> is the name of the user's workstation and <user id> is the user's name as defined on the workstation.

1.5 Reference Documents

Document	Title	Version	Acronym
TSEQ0203-01-00-21	Telecommunications and Mission Operations Directorate Mission Services and Applications (MS&A) Office Sequence Subsystem (SEQ) SST Version 23 Adaptation Guide	July 1, 1998	TMOD SEQ_GEN AG
TSEQ0729-01-00-21	Telecommunications and Mission Operations Directorate Mission Services and Applications (MS&A) Office Sequence Subsystem (SEQ) SST Version 23 User's Guide	July 1, 1998	TMOD SEQ_GEN UG
699-CAS-3-291	Cassini Orbiter Functional Requirements Book Uplink Formats & Command Tables	Rev H, 30 January 1998	3-291

Table 1-1: Documents referenced in this User's Guide

CASSINI Number	MGSO Number	Title	Version	Acronym
CMD-002	SFOC-2-CMD-SEQ-CMDXLT	Command Data Base File	03 Jan 1995	CmdDB
DSN-15	SFOC-1-SEG-DSN-ViewPrds	DSN View Periods	09 Sept 1991	DVP
DSN-16	SFOC-1-SEG-DSN-Allocatn	DSN Allocation File	09 Sept 1991	DAF
MSAS-016	SFOC-1-DPS-Any-SCLKvSCET	Spacecraft Clock Coefficients File	05 Sept 1995	SCCF
MSS-002	SFOC-2-SEQ-Any-SASF	Spacecraft Activity Sequence File	25 May 1995	SASF
MSS-003	SFOC-1-SEQ-Any-PEF	Predicted Events File	03 Feb 1995	PEF
MSS-005	SFOC-3-SEQ-SCModel	Spacecraft Model File	24 June 1996	SMF
MSS-006	SFOC-3-SEQ-SCActyType	Spacecraft Activity Type File	18 Aug 1995	SATF
MSS-007	SFOC-3-SEQ-FltMisRules	Flight/Mission Rules File	02 July 1996	FMRF
MSS-010	SFOC-2-SEQ-SEQ-SSF	Spacecraft Sequence File	03 Feb 1995	SSF

CASSINI Number	MGSO Number	Title	Version	Acronym
MSS-016	SFOC-3-SEQ-MASK	Mask File	27 Mar 1995	MF
MSS-017	SFOC-3-SEQ-RECF	Redundant Element Command File	10 May 1993	RECF
MSS-018	SFOC-3-SEQ-CVDF	Context Variable Definition File	25 June 1996	CVDF
MSS-019	SFOC-3-SEQ-Legend	Legend File	10 May 1993	LF
MSS-021	SFOC-3-SEQ-Conditions	Conditions File	25 Aug 1995	CF
NAV-002	SFOC-1-NAV-SEQ-LightTime	Light Time File	01 Oct 1994	LTF
NAV-004	SFOC-1-NAV-SEQ-OPTG	Orbit Propagation and Timing Geometry File	20 Nov 1995	OPTG

Table 1-2: File formats used in the core software provided by TMOD are given in the above Software Interface Specification (SIS) documents.

2. RUNNING SEQ_GEN

2.1 A Quick Start

For opsnet users only, the core and adaptation files for SEQ_GEN reside on afs space. To activate access to afs, enter the unix command **klog**. This enables access to the adaptation files.

After making sure that the correct adaptation files are being accessed, the user should invoke SEQ_GEN using the delivered run script file: run_seqgen and a modified copy of the sample environment file: seqgen.env.

The full paths to these two files are as follows:

/cas/MSS/run_scripts/run_seqgen
/cas/MSS/vt.adapt/seq_gen/sample_env/seqgen.env

To do a quick test to see if SEQ_GEN will run or not, copy the sample_env to your home directory and edit two lines. Using a text editor, open the sample_env and look for the keyword CLOCK and edit in the name of the current SCLKSCET file. Then do a search for the keyword SEQUENCE and put in the name of a sequence file or leave it blank for now. If you put in a sequence, you should make sure that the START_TIME and CUT_OFF_TIME in the environment file correspond to the BEGIN and CUTOFF times of your sequence. Otherwise, you will not be able to see the sequence being displayed on the screen right a way. You will have to scroll along the time line to the appropriate time to see it.

2.2 Cassini SEQ_GEN Run Script File

The following shows how to execute the run scripts where anything between [] is optional and anything between <> is required. The '-h' (help) option was used to provide the name and the parameters in the following examples. The main functions of the SEQ_GEN run script run_seqgen are to set up the paths to the X application resource file, e.g. SeqgenV24_0 for running SEQ_GEN version 24.0 and the shared library libudsf.sl (HP-UX version) or libudsf.so (Solaris version.)

```
run_seqgen [-h/-u] [-ustp ULO_seqvsmss_table_path] [-o merged_env_file] [-v]
           [-l (list MSS versions)][(-)seqgen_args] <environment_file>
           <Sequence_ID> [MssVersion]
```

1. -h,-u: These are for help. The runscript prints out the usage that repeats the above line and exits.
2. -ustp: This is the path for the SequenceID_vs_Mss_Version table.
3. -o: Name of file to place merged environment file.
4. -lmss: List the available MSS versions.
5. data file: Name of data file. (not input if -env option is used)
6. sequence_ID: This is the sequence ID i.e. 'C9'.
7. MSS_version: This is the MSS version to use regardless of what is in the sequence table.
8. –v: This option creates the file violations.rpt in the current directory at the end of the run.

There is a new file that has been added to the SEQGEN run script, which we refer to as a data file. Users may input the data file instead of an environment file. The intent is for the data file to contain all the filenames that are under the control of the user; that is, the part of the environment file that is usually the only part that needs to be updated. The sample environment file delivered by the MSS will contain all the adaptation files that are part of the delivery. Those two files will be merged together as the final input to SEQGEN. Users can provide the current information about the sequence in the data file rather than have to update the delivered sample environment file. This feature will eliminate any risk associated with executing the MSS software based on a sequence number on the command line. Users will not have to pay attention to which version of the MSS is associated with a particular sequence and whether the correct environment file is used. All the users have to know is the sequence id and the particular input files, i.e. allocation, sasf, sclkfile, etc., that are needed for that sequence, which are specified in the data file.

To run SEQGEN and use a data file to merge with the delivered environment file:

run_seqgen [h/u (help)] [ustp ULO_seqvsmss_table_path] [lmss (list MSS versions)] [lseq (list sequence ids)] [o merged_env_file] [xres Xresourece_Path] <data_file> <Sequence_ID> [MssVersion]

This feature does not affect the way SEQGEN has been run in the past.

To run SEQGEN and use an existing environment file:

run_seqgen [h/u (help)] [ustp ULO_seqvsmss_table_path] [lmss (list MSS versions)] [lseq (list Sequence IDs)] [o merged_env_file] [xres Xresourece_Path] <data file or environment_file> <Sequence_ID> [MssVersion]

Where the following parameters are:

1. h/u: These are for help. The run script prints out the usage which repeats the above line and exits
2. ustp: This is a path for an alternate SequenceID_vs_Mss_Version table
3. lmss: List the MSS versions
4. lseq: List the Sequence ID versus MSS versions
5. o: Name of merged environment file
6. xres: Creates an environment variable XAPPLRESDIR equal to Xresourece_Path
7. data_file or environment_file: Either the data or environment file
8. Sequence_ID: The sequence ID, e.g., C17, etc.
9. MssVersion: Used to override the Mss version pointed to by the Sequence ID

2.3 X Application Resource File

The X application resource file defines the window geometry and color assignments, the font sizes, and the control key accelerators for menu selection. This file needs to be read in order to define an adequate geometry and font configuration for the graphical display. Without the correct version of the X application resource file, the X Window System default window geometry, color, and font configuration are used and an odd looking window will appear. At this stage, the user should check that the SEQ_GEN version number at the top of the odd window matches that of the version number (in the file name) of the X application resource file under:
/cas/MSS/mss_sw/seq_gen/app-defaults/.

The shared library (libudsf.sl or libudsf.so) contains the adapter-defined subroutines (ADSs). Most of the ADSs were created to check parameter range values that cannot be handled by the SEQ_GEN core program. A few of the ADSs were produced to help perform modeling of flight rules.

The run script invokes the SEQ_GEN program with the default options -t and -a. The path to the SEQ_GEN executable is /cas/MSS/mss_sw/seq_gen/bin/seqgen.

The -t option output time format in the SSF as 1998-001/00:00:00.000 instead of the standard time format 1998-001T00:00:00.000.

The -a option disables the alignment of commands to frame boundaries. The option was put in to implement ECR 82176. The ECR requested that the SEQ_GEN run script delivered by MSS to include the -a option to eliminate the alignment and adjustment to the minor frame when translating SCLK times.

2.4 SEQ_GEN Environment File

The format of the environment file is defined in Cassini SIS SFOC-3-SEQ-ENVIRON. The environment file consists of two parts, the Standard Format Data Units (SFDU) and the body. The environment file body is organized with a single record per line using a <keyword>:<value> record format. The entire keyword set is defined in the SIS. A comprehensive list of environment keywords and example entries are given in Table 2-1.

Keyword	Application	Definition	Value
START_TIME	input & output	starting time boundary of the sequence	e.g. 1999-061T00:00:00.000
CUT_OFF_TIME	input & output	ending time boundary of the sequence	e.g. 1999-065T00:00:00.000
TIME_PER_SCREEN	input	amount of time shown per screen	e.g. 12:00:00
SEQUENCE_ID	output	name of the sequence applied to the merged set of the input foreground sequence(s)	e.g. C9
TITLE	output	title of the sequence applied to the merged set of the input foreground sequence(s)	e.g. Cassini C9 Sequence
SSF_FORMAT	input	selects the output format to be used in the SSF	Three options: FIXED, FREE or EXTENDED_FLOAT. The FIXED option output the SSF in the standard 80 column format and scientific notation is displayed up to only nine decimal places. The FREE option output the SSF without any formatting and the 80 column format is not used. The EXTENDED_FLOAT option is similar to the FIXED option except that FLOAT notation is displayed in up to 15 decimal places.
FP_FORMAT	input	type of floating point format to write in the SSF for scientific notation	Two options: 1 or 2 (1 means you get the standard scientific notation like 1.234E+05, the default case. If 2 is selected, 1.234E+05 will be displayed as 1.234,+05, i.e. the E is replaced with a comma).
MODEL_PAGE	input	time duration of the modeling done at a single time	e.g. 056T00:00:00.000 (default is two times the value in the keyword TIME_PER_SCREEN)

Keyword	Application	Definition	Value
GCMD	input & output	tells the command system how to build a radiatable file	TIMED or UNTIMED (TIMED is the default if none specified)
SC_MODEL	input	name of a spacecraft model file	e.g. /cas/MSS/vt.adapt/seq_gen /smf/aacs.smf
CATALOG	input	name of spacecraft activity type file	e.g. /cas/MSS/vt.adapt/seq_gen /satf/dir.satf
CONTEXT	input	name of context variable definition file	e.g. /cas/MSS/vt.adapt/seq_gen /cvdf/aacs.cvdf
CLOCK	input	name of spacecraft clock coefficients file	e.g. SCLKSCET.00028
LEGENDS	input	name of legends file	e.g. /cas/MSS/vt.adapt/seq_gen /misc/legend
RULES	input	name of flight and mission rules file	e.g. <*file_name*>.fmrf
REDUNDANT	input	name of redundant element command file	e.g. <*file_name*>.recf
DEP_CONTEXT	input	name of context variables files whose variables depend on model element attributes	e.g. <*file_name*>.dep_cvdf
MASK	input	name of activity mask file	e.g. <*file_name*>.mask
BG_SEQUENCE	input	name of background spacecraft activity sequence file	e.g. <*file_name*>.bg_sasf
TELEMETRY	input	name of the telemetry capability prediction file	e.g. <*file_name*>.tcpf
LIGHTTIME	input	name of the lighttime file	e.g. <*file_name*>.ltf
ALLOCATION	input	name of the DSN allocation file	e.g. <*file_name*>.allc
VIEWPERIOD	input	name of the DSN viewperiod file	e.g. <*file_name*>.view
GEOMETRY	input	name of the orbit propagation timing & geometry file	e.g. <*file_name*>.optg
OPTG_FD	input	name of the OPTG format description file	e.g. /cas/MSS/vt.adapt/seq_gen /misc/optg.fd
SCRIPT	input	name of the script file	e.g. <*file_name*>.script
SEQUENCE	input & output	name of the sequence file	e.g. <*file_name*>.sasf
CONDITIONS	input & output	name of conditions file (initial & final)	e.g. <*file_name*>.cf

Keyword	Application	Definition	Value
RUNLOG	output	name of the SEQ_GEN run log file	user specific e.g. <*file_name*>.log
EVENTS	output	name of the predicted events file	user specific e.g. <*file_name*>.pef
UPLINK	output	name of the spacecraft sequence file	user specific e.g. <*file_name*>.ssf
TL_PLOT	output	name of the timeline plot file	user specific e.g. <*file_name*>.plt
POSTSCRIPT	output	name of the postscript file	user specific e.g. <*file_name*>.pst
ENVIRONMENT	output	name of the environment file	user specific e.g. <*file_name*>.env

Table 2-1: SEQ_GEN Environment File Common Keywords

GCMD keyword is not defined in the environment file SIS. GCMD, which stands for Ground Command and is also known as cmd_dsn, is used to define how the command system is to build a radiatable file. GCMD has two values, TIMED and UNTIMED, where TIMED is the default if no value is specified. If UNTIMED is specified, then the GCMD would start to radiate immediately to the spacecraft upon placement in the radiation queue with the command modulation on and the transmitter in active mode.

2.5 Environment File for D8.0 Delivery

A sample environment file that is current with the adaptation files is included in the delivery. The following lists out the sample environment file seqgen.env for the D8.0 Delivery.

```
CCSD3ZF0000100000001NJPL3KS0L015$$MARK$$;
MISSION_NAME = CASSINI;
SPACECRAFT_NAME = CASSINI;
DATA_SET_ID = SEQ_ENVIRONMENT;
FILE_NAME = seqgen.env;
APPLICABLE_START_TIME = 1998-001T00:00:00.000;
APPLICABLE_STOP_TIME = 1998-050T00:00:00.000;
PRODUCT_CREATION_TIME = 1998-028T18:43:26;
PRODUCER_ID = Your_name;
HOST_ID = Your_workstation_id;
CCSD3RE00000$$MARK$$NJPL3IF0M00500000001;
START_TIME: 1998-001T00:00:00.000
CUT_OFF_TIME: 1998-050T00:00:00.000
TIME_PER_SCREEN: 24:00:00
SEQUENCE_ID: b0xx0
TITLE: Example SEQ_GEN Environment File
MODEL_PAGE:
GCMD: UNTIMED
EDITOR:
```

```
MENU_LAYER:
PROJECT:
FP_FORMAT:
Input files:

SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/aacs.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/caps.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/cda.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/cds.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/cirs.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/dev.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/dsn.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/inms.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/iss.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/mag.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/mimi.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/opmode.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/pms.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/pps.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/probe.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/radar.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/rfs.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/rpws.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/rss.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/scas.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/ssr.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/stf.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/stru.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/support.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/uvis.smf
SC_MODEL: /cas/MSS/vt.adapt/seq_gen/smf/vims.smf

CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/aacs.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/cds.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/cirs.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/clk.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/dev.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/dsn.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/geb.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/inms.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/iss.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/key.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/mimi.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/opmode.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/pms.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/pps.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/probe.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/rfs.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/rpws.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/ssr.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/stf.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/stru.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/support.cvdf
CONTEXT: /cas/MSS/vt.adapt/seq_gen/cvdf/uvis.cvdf

CATALOG: /cas/MSS/vt.adapt/seq_gen/satf/dir.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/satf/dsn.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/satf/optg.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/satf/PDT_dir.satf

CATALOG: /cas/MSS/vt.adapt/seq_gen/ssr_dp/datapol_mod_tbl.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/ssr_dp/assign_var_np.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/ssr_dp/ssr_pri_playback.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/ssr_dp/tlm_mode_chg_imm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/ssr_dp/ssr_restore_ptr.satf
```

```
CATALOG: /cas/MSS/vt.adapt/seq_gen/ssr_dp/datapol_clr_ctrs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/ssr_dp/datapol_enbl_tbl.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/ssr_dp/ssr_ping_pong.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/ssr_dp/ssr_snap_ptr_np.satf

CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/uigapi.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/ugmopx.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/ugnpsc.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/ugpmox.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/vgpmox.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/umpspa.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/usyscn.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/start_stop_mos.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/cntn_strt_stp_ms.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/cntn_mos.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/cntn_mos_rdr.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/cntn_spin_axis.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/genpscan_sp.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/grav.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/igapimage.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/targeting.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/roctm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/itarget.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/repscan.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/rocah.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/wa2x2.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/rscnx.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/limbdrift.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/modules/syscan.satf

CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/aacs_ega_exer.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/aacs_rcs_to_rwa.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/aacs_rwa_to_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/aacs_rwa_to_rcs_32.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/aacs_rwa_to_rcs_90.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/bail_maint.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/cds_atc_ena.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/cds_chg_var.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/cds_clr_err.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/cds_clr_upl.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/cds_mro.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/cds_sfp_mon_np.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/cds_sfp_mon_p.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/cds_sfp_rsp_np.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/cds_sfp_rsp_p.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/downlink_pass.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/end2end_rwa_bias.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/hgacal_boresight.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/hgacal_pattern.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/hgacal_pattern_sband.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/line_htr_act.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/me_cover_open.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/me_tcm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/observation_period.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/opnav.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/rcs_tcm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/rfs_antenna.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/rfs_coding.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/rfs_dlrate.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/rfs_osc.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/rfs_rng.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/rwa_exer.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/rwa_backup_exer.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/rwa_fric_exer.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/rwa_rate_bias.satf
```

```
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/smt_opnav.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/sru_calibration.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/ssr_chg_ptrs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/ssr_mro.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/ssr_off.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/ssr_on.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/ssr_pb.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/ssr_prep.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/blocks/iss_support_imaging.satf


CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/set_opmode.satf

CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_normal2dfpw_pem.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_normal2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_normal2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_normal2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_normal2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_normal2rsswu_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_pem2dfpw_normal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_pem2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_pem2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_pem2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_pem2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_pem2rsswu_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_tcm2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_tcm2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_tcm2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_tcm2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/dfpw_tcm2rsswu_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rcs2dfpw_normal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rcs2dfpw_pem.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rcs2dfpw_tcm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rcs2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rcs2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rcs2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rcs2rss3_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rcs2rsswu_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rwaf2dfpw_normal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rwaf2dfpw_pem.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rwaf2dfpw_tcm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rwaf2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rwaf2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rwaf2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/ors_rwaf2rsswu_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rcs2dfpw_normal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rcs2dfpw_pem.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rcs2dfpw_tcm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rcs2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rcs2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rcs2radar_rwa.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rcs2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rcs2rss3_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rcs2rsswu_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rwa2dfpw_normal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rwa2dfpw_pem.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rwa2dfpw_tcm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rwa2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rwa2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rwa2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rwa2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_rwa2rsswu_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_wurad2dfpw_normal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_wurad2dfpw_pem.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_wurad2dfpw_tcm.satf
```

```
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_wurad2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_wurad2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_wurad2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_wurad2radar_rwa.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/radar_wurad2rsswu_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss2_rwaf2dfpw_normal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss2_rwaf2dfpw_pem.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss2_rwaf2dfpw_tcm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss2_rwaf2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss2_rwaf2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss2_rwaf2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss2_rwaf2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss2_rwaf2rsswu_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rcs2dfpw_normal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rcs2dfpw_pem.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rcs2dfpw_tcm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rcs2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rcs2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rcs2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rcs2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwaf2dfpw_normal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwaf2dfpw_pem.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwaf2dfpw_tcm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwaf2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwaf2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwaf2rss3_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwaf2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwaf2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwal2dfpw_normal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwal2dfpw_pem.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwal2dfpw_tcm.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwal2ors_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwal2ors_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwal2radar_rcs.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwal2radar_wurad.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwal2rss3_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rss3_rwal2rsswu_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rsswu_rwal2rss2_rwaf.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rsswu_rwal2rss3_rwal.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/rsswu_rwal2rss3_rwaf.satf

CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/inms_wake.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/inms_sleep.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/ka_off.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/kat_off.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/me_htr_off.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/me_htr_on.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/ors_sleep.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/ors_wake.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/ors3_sleep.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/ors3_wake.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/radar_off.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/radar_on.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/rcs_2_rwa_f.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/rcs_off.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/rcs_on.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/rss_ka_on.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/rss_off.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/rss_s_bnd_on.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/rss_s_ka_on.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/rwa_2_rcs_spindown.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/rwa_full.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/rwa_limited.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/scas_off.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/uvis_wake.satf
```

```
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/x_operate.satf
CATALOG: /cas/MSS/vt.adapt/seq_gen/opmode/sub/x_standby.satf

LEGENDS: /cas/MSS/vt.adapt/seq_gen/misc/legend
OPTG_FD: /cas/MSS/vt.adapt/seq_gen/misc/optg.fd

REDUNDANT:
CONDITIONS:
DEP_CONTEXT:
MASK:
BG_SEQUENCE:
CLOCK:   /tmp/SCLKSCET.sample
LIGHTTIME:
ALLOCATION:
VIEWPERIOD:
GEOMETRY:
SCRIPT:

SEQUENCE: input.sasf

Output files:
PATH:
SEQUENCE:   seqgen.sasf
EVENTS:           pef
UPLINK:           runssf.ssf
CONDITIONS: seqgen.cf
ENVIRONMENT:      seqgen.env
RUNLOG:           seqgen.log
$$EOF
```

2.6 Editing the Sample Environment File

The sample environment file delivered with the adaptation files has arbitrary values set for several of the keywords. The user is required to change them to their own specific requirements. The user should change the following lines in the sample environment file:

PRODUCER_ID = Your_name;
HOST_ID = Your_workstation_id;
SEQUENCE_ID: CXX
TITLE: Example SEQ_GEN Environment File

APPLICABLE_START_TIME = 1998-001T00:00:00.000;
APPLICABLE_STOP_TIME = 1998-050T00:00:00.000;
START_TIME: 1998-001T00:00:00.000
CUT_OFF_TIME: 1998-050T00:00:00.000

CLOCK: /tmp/SCLKSCET.sample
SEQUENCE: input.sasf

PRODUCER_ID The user should enter his/her name, e.g. Robert_Cole (with no space in between).
HOST_ID This is the workstation ID, e.g. casulo1.

SEQUENCE_ID This is the sequence ID, e.g. C21.
TITLE This is the title of the sequence, e.g. C22 PIM.

As already mentioned above, the user should replace the arbitrary **CLOCK** and **SEQUENCE** keyword values in the sample environment file with the correct path and file names. The **CLOCK** file should be the version of the SCLKSCET file that is currently being used for uplink sequences. The **SEQUENCE** file is of course a sequence file (i.e. SASF) created by the user. The user should change the **START_TIME** and **CUT_OFF_TIME** of the environment to correspond to the **BEGIN** and **CUTOFF** times in the SASF.

The **APPLICABLE_START_TIME** and **APPLICABLE_STOP_TIME** determine the beginning and end of modelings by SEQ_GEN. Under normal circumstances and for a novice, it is sufficient to put **APPLICABLE_START_TIME** and **APPLICABLE_STOP_TIME** as the same as the **START_TIME** and **CUT_OFF_TIME**.

Another keyword that the user might want to change is **TIME_PER_SCREEN**. It is currently set to 12:00:00 in the seqgen.env, which means that the SEQ_GEN window will cover a 12 hour period. If the user wishes to see a longer time span, **TIME_PER_SCREEN** can be changed accordingly. Alternatively, the user can use the Zoom In and Zoom Out capabilities under the Time Panel button to change the screen coverage. There are times, a user may want to move a request from one end of the window the other, there is a handy method the author finds most useful. First, highlight the request by clicking it once, then move the mouse pointer to a new location, press Shift down and click. The request is now at the new location.

Also, under **Output files** in the environment file, the user may enter their own file names to specify the output files.

The contents of the environment file are entirely under the control of the user. It is up to the user to preserve the consistency of the entries in the environment file. Hence, the user should not make unnecessary changes to the environment files other than those mentioned here.

A data file that contains a relevant subset of the lines in the environment file may be used. This is documented in Section 2.2 of this document.

2.7 SEQ_GEN Running Modes

2.7.1 Interactive Mode

There are two execution modes for SEQ_GEN, interactive and batch. For the interactive mode, the command line argument set may be:

$run_seqgen <environment filename> `<Sequence_ID>`

An ampersand, &, may be optionally placed after the environment file name to instruct the operating system to execute this process in the background. Execution of SEQ_GEN as a

background process does not alter the program presentation.

Additional options may be selected on the command line. The following is a partial list. Refer to the TMOD SEQ_GEN (SST) User's Guide for more detail.

b run in batch mode
d run in silence mode for reading and writing of files only
e display error report upon exit
f run in fast alone, modeler user interface is disable
i run in silence mode: no popup alerts or warnings
l auto-load files upon startup
m manually wait for modeling program to connect
n turn off modeling
o run expansion program alone, modeling is automatic off
p align from previous step, start plus delta(s) then align
s execute one command at a time when running in Script Mode
S start in script mode
D start in debug mode

The -S option which starts SEQ_GEN in script mode is very useful in re-running a previous session. Some users have found that the -S option saves them valuable time.

The additional option "-v" can be selected separately from the other options, e.g. "-b –v" to produce a violations report at the end of the SEQ_GEN run. If the Predicted Events File (PEF) specified in the environment file exists at the end of the run, SEQ_REVIEW will prepare a file called violations.rpt based on it in the current unix directory. This file is a nicely formatted time-ordered listing of the violations that appear in the PEF.

2.7.2 Batch Mode

One of the ways to speed up the process is to run SEQ_GEN in batch mode with the -b option. The following steps can serve as a timesaver:

1. Do the normal editing of commands and saving of SASFs in interactive mode, but do not save the PEF. If you leave out the PEF file name under the output files, no PEF will be created.

2. When you have finished creating your sequences and want a PEF, then run SEQ_GEN in batch mode with a PEF file name in the environment file.

3. UNIQUE CASSINI SEQ_GEN FEATURES

3.1 Components of a Sequence

A typical sequence consists of multiple requests. Each request is made up of a series of spacecraft command and activity steps. Some of the most commonly used step types are: Command, Note, Activity and D-Command. To see a full listing of the various request step types, the user should click the New button under the Step Panel in the SEQ_GEN Editor Window. A sequence will normally start with a request containing an activity step for the SEQTRAN directive WINDOW, and end with a request containing an activity step for the SEQTRAN directive SEQEND. The following is an example of a Cassini spacecraft activity sequence file (SASF) with **request** and **step** in boldface:

```
CCSD3ZF0000100000001NJPL3KS0L015$$MARK$$;
MISSION_NAME = CASSINI;
SPACECRAFT_NAME = CASSINI;
DATA_SET_ID = SPACECRAFT_ACTIVITY_SEQUENCE;
FILE_NAME = sample.sasf;
APPLICABLE_START_TIME = 1998-075T00:00:00.000;
APPLICABLE_STOP_TIME = 1998-131T00:00:00.000;
PRODUCT_CREATION_TIME = 1998-064T03:21:13;
PRODUCER_ID = Kevin_Yau;
SEQ_ID = C7;
HOST_ID = ulo05;
CCSD3RE00000$$MARK$$NJPL3IF0M01300000001;
$$CAS      SPACECRAFT ACTIVITY SEQUENCE FILE
************************************************************
*PROJECT    CAS
*SPACECRAFT 082
*OPERATOR   Kevin Yau, 301-250X,X3-5880 MS301-250D S314
*FILE_CMPLT TRUE
*DATE       Thu Mar  5 03:21:13 1998
*SEQ_GEN    V22.5 Mon Feb 2 14:21:45 PST 1998
*BEGIN      1998-075T00:00:00.000
*CUTOFF     1998-131T00:00:00.000
*TITLE      Example Nominal Sequence
*EPOCHS_DEF
*C7_START,                          1998-075T00:00:00.000
*EARTH_OCCULT_BEGIN,1998-116T14:15:32.000
*EARTH_OCCULT_END,          1998-116T16:04:42.000
*PIM_START,              1998-106T18:40:00.000
*SUN_OCCULT_BEGIN, 1998-116T13:40:32.000
*SUN_OCCULT_END,    1998-116T13:59:39.000
*EPOCHS_END
*Input files used:
*File Type  Last modified          File name
************************************************************
$$EOH
$$EOD
```

```
request(A_Window,
                START_TIME, C7_START,
                TITLE, "Uplink Window Request",
                REQUESTOR, "Kevin Yau, Ext 3-5880",
                DESCRIPTION, "Beginning of sequence window",
                PROCESSOR, "SEQ",
                KEY, "SEQWIN")
                WORKGROUP,"ULO_SEQGEN")
        activity(1,
                SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
                DRAW, VERTICAL,
                SEQTRAN_directive(WINDOW,1998-071T14:00:00,1998-071T21:00:00,1998-126T12:00:00,
                1998-127T12:00:00, "NORMAL", "LDNGO","ABS")
        ),
end;

request(VIMS_Heaters_Off,
                START_TIME, C7_START+00:05:00.000,
                TITLE, "VIMS Cruise 2 - Low level decontamination",
                REQUESTOR, "Kevin Yau, Ext 3-5880",
                PROCESSOR, "SEQ",
                KEY, "VIMS")
        note(1,
                SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
                TEXT,\"Turn VIMS decon heaters off (Duration=00:05:00)"\
        ),
        command(2,
                SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
                37PS_IROPT_DECON("HTR1","OFF")
        ),
        command(3,
                SCHEDULED_TIME,\0:0:10\,FROM_PREVIOUS_START,
                37PS_IROPT_DECON("HTR2","OFF")
        ),
end;

request(Reset_SSR_Pointers,
                START_TIME, C7_START+1T11:59:59.000,
                TITLE, "RESET SSR",
                REQUESTOR, "Kevin Yau, Ext 3-5880",
                PROCESSOR, "SEQ",
                KEY, "SSR")
        note(1,
                SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
                TEXT,\"Move record and playback pointers to desired locations (Duration=00:01:00)"\
        ),
        activity(2,
                SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
                activity(SSR_CHG_PTRS,"ARBITRARY",0x00000,"ARBITRARY",0x0040)
        ),
end;

request( . . .
```

```
 .
 .
 .
 end;

request(Z_Seqend,
                START_TIME, 1998-131T00:00:00.000,
                REQUESTOR, "Kevin Yau, Ext 3-5880",
                DESCRIPTION, "End of sequence window",
                PROCESSOR, "CDSBTH",
                KEY, "SEQWIN",
                WORKGROUP,"ULO_SEQGEN")
        activity(1,
                SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
                DRAW, VERTICAL,
                SEQTRAN_directive(SEQEND)
        ),
end;
$$EOF
```

SEQTRAN directives are special activity types used to add SEQTRAN instructions to the sequence. The purpose of the WINDOW and SEQEND directives are to signify to SEQTRAN the beginning and end of a sequence. The WINDOW directive also serves a special function. It indicates to SEQTRAN which type of sequence program is being sent. The example here illustrates that of a Normal sequence program. The contents of the SEQTRAN directives will be fully described below. Another important activity type shown in the example is that of the block. In the Reset_SSR_Pointers request, the activity step has a call to a module named SSR_CHG_PTRS.

3.2 Sequence Program Types

Sequence programs can be broadly divided into two principal types based on the sequencing memory areas: Non-privileged and Privileged sequence programs. The two tables below depict the different regions of the Non-privileged and Privileged sequencing memory.

Non-privileged Sequencing Memory

Address - decimal (hex)	Corresponding Sequence Memory Region
0 – 1023 (3FF)	Global Variables (1K 16-bit words)
1024 (400) - 2879 (B3F)	Immediate/Delayed Action Program (IDAP) Region (1856 16-bit words)
2880 (B40) - 6975 (1B3F)	Mini Sequence Region (4K 16 bit-words) (for Mini, Critical and Conditional sequence programs)
6976 (1B40) – 153599 (257FF)	Nominal Stored Sequence and Utility Region (145K-1856=146624 16-bit words) (for Normal sequence and Utility programs)

Privileged Sequencing Memory

Address - decimal (hex)	Corresponding Sequence Memory Region
0 – 1023 (3FF)	Shared Global Variables (1K 16-bit words)
1024 (400) - 1139 (473)	Privileged Action Program (PAP) Region (116 16-bit words)

Normal Sequence Program resides in the nominal segment of the Non-privileged sequencing memory. Hence these programs are generally known as nominal sequences. This type of sequence programs is the most commonly used program.

Mini, Critical and **Conditional Sequence Programs** reside in the Non-privileged sequence memory region generally known as the mini-sequence region. **Mini Sequence Programs** are identical to Normal programs except that they reside in the mini-sequence memory region. **Critical Sequence Program** cannot be divided into time-based program as nominal sequences. Time-based programs are generated based on the uplink windows of the current sequence, the next sequence and the next-next sequence, which are called current, overlap and long-term programs respectively. Only one Critical sequence program can be active in sequencing memory at any given time. It cannot be processed together with any other programs. **Conditional Sequence Program** like a critical sequence, cannot be divided into time-based programs and also cannot be processed together with any other programs.

Immediate/Delayed Action Program (IDAP) occupies a special Non-privileged sequencing memory region. This region has a total of 1856 16-bit words and is divided equally into 16 subdivisions. Each subdivision contains a single IDAP of 116 words. In another word, there are 16 available IDAP slots. IDAP cannot be mixed with other programs or direct commands.

Privileged Action Program (PAP) sequencing memory region consists of 116 16-bit words, which means a PAP can have a maximum of 116 words. A PAP cannot be mixed with other programs or direct commands, only CDS commands are allowed. Only one PAP at a time will be processed by SEQTRAN and a PAP should have clocked out completely before the next PAP begins.

3.3 SEQTRAN directives

3.3.1 WINDOW and SEQEND

The **WINDOW** directive indicates the beginning of a sequence program. It has a number of parameters. The general SASF input format is:

SEQTRAN_directive(WINDOW,***OPEN,CLOSE,OPEN2,OPEN3,TYPE,LOAD,TIME_CODE***)

where:
OPEN is the time that the first uplink packet can reach the spacecraft and be loaded into memory. It

is required for all sequences except RESET.
CLOSE is the time that the last bit of the last uplink packet must be received at the spacecraft. It is required for all sequences except RESET.
OPEN2 is the earliest time that the first uplink packet of the next sequence can reach the spacecraft and be loaded into memory. It is also used to determine what events must be stored in the overlap region so they will not be overwritten by the next sequence load. It is required for NORMAL and MINSEQ sequences.
OPEN3 is the earliest time that the first uplink packet of the sequence following the next sequence can reach the spacecraft and be loaded into memory. It is also used to determine what events must be stored in the long-term region so they will not be overwritten by either of the next two sequence loads.
It is required for NORMAL and MINSEQ sequences.
TYPE indicates the type of sequence program that is to be uplinked. The six options for this parameter are: "NORMAL", "MINSEQ", "CRIT", "COND", "TCMSEQ", and "RESET". The default is set to "NORMAL". Here "NORMAL" means a Normal sequence program; "MINSEQ" means a Mini sequence program; "CRIT" means a Critical sequence program; "COND" means a Conditional sequence program; and "RESET means a reset of the sequence memory boundaries.
LOAD indicates whether the sequence program is to be automatically activated upon load or loaded into memory only. The two available options for the parameter are: "LDNGO" or "LDONLY".
TIME_CODE indicates whether the time code format for the sequence program is relative: REL or absolute: ABS(default).

The uplink window OPEN and CLOSE times should be earlier than that the sequence START_TIME. Otherwise an error message will pop up.

SEQEND indicates the end of a sequence program. It has no parameters.

Below is another example of using the WINDOW and SEQEND directives. In this case, it shows a Critical sequence:

```
request(A_Window,
                    START_TIME, C7_START,
                    TITLE, "Uplink Window Request",
                    REQUESTOR, "Kevin Yau, Ext 3-5880",
                    DESCRIPTION, "Beginning of sequence window",
                    PROCESSOR, "SEQ",
                    KEY, "SEQWIN")
                    WORKGROUP,"ULO_SEQGEN")
          activity(1,
                    SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
                    DRAW, VERTICAL,
                    SEQTRAN_directive(WINDOW,1998-071T14:00:00,1998-071T21:00:00,1998-126T12:00:00,
                    1998-127T12:00:00, "CRIT", "LDNGO","ABS")
          ),
end;
request( . . .
 .
 .
 .
```

```
 end;

request(Z_Seqend,
                START_TIME, 1998-131T00:00:00.000,
                REQUESTOR, "Kevin Yau, Ext 3-5880",
                DESCRIPTION, "End of sequence window",
                PROCESSOR, "CDSBTH",
                KEY, "SEQWIN",
                WORKGROUP,"ULO_SEQGEN")
        activity(1,
                SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
                DRAW, VERTICAL,
                SEQTRAN_directive(SEQEND)
        ),
end;
```

3.3.2 BEGIDP and ENDIDP

BEGIDP is the directive to signify the beginning of an Immediate/Delayed Action Program (IDAP). It has the following input format:

SEQTRAN_directive(BEGIDP,***SLOT,LOAD,TIME_CODE***)

SLOT - the slot number which will receive the IDAP being processed. It can be one of 16 slots: "IDAP01","IDAP02","IDAP03","IDAP04","IDAP05","IDAP06","IDAP07","IDAP08","IDAP09","IDAP10","IDAP11","IDAP12","IDAP13","IDAP14","IDAP15","IDAP16".
LOAD - indicates if the IDAP is to be automatically activated upon successful load: LDNGO or loaded into memory only: LDONLY.
TIME_CODE indicates if the begin time for the IDAP is relative ("REL") or absolute ("ABS"). The default is set to "REL".

Depending on the selected IDAP slot, IDAP can be separated into ULO IDAP (slots IDAP01 to IDAP14) or RTO IDAP (slots IDAP015 and IDAP16).

ENDIDP is the directive used to indicate the end of an IDAP. Below is an IDAP example:

```
        activity(1,
                SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
                SEQTRAN_directive(BEGIDP,"IDAP01","LDNGO","REL")
        ),
        .
        .
        .
        activity(1,
                SCHEDULED_TIME,\01:0:0\,FROM_PREVIOUS_START,
                SEQTRAN_directive(ENDIDP)
        ),
```

3.3.3 BEGPAP and ENDPAP

BEGPAP is the first directive of the Privileged Action Program (PAP) and its input format is:

SEQTRAN_directive(BEGPAP,***TIME_CODE***)

Where ***TIME_CODE*** set the time code to be used for the begin time of the PAP. It has two options: "REL" (relative) or "ABS" (absolute). The default is set to "REL".

ENDPAP is the final directive of a PAP. Below is a PAP example:

```
activity(1,
        SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
        SEQTRAN_directive(BEGPAP,"REL")
),
.
.
.
activity(1,
        SCHEDULED_TIME,\01:0:0\,FROM_PREVIOUS_START,
        SEQTRAN_directive(ENDPAP)
),
```

3.3.4 PKTTYP, PKTSIZ and ALFEND

PKTTYP, PKTSIZ and ALFEND are the three directives used to send an ALF load. They specify the packet type, packet size and end of ALF load respectively.

1. **PKTTYP** determines the destination for the ALF load and has the following input format:

SEQTRAN_directive(PKTTYP,***LOADTYPE***)

LOADTYPE specifies the destination subsystem for the ALF load. The possible values are: "CDSPRM", "CDSRAM", "AACS", "NAC", "WAC", "MAG", "VIMS", "RPWS", "INMS", "MIMI", "CDA", "RADAR", "CAPS", "UVIS" and "CIRS". For CDS, it indicates one of two types of load, namely, a RAM or PROM load.

2. **PKTSIZ** determines the number of ALF commands, following this directive, to be included in the packet being generated. It has the following input format:

SEQTRAN_directive(PKTSIZ,***PACKET_SIZE***)

PACKET_SIZE determines the number of ALF commands to be included in the next packet. The range on this parameter value varies depending on the PKTTYP directive. If PKTTYP = CDSPRM the range is [1 or 4]. If PKTTYP = anything else, the range is [1..5].

3. **ALFEND** is the last directive of the ALF load. It is responsible for providing statistical data for ALF command and packet generation. It has the following format:

SEQTRAN_directive(ALFEND,***NO_OF_CMD,NO_OF_PKT***)

NO_OF_CMD - Number of ALF commands used to create the current ALF load sasf.
NO_OF_PKT - Number of Telecommand packets generated for this load.

The following example is an ALF load destined for the AACS subsystem. It has a total of five commands and generated three packets:

```
request(ALF_Load,
        START_TIME, 1997-303T16:30:48.000,
        REQUESTOR, "Name of Requester",
        PROCESSOR, "DIRECT+CDSB+SSRA+PARTND+SPAACS",
        KEY, "AACS")

    activity(0,
        SCHEDULED_TIME,\00:00:00\,FROM_PREVIOUS_START,
        SEQTRAN_directive(PKTTYP,"AACS")
    ),
    activity(1,
        SCHEDULED_TIME,\00:00:00.008\,FROM_PREVIOUS_START,
        SEQTRAN_directive(PKTSIZ,3)
    ),
    command(1,
        SCHEDULED_TIME,\00:00:00.008\,FROM_PREVIOUS_START,
        7ALF(148,146,[0x62af,0x0000,0x0003,0x62b0,0x65fe,0x0003,0x62b1,0x4524,0x0003,0x62b2,
        0x0000,0x0003,0x62b3,0x58da,0x0003,0x62b4])
    ),
    command(2,
        SCHEDULED_TIME,\00:00:00.008\,FROM_PREVIOUS_START,
        7ALF(149,147,[0x6023,0x0003,0x62b5,0x8000,0x0003,0x62b6,0xbad2,0x0003,0x62b7,0x3e0e,
        0x0003,0x62b8,0x0000,0x0003,0x62b9,0x59f0])
    ),
    command(3,
        SCHEDULED_TIME,\00:00:00.008\,FROM_PREVIOUS_START,
        7ALF(150,148,[0x0003,0x62ba,0x2e0f,0x0003,0x62bb,0x0000,0x0003,0x62bc,0x52e9,0x0003,
        0x62bd,0xce0e,0x0003,0x62be,0x8000,0x0000])
    ),
    activity(2,
        SCHEDULED_TIME,\00:00:06\,FROM_PREVIOUS_START,
        SEQTRAN_directive(PKTSIZ,1)
    ),
    command(4,
        SCHEDULED_TIME,\00:00:00.008\,FROM_PREVIOUS_START,
        7ALF(151,149,[0xa083,0x4ae4,0x0000,0xa084,0x059f,0x0000,0x0ffd,0x0657,0x0000,0x0fff,
        0x426d,0x0000,0x0000,0x0000,0x0000,0x0000])
    ),
    activity(3,
        SCHEDULED_TIME,\00:00:03\,FROM_PREVIOUS_START,
```

```
            SEQTRAN_directive(PKTSIZ,1)
        ),
        command(5,
            SCHEDULED_TIME,\00:00:00.008\,FROM_PREVIOUS_START,
            7ALF_END(19028,19029)
        ),
        activity(4,
            SCHEDULED_TIME,\00:00:00.008\,FROM_PREVIOUS_START,
            SEQTRAN_directive(ALFEND,5,3)
        ),
end;

$$EOF
```

3.3.5 ABSREL and RELABS

ABSREL and RELABS are directives to change the time code formats in the CPF (Command Packet File) and used in Critical sequences only. ABSREL is a SEQTRAN directive used to change the time code format from absolute to relative. RELABS is a SEQTRAN directive used to change the time code format from relative to absolute.

An example of the ABSREL directive:

```
        activity(1,
            SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
            SEQTRAN_directive(ABSREL)
        ),
```

An example of the RELABS directive:

```
        activity(1,
            SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
            SEQTRAN_directive(RELABS)
        ),
```

3.4 SEQ_GEN Directives

SEQ_GEN Directives are special instructions to SEQ_GEN to output information about a sequence at a particular time.

3.4.1 CONDITION

Every time a CONDITION directive appears in the sequence, SEQ_GEN will write a condition file corresponding to that time, giving it the name specified in the parameter FILE_NAME. The format of this directive is:

SEQGEN_directive(CONDITION,***FILE_NAME***)

An example:

```
activity(1,
        SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
        SEQGEN_directive(CONDITION,"Name.cf")
),
```

3.4.2 MODEL

The MODEL directive is used to output the attribute values of a selected model to the PEF at a particular instance. It has the format:

SEQGEN_directive(MODEL,***MODEL_NAME***)

where ***MODEL_NAME*** is the name of the model element that a status report is to include on the PEF. If ALL is specified for this parameter, all model elements' attributes will be included on the PEF.

An example:

```
activity(1,
        SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
        SEQGEN_directive(MODEL,"PMS")
),
```

3.4.3 SSF_BEGIN

This directive is used to instruct SEQ_GEN to output a SSF covering a sub-interval of time of the sequence. The SSF will contain all items whose times are equal to or later than the time of the directive, but earlier than the time of the next SSF_BEGIN directive and CUT_OFF_TIME. It has the following format:

SEQGEN_directive(SSF_BEGIN,***FILE_NAME,SEQ_ID,TITLE***)

where ***FILE_NAME*** is the file name of the desired SSF.
SEQ_ID is the id of the sequence segment.
TITLE is a title for the sequence segment.

An example:

```
activity(1,
        SCHEDULED_TIME,\0:0:0\,FROM_PREVIOUS_START,
        SEQGEN_directive(SSF_BEGIN,"Name.ssf","C7001","C7_Test")
),
```

3.5 Processor Field

In the sequence example given in section 3.1, the value of the PROCESSOR in the SEQEND request header is different from those in other requests. The SEQEND PROCESSOR says "CDSBTH", and all the others say "SEQ". The processor value SEQ is the default for sequence

commands. When a sequence is expanded, the routing information from the SEQEND request is used for all commands, except those that have their own processor values. The routing information for the processor field can be entered in two ways, either specified at the request header or at the command step. However, the processor value specified at the command step will take precedence over that specified at the request header. "SEQ" and "CDSBTH" are only two of the available command routing traits. The following section will address all processor routing traits in detail.

3.6 Command Routing

The three basic command routings are: SEQ (Sequence), DIRECT (Direct) and DIRCRT (Direct-critical). Most of the Cassini commands can be either sequenced or direct. Sequence only or direct only commands constitute a relatively small portion of the total. Direct critical commands are not used. Figure 3-1 shows two main trunks: SEQ on the left hand side and DIRECT/ DIRCRT on the right hand side. Each of the main trunks diverges into a number of branches based on the type of commands. There are a total of eight possible traits that can be included in the processor field. The default values applicable to some of the traits are shown in bold in Figure 3-1 and also in Table 3-1. Table 3-1 gives a detailed listing of all the available trait values.

3.6.1 Sequence Routing

For a sequence, the default routing for the processor is SEQ. In fact, SEQ is the routing trait for commands that go the CDS and single-string external subsystems (including all the science instruments).

For a command that goes to an external subsystem with redundant-strings, the default remote terminal trait is EXTPRI if none is specified by the user. Subsystems that contain redundant strings are AACS, RSP, PPS, RFS and PMS. These subsystems can have commands routed to string A, B, Prime or Backup via a CDS bus command. To route a command to a redundant string other than the default, for example the B string, the routing instruction is SEQ+EXTB. The + operator is used to link the routing traits. Where a trait is null, nothing should be entered in the routing definition.

The multi-remote terminal trait is not currently available (a deferred capability to be provided by CDS). The purpose of the multi-remote trait is to enable a command to be routed to both redundant strings of a remote terminal. Incorporating the multi-remote trait, the routing traits will have the format of the following example: "SEQ+EXTPRI+MLTSEC", where EXTPRI is the primary string and MLTSEC is the secondary string of the external subsystem.

3.6.2 Direct Routing

In the case of a direct command, if no other routing values beside DIRECT is specified, the default for the CDS string is always CDSBTH. The bus wrap is defaulted to NOWRAP if the command is routed to an external redundant-string. Commands are sent to the remote terminal in two ways, via direct external packet header or the direct CDS header. The direct external packet header contains the routing information which must specify A or B strings for redundant string terminals. The direct external packet header sends commands only to the physical terminal. For logical addressing (i.e. primary or secondary), a redundant subsystem command is routed using a direct CDS packet header via a BUS command.

The traits Partition and Sub-partition are applicable only when the SSR Device trait is given the value SSRA or SSRB. In the ALF load example above, the processor is assigned with the following routing information: "DIRECT+CDSB+SSRA+PARTND+SPAACS".

3.6.3 Range Checking

Only a basic check on the type of command is performed by SEQ_GEN on the value entered for the PROCESSOR. If any of the “direct only” commands (commands with a stem containing the keywords “CE”, “ALF” and “6PROM”) is sent as a “sequence” command, a violation error message will be given to the user. Entry of the correct routing instruction is the responsibility of the user. SEQTRAN will perform a more detailed suite of range checks on the routing instruction per command in the SSF.

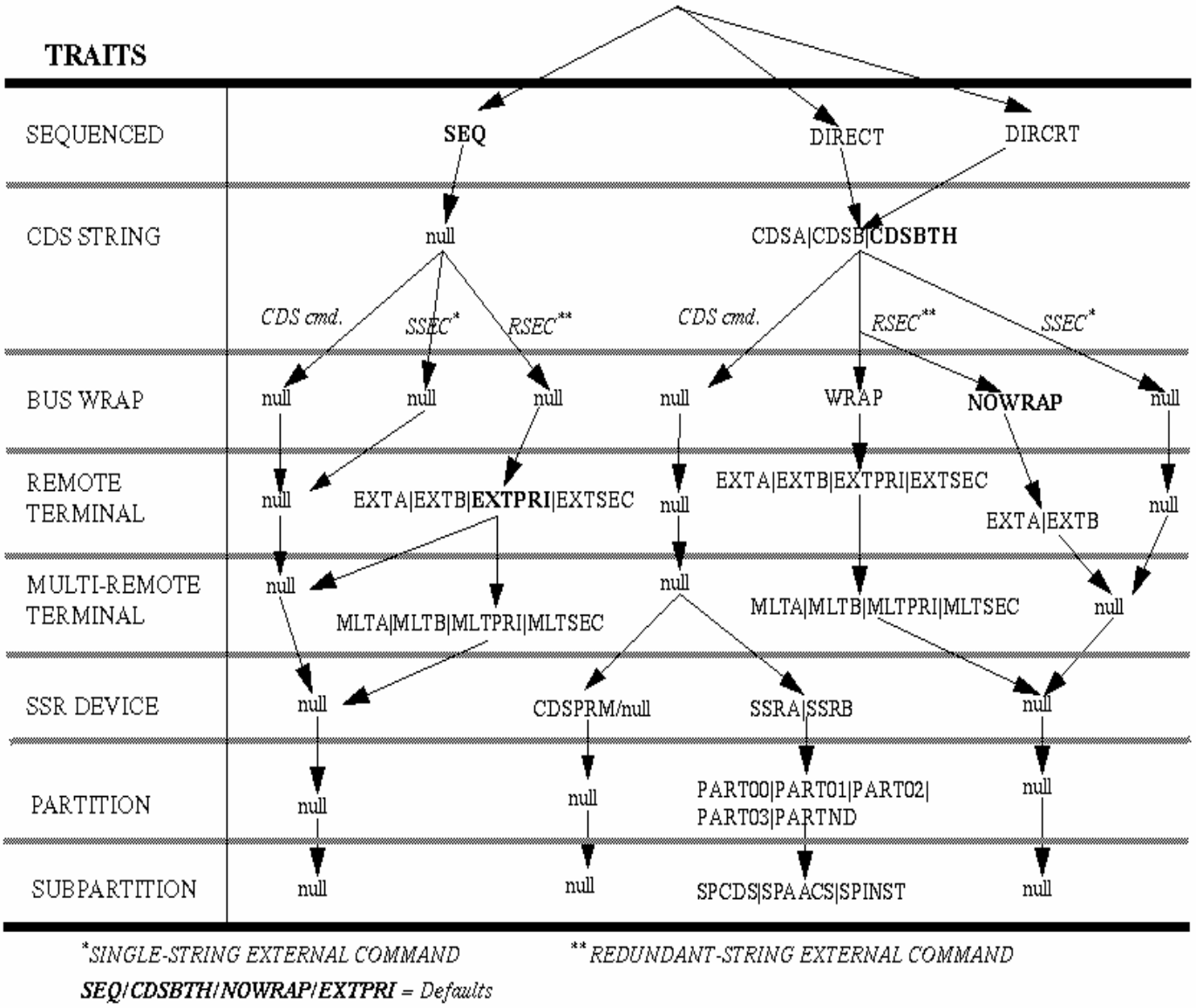

Figure 3-1: Command Routing Tree

Trait	Value	Description
Sequenced	**SEQ**	Indicates that the command is for a stored sequence.
	DIRECT	Indicates that the command will be used as a direct command.
	DIRCRT	Indicates that the command is a critical direct command which requires the critical subaddress in the bus command for external commands.
CDS String	CDSA	Indicates CDS string A will receive the direct command for processing.
	CDSB	Indicates CDS string B will receive the direct command for processing.
	CDSBTH	Indicates both CDS strings will receive the direct command for processing.
Remote Terminal	EXTA	For a redundant-string remote terminal, string A will be built into the bus command for the recipient address.
	EXTB	For a redundant-string remote terminal, string B will be built into the bus command for the recipient address.
	EXTPRI	For a redundant-string remote terminal, primary string will be built into the bus command for the recipient address.
	EXTSEC	For a redundant-string remote terminal, backup string will be built into the bus command for the recipient address.
MultiRemote	MLTA	Indicates external second string A of remote terminal for multi-bus command.
(CDS deferred)	MLTB	Indicates external second string B of remote terminal for multi-bus command.
	MLTPRI	Indicates external second string as primary string of remote terminal for multi-bus command.
	MLTSEC	Indicates external second string as backup string of remote terminal for multi-bus command.
Bus Wrap	WRAP	Used only for direct commands. Indicates the command must be wrapped in a bus command: thereby, using a logical name rather than physical as required for direct packets.
	NOWRAP	Used only for direct commands. Indicates the command will not be wrapped in a bus command for forwarding by CDS; therefore, physical (EXTA or EXTB) is required for redundant-string remote terminals.
SSR Device	CDSPRM	Indicates a CDS PROM load for ALF command. When trait specified, the following two traits are ignored.
	SSRA	For ALF commands, no defaults are allowed for the following two traits. For CDS/SSR feedthrough commands, no values are allowed for the following two traits.
	SSRB	For ALF commands, no defaults are allowed for the following two traits. For CDS/SSR feedthrough commands, no values are allowed for the following two traits.

Trait	Value	Description
Partition	PART00	Indicates the partition number or nondefault partitions -- Partition 0
	PART01	Partition 1
	PART02	Partition 2
	PART03	Partition 3
	PARTND	Indicates nondefault group for SSR ALF load.
Subpartition	SPCDS	Indicates the CDS subpartition within the partition.
	SPAACS	Indicates the AACS subpartition within the partition.
	SPINST	Indicates the instrument subpartition within the partition.

Table 3-1: Command Routing Information Table

3.7 Spacecraft Clock Format

The spacecraft (S/C) has many clocks for keeping track of time in the various subsystems. A reference clock exists for synchronizing subsystem operations and executing commands from the CDS to itself and the other subsystems. The time in S/C clock units is displayed in SEQ_GEN outputs files and can be entered by the user. It is not necessary to define the time of any commands in S/C clock units. The clock definition information in conjunction with the SCTF provides a time conversion capability between S/C event time (SCET) and S/C clock time.

The units of the clock are Cassini-specific. The clock consists of two fields. The clock field format is:

XXXXXXXXXX:xxx

where the field separator is a colon (:). The left field, the major frame, has a duration of 1 second and supports 10 primary places. The right field, the minor frame, has a duration of 1/256 second occupying three places counting from 0 to 255. In order for SEQ_GEN to know the difference between S/C time and Universal time, the Mnemonic "CLK_ABS" must be appended to the clock time, for example:

CLK_ABS:XXXXXXXXXX:xxx

where CLK_ABS is the prefix signifying an absolute S/C clock time. For a S/C clock duration, the format is:

CLK_DUR:XXXXXXXXXX:xxx

where CLK_DUR is the prefix signifying a S/C clock duration.

3.8 Command Time Alignment

The Cassini CDS transacts commands and program calls starting at each major frame boundary. The commands and program calls are buffered and transacted in the order they are buffered. Due to alignment problems associated with the core software, SEQ_GEN has been adapted to align the time of each command and program call to the nearest S/C clock minor frame boundary. The alignment is performed during expansion of the sequence and is reflected in the PEF and SSF outputs. The fractional seconds are not processed by SEQTRAN during translation.

The development staff knows the following problems relating to the time alignment problem and ordering of commands in SEQ_GEN:

1. Commands within a request that have identical times: the order you see in the SSF is the same as the order of the commands you put in. So there shouldn't be any problems.

2. Merging commands from two different requests when some of the commands have identical times: the ordering is governed by the alphabetical order of the command stems.

3. SEQTRAN_directives seem to have a mind of their own. We found that the only way to assure SEQEND as the last entry is to offset the time of the activity by one major frame of the Cassini S/C clock (i.e. 1 sec). An example is given below:

```
request(seq_end,
            START_TIME, 1998-080T06:00:00.0,
            REQUESTOR, "Kevin Yau",
            DESCRIPTION, "End of sequence window",
            PROCESSOR, "CDSA",
            KEY, "SEQWIN",
            WORKGROUP,"MSS_SEQGEN")

      activity(1,
            SCHEDULED_TIME,\0:0:01\,FROM_PREVIOUS_START,
            DRAW, VERTICAL,
            SEQTRAN_directive(SEQEND)
      ),
end;
```

The ordering of commands with identical times in SEQ_GEN is a potential trap to new users. To address this problem, a model was created to flag a warning message whenever two commands have identical times.

4. SEQ_GEN USER NOTES

4.1 Notes on the Type of Violation Messages

There are currently no Flight Mission Rule Files (FMRFs) among the Cassini SEQ_GEN adaptation files. As there are no FMRFs in any operational Cassini SEQ_GEN, the users should only see one type of violation flag to the right of the "Model Conflicts:" legend. The "Rule Violations:" legend is a built-in feature of the core software, which all Cassini users should ignore.

The violation flags come in two colors: blue for WARNING messages and red for ERROR messages. The convention used in the models is that all flight rule violations will trigger a red flag, and that warnings will trigger a blue flag.

Notes on Using key.cvdf

key.cvdf is provided for the user to turn off the flight rule models of an individual subsystem or instrument. Opening key.cvdf with a text editor, the user can see two columns, the name of the subsystems and instruments on the left and a column of 1 on the right. Changing the 1 to 0 will turn off the models of that subsystem or instrument. This capability is very useful in isolating violation messages from a particular subsystem or instrument.

4.2 Notes on Using Sections 5 to 28

Reference tables on the implemented flight rule models are provided in Sections 5 to 28. These sections are organized by subsystems and instruments. Each section has three main subsections. The first main subsection contains a table listing of all the modeled flight rules for the subsystem or instrument. The second main subsection contains tables for the attributes used in the models. The last main subsection contains tables for identifying the individual elements of array attributes. However, there are exceptions to this general layout. In a few of the subsystems and instruments, there is only a subsection on attributes and no subsections on modeled flight rules or array attribute elements.

The flight rule tables are handy for tracing which of the flight rules was coded. They can also be very useful in locating the responsible commands and model attributes that triggered a violation. The model attribute tables are good for tracking down the range and default values.

The tables of array attribute elements are very helpful when one wants to display the state information of an array attribute element. To display an array attribute element, the user should click the Display Attribute button under the Attribute Panel in the SEQ_GEN Main Window. A window will pop up with Model Attributes on the left panel and Model Elements on the right panel. Select an array attribute from the Model Attributes panel, for example, AACS::POWER. Once you have clicked this attribute, a panel will pop up to say that “This attribute has a list of 49 values. Please enter which one is of interest”. Type in any number from 1 to 49 and click OK. Then click Graph, the state information corresponding to that element of the attribute is displayed. If 1 was entered, the state of RWA1 would have been displayed.

4.3 Seqgen OPMODE Transitions

There are 16 OPMODES. The following are their Seqgen names:

ORS_RWAF
ORS_RCS
DFPW_normal
DFPW_TCM
RWA_Unload
RADAR_WuRad
RADAR_RWA
RADAR_RCS
RSSWU_RWAL
RSS3_RCS
RSS2_RWAF
RSS3_RWAL
RSS3_RWAF
TCM_RCS
TCM_ME
DFPW_PEM

There is an OPMODE transition block for each legal OPMODE transition. The name of each of these blocks is the concatenation of the "from" OPMODE, "2", and the "to" OPMODE. Example: RSSWU_RWAL2 RSS2_RWAF.

For Seqgen modeling purposes, there are two other OPMODES:

UNIQUE_SEQUENCE	When there is a "unique sequence," there is no real OPMODE. Still, Seqgen needs to call it something.
TRANSITION	This is the degenerate case where an OPMODE transition is in progress.

There is a special OPMODE transition block called SET_OPMODE. It is used to set the Seqgen-modeled OPMODE to any of the 16 OPMODES, plus UNIQUE_SEQUENCE. Its intended use is to change the Seqgen-modeled OPMODE to or from UNIQUE_SEQUENCE.

Error Messages

If an OPMODE transition block is run, Seqgen checks to see if the "from" OPMODE is the current OPMODE. If not, an error message will be issued.

If SET_OPMODE is run, and the opmode parameter is not "UNIQUE_SEQUENCE," Seqgen checks to see if the current OPMODE is UNIQUE_SEQUENCE. If not, an error message will be issued.

If the OPMODE has not been initialized in Seqgen, it has a default value of "?" If a transition block is run when the initial OPMODE is "?" and error message is issued indication that the opmode is not initialized.

4.4 Cyclics

A cyclic is a feature in Seqgen that allows the user to be modular and efficient in their sequencing effort, as well as to save sequence space and sequence validation time. A cyclic is a piece of a sequence (commands, block calls) that is defined once and can be called multiple times in the requests of the same sasf; any of these calls can be looped a number of times with a selectable period. For information on implementing cyclics, consult the core SST User's Guide.

A cyclic call has a small amount of overhead, but in most cases, if it contains 2 or more commands, and it is called at least twice, there is a savings in sequence space on the spacecraft.

Cyclic names have restrictions – they must be 6 or fewer characters long, contain the characters A-Z and 0-9, not start with a number, and not be named the same as any block, module, or directive. These are all Seqgen constraints. An additional convention is that a cyclic name cannot start with the letter U.

5. STRUCTURE SUBSYSTEM (STRU)

5.1 STRU Model Attributes

Attributes	Range	Default	Associated Commands	Description
PS_RSP_HTR	"RHTR1=ON", "RHTR1=OFF",	"RHTR1=?"	1PS_RSP_HTR	To keep the state of RSP heater 1.
PS_RSP_HTR_TIME[2]	ALL	[1997-001T00:00:00.000, 1997-001T00:00:00.000]	1PS_RSP_HTR	To keep track of RSP heater 1 power ON and OFF times.

5.2 Array Attribute Elements in STRU Model

Attribute	Element Number	Element
PS_RSP_HTR_TIME[2]	1	"RHTR1=ON"
	2	"RHTR1=OFF"

6. RADIO FREQUENCY SUBSYSTEM (RFS)

6.1 Modeled Flight Rules

Flight Rule	Associated Commands	Associated Models and Attributes	Notes
FR02E1	2PS_TCU, 2RESET, 2CDU, 2WTS, 2DST, 2XTWTA, 2RFIS, 2MOD, 2TCU, 2RTI	RFS::PS_TCU	
FR02B2	2PS_TWTA, 2WTS, 2XTWTA	RFS::X_TWTA, RFS::WTS	
FR02E3	2PS_TWTA, 2XTWTA	RFS::PS_X_TWTA, RFS::X_TWTA	
FR02E4	2CDU, 2DST, 2MOD, 2RESET, 2RFIS, 2RTI, 2TCU, 2WTS, 2XTWTA	RFS::LAST_CMD, RFS::WTS_READY_STATE, RFS::CDU	
FR02B5	2PS_DST, 2PS_TCU	RFS::PS_DST, RFS::PS_TCU	
FR02B6	2DST	RFS::PS_DST, RFS::DST	
FR02C8	2PS_USO	RFS::PS_USO	
FR02E9	2TCU, 6CHG_SC_TLM_IMM	RFS::TCU, CDS::CHG_SC_TM_IMM	
FR02E10	2DST, 2MOD	RFS::DST, RFS::MOD	
FR02C12	2PS_TWTA	RFS::PS_X_TWTA	
FR02E13	2TCU, 2XTWTA, 6SET_SC_DEV_STAT	CDS_SET_SC_DEV_STATUS::PRIME, RFS::TCU, RFS::X_TWTA	
FR02D14	2PS_DST, 2DST, 6SFP_MON_CNTL_NP, 6SFP_MON_CNTL_P, 6SFP_RSP_CNTL_NP, 6SFP_RSP_CNTL_P	CDS_SFP::MON_CNTL_NP, CDS_SFP::MON_CNTL_P, CDS_SFP::RSP_CNTL_NP, CDS_SFP::RSP_CNTL_P, RFS::PS_DST, RFS::DST	Was SYS FR00C1
FR02D15	2XTWTA, 2PS_TWTA, 6SFP_MON_CNTL_NP, 6SFP_MON_CNTL_P, 6SFP_RSP_CNTL_NP, 6SFP_RSP_CNTL_P	CDS_SFP::MON_CNTL_NP, CDS_SFP::MON_CNTL_P, CDS_SFP::RSP_CNTL_NP, CDS_SFP::RSP_CNTL_P, RFS::PS_X_TWTA, RFS::X_TWTA	Was SYS FR00C2

Flight Rule	Associated Commands	Associated Models and Attributes	Notes
FR02D16	2PS_TWTA, 2PS_DST, 2PS_TCU	RFS::PS_X_TWTA, CDS_SET_SC_DEV_STATUS::PRIME	
FR02D18	2RESET	None	

6.2 RFS Model Attributes

Attributes	Range	Default	Associated Commands	Description
ANTENNA[2]	"UPLINK=none", "DOWNLINK=none", "UPLINK=HGA", "DOWNLINK=HGA", "UPLINK=LGA1", "DOWNLINK=LGA1", "UPLINK=LGA2", "DOWNLINK=LGA2"	["UPLINK=?", "DOWNLINK=?"]	2DST, 2MOD, 2PS_DST, 2PS_TCU, 2PS_TWTA, 2TCU, 2WTS, 2XTWTA	Tracks the antennas currently being used for downlink and uplink.
CDU	"CDU=R7.81", "CDU=R15.6", "CDU=31.3", "CDU=R62.5", "CDU=R125", "CDU=R250", "CDU=R500", "CDU=R1000", "CDU=R2000","CDU=RESET", "CDU=IP"	"CDU=?"	2CDU	Tracks the state of the CDUs
DST[6]	"NCO=NCENA", "NCO=NCINH", "USO=USOENA", "USO=USOINH", "RNG=RNGOFF", "RNG=RNGON", "RMI=RNGMHI", "RMI=RNGMLO", "XEX=XEXON", "XEX=XEXOFF", "DOR=DORON", "DOR=DOROFF"	["NCO=?", "USO=?", "RNG=?", "RMI=?", "XEX=?", "DOR=?"]	2DST	Tracks the state of the DSTs
LAST_CMD	ALL	1997-279T00:00:00	2CDU, 2DST, 2MOD, 2RESET, 2RFIS, 2RTI, 2TCU, 2WTS, 2XTWTA	Tracks the command frequency into the RFS processor
MOD	0 ... 63	0	2MOD	Tracks the modulation of the radio frequency downlink
PS_DST[4]	"DSTALA=OFF", "DSTALA=ON", "DSTALB=OFF", "DSTALB=ON", "DSTBLA=OFF", "DSTBLA=ON", "DSTBLB=OFF", "DSTBLB=ON"	["DSTALA=?", "DSTALB=?", "DSTBLA=?", "DSTBLB=?"]	2PS_DST	Tracks the power state of the DSTs

Attributes	Range	Default	Associated Commands	Description
PS_TCU[4]	"TCUALA=OFF", "TCUALA=ON", "TCUALA=IP", "TCUALB=OFF", "TCUALB=ON", "TCUALB=IP", "TCUBLA=OFF", "TCUBLA=ON", "TCUBLA=IP", "TCUBLB=OFF", "TCUBLB=ON", "TCUBLB=IP"	["CUALA=?", "TCUALB=?", "TCUBLA=?", "TCUBLB=?"]	2PS_TCU	Tracks the power state of the TCUs
PS_USO[1]	"PS_USO=OFF", "PS_USO=ON"	["PS_USO=?"]	2PS_USO	Tracks the power state of the USO
PS_X_TWTA[4]	"X_TWTALA=ON", "X_TWTALA=OFF", "X_TWTALB=ON", "X_TWTALB=OFF", "X_TWTBLA=ON", "X_TWTBLA=OFF", "X_TWTBLB=ON", "X_TWTBLB=OFF"	["X_TWTALA=?", "X_TWTALB=?", "X_TWTBLA=?", "X_TWTBLB=?"]	2PS_TWTA	Tracks the power state of the X Band TWTAs
RESET	ALL	"LAST_RESET=1997-279T00:00:00"	2RESET	Tracks the reset state of the TCUs
RFIS[2]	"KA_TWTA=STANDBY", "KA_TWTA=ACTIVE", "KA_TWTA=OFF", "S_REF=DST-A", "S_REF=DST-B"	["KA_TWTA=?","S_REF=?"]	2RFIS, 18PS_KA_BND_TWTA	Tracks the transmission state of the Ka Band TWTA and the reference DST for S-Band transmission
RTI[2]	"RST=RSTNOT", "RST=RSTEXE", "TRN=TRNINH", "TRN=TRNENA"	["RST=?","TRN=?"]	2RTI	Tracks the state of 2RTI command.
TCU[8]	"RAT=CODLNG", "RAT=CODSHT", "COD=CODON", "COD=CODOFF", "TLM=TLMCA", "TLM=TLMCB", "FRQ=SUBHI", "FRQ=SUBLO", "SUB=SUBON", "SUB=SUBOFF", "TM3=TM3ON", "TM3=TM3OFF", "TM2=TM2ON", "TM2=TM2OFF", "TM1=TM1ON", "TM1=TM1OFF"	["RAT=?", "COD=?", "TLM=?", "FRQ=?", "SUB=?", "TM3=?", "TM2=?", "TM1=?"]	2TCU	Tracks the state of the TCUs
WTS[4]	"WTS_1A=LGA2(SWILA1)", "WTS_1A=LGA1(SWILA2)", "WTS_1B=LGA2(SWILB1)", "WTS_1B=LGA1(SWILB2)", "WTS_2A=HGA(SWIHA1)", "WTS_2A=LGAs(SWIHA2)", "WTS_2B=HGA(SWIHB1)", "WTS_2B=LGAs(SWIHB2)"	["WTS_1A=?", "WTS_1B=?", "WTS_2A=?", "WTS_2B=?"]	2WTS	Tracks the positions of the Waveguide Transfer Switches

Attributes	Range	Default	Associated Commands	Description
WTS_READY_STATE[5]	"WTS_1A=READY", "WTS_1A=WAIT10", "WTS_1B=READY", "WTS_1B=WAIT10", "WTS_2A=READY", "WTS_2A=WAIT10", "WTS_2B=READY", "WTS_2B=WAIT10", "ALL=READY", "ALL=WAIT2"	["WTS_1A=READY", "WTS_1B=READY", "WTS_2A=READY", "WTS_2B=READY", "ALL=READY"]	2WTS	Tracks the commandability of the Waveguide Transfer Switches
X_TWTA[4]	"X_TWTA-A=WARM-UP", "X_TWTA-A=STANDBY", "X_TWTA-A=ACTIVE", "X_TWTA-B=WARM-UP", "X_TWTA-B=STANDBY", "X_TWTA-B=ACTIVE", "X_TWTA_A_STATE=STANDBY", "X_TWTA_A_STATE=ACTIVE", "X_TWTA_B_STATE=STANDBY", "X_TWTA_B_STATE=ACTIVE"	["X_TWTA-A=?","X_TWTA-B=?", "X_TWTA_A_STATE=STANDBY", "X_TWTA_B_STATE=STANDBY"]	2XTWTA	Tracks the transmission state of the X Band TWTAs

6.3 Array Attribute Elements in RFS Model

Attribute	Element Number	Element
ANTENNA[2]	1	"UPLINK"
	2	"DOWNLINK"
DST[6]	1	"NCO"
	2	"USO"
	3	"RMI"
	4	"RNG"
	5	"XEX"
	6	"DOR"
PS_DST[4]	1	"DSTALA"
	2	"DSTALB"
	3	"DSTBLA"
	4	"DSTBLB"
PS_TCU[4]	1	"TCUALA"
	2	"TCUALB"
	3	"TCUBLA"
	4	"TCUBLB"
PS_USO[1]	1	"PS_USO"
PS_X_TWTA[4]	1	"X_TWTALA"
	2	"X_TWTALB"

Attribute	Element Number	Element
	3	"X_TWTBLA"
	4	"X_TWTBLB"
RFIS[2]	1	"KA_TWTA"
	2	"S_REF"
RTI[2]	1	"RST"
	2	"TRN"
TCU[8]	1	"RAT"
	2	"COD"
	3	"TLM"
	4	"FRQ"
	5	"SUB"
	6	"TM3"
	7	"TM2"
	8	"TM1"
WTS[4]	1	"WTS_1A"
	2	"WTS_1B"
	3	"WTS_2A"
	4	"WTS_2B"
WTS_READY_STATE[5]	1	"WTS_1A"
	2	"WTS_1B"
	3	"WTS_2A"
	4	"WTS_2B"
	5	ALL

Attribute	Element Number	Element
X_TWTA[4]	1	"X_TWTA-A"
	2	"X_TWTA-B"
	3	"X_TWTA-A_STATE"
	4	"X_TWTA-B_STATE"

7. POWER AND PYROTECHNICS SUBSYSTEM (PPS)

7.1 Modeled Flight Rules

Fight Rules	Associated Commands	Associated Models and Attributes	Notes
FR04A1	4PS_PSU, 10PY_PMS, 12PY_ARWM_UNLA, 12PY_LG_PRB_DPLY, 12PY_MAG_BM_DPLY, 12PY_MEA_COVER, 12PY_SC_LV_SEP, 37PY_COVER, 74PY_COVER, 79PY_COVER, 80PY_PRB_SEP	PPS::PSU_CAPACITORS	
FR04C3	10PY_PMS, 12PY_ARWM_UNLAT, 12PY_LG_PRB_DPLY, 12PY_MAG_BM_DPLY, 12PY_SC_LV_SEP, 12PY_MEA_COVER, 37PY_COVER, 74PY_COVER, 79PY_COVER, 80PY_PRB_SEP	PPS::PYRO_FIRE_STATE	
FR04E6	6CE_PRM_PWR_OFF, 6CE_BKUP_PWR_OFF, 6PS_CDS, 7CE_BACKUPPWROFF, 7CE_PRIMEPWROFF, 7PS_AFC, 16CE_PRM_PWR_OFF, 16CE_BKUP_PWROFF, 16PS_SSR	PPS::CE_PRM_PWR_OFF_TIME, PPS::CE_BKUP_PWROFF_TIME	

Fight Rules	Associated Commands	Associated Models and Attributes	Notes
FR04E7	4EVENT_ENABLE, 4GPPS_SWAP, 4PYRO_CMD_DISA, 4PYRO_CMD_ENA, 4RESET, 4RTG_DIODE_BYP, 4RTG_DIODE_ISO, 4RT_CASE1_SHORT, 4RT_CASE2_SHORT, 4RT_CASE3_SHORT, 4RT_WDT_ST_CLR, 4UV_RESET	PPS::LAST_CMD_TIME	
FR04D10	80PS_PRB_PWR, 80PY_PRB_SEP	PPS::FIRED_PYROS, PROBE::PS_PROBE_PWR	
FR04C11	12PS_ATICUL_RWM, 12ARWM_POL_CCW, 12ARWM_POL_CW	DEV::ARWM_POL, DEV::PS_ATICUL_RWM	
FR04E14	2PS_TWTA, 2PS_DST, 2PS_TCU, 4PS_PYRO_ENA_RST	PPS::PS_PYRO_ENA_RST, RFS::PS_X_TWTA, RFS::PS_DST, RFS::PS_TCU	
FR04E16	4PS_PYRO_ENA_RST, 4EVENT_ENABLE	PPS::EVENT_ENABLE	
FR04B18	12PS_MEA_MOTR_A, 12PS_MEA_MOTR_B	DEV::PS_MEA_MOTR_A, DEV::PS_MEA_MOTR_B	
FR04D19	7POWER	AACS_POWER::POWER	
FR04B21	4PS_CASE_SHORT 4RT_CASE1_SHORT 4RT_CASE2_SHORT 4RT_CASE3_SHORT		

7.2 PPS Model Attributes

Attributes	Range	Default	Associated Commands	Description
CE_BKUP_PWROFF_TIME [6]	ALL	[1997-001T00:00:00.000,1997-001T00:00:00.000,1997-001T00:00:00.000,1997-001T00:00:00.000,1997-001T00:00:00.000,1997-001T00:00:00.000]	6CE_BKUP_PWR_OFF,7CE_BACKUPPWROFF,16CE_BKUP_PWROFF	Array for storing Enable and Disable times of commands: 6CE_BKUP_PWR_OFF,7CE_BACKUPPWROFF,16CE_BKUP_PWROFF
CE_PRM_PWR_OFF_TIME[6]	ALL	[1997-001T00:00:00.000,1997-001T00:00:00.000,1997-001T00:00:00.000,1997-001T00:00:00.000,1997-001T00:00:00.000,1997-001T00:00:00.000]	6CE_PRM_PWR_OFF,7CE_PRIMEPWROFF,16CE_PRM_PWR_OFF	Array for storing Enable and Disable times of commands: 6CE_PRM_PWR_OFF,7CE_PRIMEPWROFF,16CE_PRM_PWR_OFF

Attributes	Range	Default	Associated Commands	Description
EVENT_ENABLE[2]	"PPS_A=GRP1", "PPS_A=GRP2", "PPS_A=GRP3", "PPS_A=GRP4", "PPS_A=GRP5", "PPS_A=GRP6", "PPS_A=GRP7", "PPS_A=GRP8", "PPS_A=GRP9", "PPS_A=GRP10", "PPS_A=GRP11","PPS_A=GRP12", "PPS_A=GRP13", "PPS_A=GRP14", "PPS_A=GRP15", "PPS_A=GRP16", "PPS_A=GRP17", "PPS_A=GRP18", "PPS_A=GRP19", "PPS_A=GRP20", "PPS_A=GRP21", "PPS_A=GRP22", "PPS_A=GRP23", "PPS_A=GRP24", "PPS_A=GRP25", "PPS_A=GRP26", "PPS_A=DISABLED", "PPS_B=GRP1", "PPS_B=GRP2", "PPS_B=GRP3", "PPS_B=GRP4", "PPS_B=GRP5", "PPS_B=GRP6", "PPS_B=GRP7", "PPS_B=GRP8", "PPS_B=GRP9", "PPS_B=GRP10", "PPS_B=GRP11", "PPS_B=GRP12", "PPS_B=GRP13", "PPS_B=GRP14", "PPS_B=GRP15", "PPS_B=GRP16", "PPS_B=GRP17", "PPS_B=GRP18", "PPS_B=GRP19", "PPS_B=GRP20", "PPS_B=GRP21", "PPS_B=GRP22", "PPS_B=GRP23", "PPS_B=GRP24", "PPS_B=GRP25", "PPS_B=GRP26", "PPS_B=DISABLED"	["PPS_A=?","PPS_B=?"]	4EVENT_ENABLE	Tracks the group enables set in PPS-A and PPS-B

Attributes	Range	Default	Associated Commands	Description
FIRED_PYROS[43]	ALL	["PV1=NOT_FIRED", "PV2=NOT_FIRED", "PV3=NOT_FIRED", "PV4=NOT_FIRED", "PV5=NOT_FIRED", "PV6=NOT_FIRED", "PV7=NOT_FIRED", "PV8=NOT_FIRED", "PV9=NOT_FIRED", "PV10=NOT_FIRED", "PV11=NOT_FIRED","PV12=NOT_FIRED", "PV13=NOT_FIRED","PV14=NOT_FIRED", "PV15=NOT_FIRED","PV20=NOT_FIRED", "PV22=NOT_FIRED","PV23=NOT_FIRED", "PV24=NOT_FIRED","PV25=NOT_FIRED", "PV26=NOT_FIRED","PV27=NOT_FIRED", "PV28=NOT_FIRED","PV29=NOT_FIRED", "PV30=NOT_FIRED","PV31=NOT_FIRED", "PV32=NOT_FIRED","PV33=NOT_FIRED", "PV40=NOT_FIRED","PV41=NOT_FIRED", "PV2W=NOT_FIRED", "PV2Y=NOT_FIRED", "PV2Z=NOT_FIRED", "Mag_Boom=NOT_FIRED", "RWM_Unlatch=NOT_FIRED", "LG_Prb=NOT_FIRED", "MEA_Cover=NOT_FIRED", "LV_SC_Sep=NOT_FIRED", "VIMS_Cover=NOT_FIRED", "INMS_Cover=NOT_FIRED", "CDA_Cover=NOT_FIRED", "Probe_Sep=NOT_FIRED",""]	10PY_PMS, 12PY_ARWM_UNLAT, 12PY_LG_PRB_DPLY, 12PY_MAG_BM_DPLY, 12PY_SC_LV_SEP, 12PY_MEA_COVER, 37PY_COVER, 74PY_COVER, 79PY_COVER, 80PY_PRB_SEP	Tracks the S/C pyro events that have been fired
GPPS_SWAP	ALL	"LAST_GPPS_SWAP=NEVER"	4GPPS_SWAP	Tracks the General Purpose Power supplies being used by the PPS REUs
LAST_CMD_TIME	ALL	1997-279T00:00:00	ALL	To keep track of the time of all PPS commands
MEA_MOTR_A[2]	"OFF","ON"	["?","?"]	12PS_MEA_MOTR_A	Tracks the ON/OFF state of 12PS_MEA_MOTR_A in the S or D positions
MEA_MOTR_B[2]	"OFF","ON"	["?","?"]	12PS_MEA_MOTR_B	Tracks the ON/OFF state of 12PS_MEA_MOTR_A in the S or D positions

Attributes	Range	Default	Associated Commands	Description
PPSA_REU_TIME[2]	ALL	[1997-001T00:00:00.000, 1997-001T00:00:00.000]	4PS_REU	Array for storing the ON time of PPSA_REU. Only the first subscript of the array is used. The array is defined in this way because the FR06C29 subroutine requires a two dimensional array input
PPSB_REU_TIME[2]	ALL	[1997-001T00:00:00.000, 1997-001T00:00:00.000]	4PS_REU	Array for storing the ON time of PPSB_REU. Only the first subscript of the array is used. The array is defined in this way because the FR06C29 subroutine requires a two dimensional array input.
PS_CASE_SHORT	"PS_CASE_SHORT=OFF", "PS_CASE_SHORT=ON"	"PS_CASE_SHORT=?"	4PS_CASE_SHORT	Tracks the power state of the RTG case short relays
PS_GPPS	"PS_GPPS=ALA","PS_GPPS=ALB", "PS_GPPS=BLA", "PS_GPPS=BLB"	"PS_GPPS=?"	4PS_GPPS	Tracks the power state of the GPPSs
PS_PSU[2]	"PSU-A=ON","PSU-A=OFF", "PSU-B=ON", "PSU-B=OFF"	["PSU-A=?","PSU-B=?"]	4PS_PSU	Tracks the power states of the PSUs
PS_PSUI	"PS_PSUI=OFF","PS_PSUI=ON"	"PS_PSUI=?"	4PS_PSUI	Tracks the power state of the PSUI
PS_PYRO_ENABLE[2]	"PS_PYRO_ENABLE-A=ON", "PS_PYRO_ENABLE-A=OFF", "PS_PYRO_ENABLE-B=ON", "PS_PYRO_ENABLE-B=OFF"	["PS_PYRO_ENABLE-A=?", "PS_PYRO_ENABLE-B=?"]	4PS_PYRO_ENABLE	Tracks the power state of the group enable relays
PS_PYRO_ENA_RST[4]	"PS_PYRO_ENA_RST-ALA=ON", "PS_PYRO_ENA_RST-ALA=OFF", "PS_PYRO_ENA_RST-ALB=ON", "PS_PYRO_ENA_RST-ALB=OFF", "PS_PYRO_ENA_RST-BLA=ON", "PS_PYRO_ENA_RST-BLA=OFF", "PS_PYRO_ENA_RST-BLB=ON", "PS_PYRO_ENA_RST-BLB=OFF"	["PS_PYRO_ENA_RST-ALA=?", "PS_PYRO_ENA_RST-ALB=?", "PS_PYRO_ENA_RST-BLA=?", "PS_PYRO_ENA_RST-BLB=?"]	4PS_PYRO_ENA_RST	Tracks the power state of the group enable reset relays

Attributes	Range	Default	Associated Commands	Description
PS_REU[4]	"PS_REU-A1=ON", "PS_REU-A1=NOT_SET", "PS_REU-A2=ON", "PS_REU-A2=NOT_SET", "PS_REU-B1=ON", "PS_REU-B1=NOT_SET", "PS_REU-B2=ON", "PS_REU-B2=NOT_SET"	["PS_REU-A1=?", "PS_REU-A2=?", "PS_REU-B1=?", "PS_REU-B2=?"]	4PS_REU	Tracks the power state of the PPS REUs
psu	"A", "B", "INVALID"	"INVALID"	4EVENT_ENABLE, 4PYRO_CMD_ENA, 4PYRO_CMD_DISA, 10PY_PMS, 12PY_ARWM_UNLAT, 12PY_LG_PRB_DPLY, 12PY_MAG_BM_DPLY, 12PY_SC_LV_SEP, 12PY_MEA_COVER, 37PY_COVER, 74PY_COVER, 79PY_COVER, 80PY_PRB_SEP	Determines the routing of certian PPS commands
PSU_CAPACITORS[2]	"PSU_CAP_A=DISCHARGED", "PSU_CAP_A=CHARGING", "PSU_CAP_A=CHARGED", "PSU_CAP_A=DISCHARGING", "PSU_CAP_B=DISCHARGED", "PSU_CAP_B=CHARGING", "PSU_CAP_B=CHARGED", "PSU_CAP_B=DISCHARGING"	["PSU_CAP_A=?","PSU_CAP_B=?"]	4PS_PSU	Tracks the charge state of the pyro fire capacitors
PYRO_CMD_ENABLE[2]	"PSU_A_PYRO_CMDS=ENABLED", "PSU_A_PYRO_CMDS=DISABLED", "PSU_B_PYRO_CMDS=ENABLED", "PSU_B_PYRO_CMDS=DISABLED"	["PSU_A_PYRO_CMDS=?", "PSU_B_PYRO_CMDS=?"]	4PYRO_CMD_ENABLE	Tracks the pyro fire command accept/reject flag in CDS
PYRO_ENA_RST_ON	ALL	1997-279T00:00:00	4PS_PYRO_ENA_RST	Tracks the 4PS_PYRO_ENA_RST ON time

Attributes	Range	Default	Associated Commands	Description
PYRO_FIRE_STATE[2]	"NOT_FIRED", "FIRED"	["NOT_FIRED","NOT_FIRED"]	10PY_PMS, 12PY_ARWM_UNLAT, 12PY_LG_PRB_DPLY, 12PY_MAG_BM_DPLY, 12PY_SC_LV_SEP, 12PY_MEA_COVER, 37PY_COVER, 74PY_COVER, 79PY_COVER, 80PY_PRB_SEP	Tracks the time a pyro event occurs in each PPS
RESET	ALL	"LAST_PPS_RESET=NEVER"	4RESET	The time of last PPS reset
RTG_CASE_SHORT[3]	"RTG1=ISOLATED", "RTG1=SHORTED", "RTG2=ISOLATED", "RTG2=SHORTED", "RTG3=ISOLATED", "RTG3=SHORTED"	["RTG1=?","RTG2=?","RTG3=?"]	4RT_CASE1_SHORT, 4RT_CASE2_SHORT, 4RT_CASE2_SHORT	Tracks the shorted/isolated state of the RTG cases
RTG_CASE_SHORT_TIME	ALL	1997-279T00:00:00	4RT_CASE1_SHORT, 4RT_CASE2_SHORT, 4RT_CASE2_SHORT	To keep track of the time of 4RT_CASE1_SHORT, 4RT_CASE2_SHORT, 4RT_CASE2_SHORT
RTG_ISO_DIODES[3]	"RTG1_ISO_DIODE=BYPASS", "RTG1_ISO_DIODE=IN_USE", "RTG2_ISO_DIODE=BYPASS", "RTG2_ISO_DIODE=IN_USE", "RTG3_ISO_DIODE=BYPASS", "RTG3_ISO_DIODE=IN_USE"	["RTG1_ISO_DIODE=?", "RTG2_ISO_DIODE=?", "RTG3_ISO_DIODE=?"]	4RTG_DIODE_BYP, 4RTG_DIODE_ISO	Tracks the state of the RTG case isolation diodes
UV_RESET	ALL	"LAST_UV_PPS_RESET=NEVER"	4UV_RESET	Tracks the time of the last Under Voltage Reset

7.3 Array Attribute Elements in PPS Model

Attribute	Element Number	Element
EVENT_ENABLE[2]	1	"PPS_A"
	2	"PPS_B"
FIRED_PYROS[43]	1	"PV1"
	2	"PV2"
	3	"PV3"
	4	"PV4"
	5	"PV5"
	6	"PV6"
	7	"PV7"
	8	"PV8"
	9	"PV9"
	10	"PV10"
	11	"PV11"
	12	"PV12"
	13	"PV13"
	14	"PV14"
	15	"PV15"
	16	"PV20"

Attribute	Element Number	Element
	17	"PV22"
	18	"PV23"
	19	"PV24"
	20	"PV25"
	21	"PV26"
	22	"PV27"
	23	"PV28"
	24	"PV29"
	25	"PV30"
	26	"PV31"
	27	"PV32"
	28	"PV33"
	29	"PV40"
	30	"PV41"
	31	"PV2W"
	32	"PV2Y"
	33	"PV2Z"
	34	"Mag_Boom"
	35	"RWM_Unlatch"
	36	"LG_Prb"
	37	"MEA_Cover"
	38	"LV_SC_Sep"
	39	"VIMS_Cover"

Attribute	Element Number	Element
	40	"INMS_Cover"
	41	"CDA_Cover"
	42	"Probe_Sep"
	43	"PV10_22", "PV11_23", "PV12_24", "PV13_25", "PV14_26", "PV15_27", "PV2Y_31", "PV2Z_32", "INVALID", "PV"
MEA_MOTR_A[2]	1	"D"
	2	"S"
MEA_MOTR_B[2]	1	"D"
	2	"S"
PS_PSU[2]	1	"PSU-A"
	2	"PSU-B"
PS_PYRO_ENABLE[2]	1	"PS_PYRO_ENABLE-A"
	2	"PS_PYRO_ENABLE-B"
PS_PYRO_ENA_RST[4]	1	"PS_PYRO_ENA_RST-ALA"
	2	"PS_PYRO_ENA_RST-ALB"
	3	"PS_PYRO_ENA_RST-BLA"
	4	"PS_PYRO_ENA_RST-BLB"
PS_REU[4]	1	"PS_REU-A1"
	2	"PS_REU-A2"
	3	"PS_REU-B1"
	4	"PS_REU-B2"
PSU_CAPACITORS[2]	1	"PSU_CAP_A"
	2	"PSU_CAP_B"

Attribute	Element Number	Element
PYRO_CMD_ENABLE[2]	1	"PSU_A_PYRO_CMDS"
	2	"PSU_B_PYRO_CMDS"
PYRO_FIRE_STATE[2]	1	"A"
	2	"B"
RTG_CASE_SHORT[3]	1	"RTG1"
	2	"RTG2"
	3	"RTG3"
RTG_ISO_DIODES[3]	1	"RTG1_ISO_DIODE"
	2	"RTG2_ISO_DIODE"
	3	"RTG3_ISO_DIODE"

8. COMMAND AND DATA SUBSYSTEM (CDS)

8.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR06B2	6CE_RESET, 6GND_RESET		
FR06B4	6PS_CDS	CDS::NonVolatile_CRC	
FR06E5	6CE_SSR_SEL	CDS::CRC	
FR06B6	6CE_SUROM_EDAC, 6CE_XBA_BC_LOCK, 6CE_XBA_BC_SWAP, 6CE_XBA_DISCRETE		
FR06B10	6CE_TIME_UPDATE, 6SET_TIME	CDS::CE_TIME_UPDATE, CDS::tud_index	
FR06B13	6CE_SSR_DFLT_GRP, 6CE_SSR_GRP_EQV, 6PS_CDS	CDS::CE_SSR_DLT_GRP, CDS::CE_SSR_GRP_EQV, CDS::CE_SSR_DLT_GRP_A, CDS::CE_SSR_DLT_GRP_B, CDS::CE_SSR_GRP_EQV_A, CDS::CE_SSR_GRP_EQV_B, CDS::PS_CDS_A, CDS::PS_CDS_B	
FR06D29	4PS_REU, 6PS_EU, 6PS_PMS_REU, 6PS_RSP_REU, 6REU_LOAD	CDS::PS_EUA_ONOFF_TIME, CDS::PS_EUB_ONOFF_TIME, CDS::PS_PMSA_ONOFF_TIME, CDS::PS_PMSB_ONOFF_TIME, CDS::PS_RSPA_ONOFF_TIME, PPS::PS_REU_A_ONOFF_TIME, PPS::PS_REU_B_ONOFF_TIME	
FR06D30	6PS_EU, 6PS_PMS_REU, 6PS_RSP_REU, 6REU_LOAD	CDS::PS_EUA_ONOFF_TIME, CDS::PS_EUB_ONOFF_TIME, CDS::PS_PMSA_ONOFF_TIME, CDS::PS_PMSB_ONOFF_TIME, CDS::PS_RSPA_ONOFF_TIME, PPS::PS_REU_A_ONOFF_TIME, PPS::PS_REU_B_ONOFF_TIME	
FR06E33	6RT_WPFNC_CDS, 6RT_WPFNC_EU, 6RT_WPFNC_PMS, 6RT_WPFNC_PPS, 6RT_WPFNC_RSP, 7RT_WPINH_CTL,		

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
	7RT_WRITE_PROTEC 35RT_WPFNC_MAG, 36RT_WPFNC_NAC, 36RT_WPFNC_WAC, 37RT_WPFNC_VIMS, 73RT_WPFNC_RPWS, 74RT_WPFNC_INMS, 76RT_WPFNC_MIMI, 79RT_WPFNC_CDA, 80RT_WPFNC_PSAA, 80RT_WPFNC_PSAB, 81RT_WPFNC_RADAR, 82RT_WPFNC_CAPS, 84RT_WPFNC_UVIS, 89RT_WPFNC_CIRS		
FR06D34	6ESCR_REUERR_EU, 6ESCR_REUERR_PMS, 6ESCR_REUERR_PPS, 6ESCR_REUERR_RSP, 4RT_WDT_ST_CLR, 6RT_WDTERR_CDS, 6RT_WDTERR_EU, 6RT_WDTERR_PMS, 6RT_WDTERR_PPS, 6RT_WDTERR_RSP, 6RT_WPERR_CDS, 6RT_WPERR_EU, 6RT_WPERR_PMS, 6RT_WPERR_PPS, 6RT_WPERR_RSP,7RT_WDTERR_CTL, 7RT_WPERR_CTL, 35RT_WDTERR_MAG, 35RT_WPERR_MAG, 36RT_WDTERR_NAC, 36RT_WDTERR_WAC, 36RT_WPERR_NAC, 36RT_WPERR_WAC, 37RT_WDTERR_VIMS, 37RT_WPERR_VIMS, 73RT_WDTERR_RPWS, 73RT_WPERR_RPWS, 74RT_WDTERR_INMS,		

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
	74RT_WPERR_INMS, 76RT_WDTERR_MIMI, 76RT_WPERR_MIMI, 79RT_WDTERR_CDA, 79RT_WPERR_CDA, 80RT_WDTERR_PSAA, 80RT_WDTERR_PSAB, 80RT_WPERR_PSAA, 80RT_WPERR_PSAB, 81RT_WDTERR_RADAR, 81RT_WPERR_RADAR, 82RT_WDTERR_CAPS, 82RT_WPERR_CAPS, 84RT_WDTERR_UVIS, 84RT_WPERR_UVIS, 89RT_WDTERR_CIRS, 89RT_WPERR_CIRS		
FR06A36	All Non-PPS Commands	GLOBAL::All_Non_PPS_Cmd_Count, GLOBAL::Non_PPS_Cmd_Count, GLOBAL::Last_Non_PPS_Cmd_Time	
FR06B38	6SSR_CONFIG, 6SSR_DFLT_CONFIG, 6SSR_PING_PONG	CDS::SSR_PARTITION_STATE[6]	
FR06B39	6SSR_CONFIG, 6SSR_DFLT_CONFIG, 6SSR_PRI_PLYBK	CDS::SSR_PARTITION_STATE[6]	
FR06B40	6SSR_CONFIG, 6SSR_DFLT_CONFIG	CDS::CHG_SC_TM_IMM	
FR06B45	6CFP_FIL_CNTL	CDS::SSPS_Mon_and_Resp	
FR06E47	6PATCH		
FR06E51	6SSR_WRT_PROTECT		
FR06E53	6SET_CMP_STATS		
FR06B61	6POLY_NP	CDS::POLY_NP_Cmd_Count, CDS::Last_6POLY_NP_Cmd_Time	

8.2 Model Attributes

8.2.1 CDS Model Attributes

Attributes	Range	Default	Associated Commands	Description
ATC_CNTL[12]	"ATC_1=ENABLE", "ATC_2=ENABLE", "ATC_3=ENABLE", "ATC_4=ENABLE", "ATC_5=ENABLE", "ATC_6=ENABLE", "ATC_7=ENABLE", "ATC_8=ENABLE", "ATC_9=ENABLE", "ATC_10=ENABLE", "ATC_11=ENABLE", "ATC_12=ENABLE", "ATC_1=DISABLE", "ATC_2=DISABLE", "ATC_3=DISABLE", "ATC_4=DISABLE", "ATC_5=DISABLE", "ATC_6=DISABLE", "ATC_7=DISABLE", "ATC_8=DISABLE", "ATC_9=DISABLE", "ATC_10=DISABLE", "ATC_11=DISABLE", "ATC_12=DISABLE"	["ATC_1=?", "ATC_2=?", "ATC_3=?", "ATC_4=?", "ATC_5=?", "ATC_6=?", "ATC_7=?", "ATC_8=?", "ATC_9=?", "ATC_10=?", "ATC_11=?", "ATC_12=?"]	6ATC_CNTL	To keep track of the state set by the command 6ATC_CNTL.
ATC_CNTL_TIME[24]	ALL	[1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000,	6ATC_CNTL	To keep track of the ATC time.

Attributes	Range	Default	Associated Commands	Description
		1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000]		
CDS_Function	"", "6MRO_SSR", "6SSR_MLD_REPAIR", "6SSR_MLD_COPY", "6SSR_MLD_VERIFY"	"?"	6SSR_PASS_CMD_P, 6MRO_SSR, 6SSR_MLD_REPAIR, 6SSR_MLD_COPY, 6SSR_MLD_VERIFY	To keep track of the which CDS Function are operation.
CDS_Function_Time	ALL	1997-001T0:0:0.000	6SSR_PASS_CMD_P, 6MRO_SSR, 6SSR_MLD_REPAIR, 6SSR_MLD_COPY, 6SSR_MLD_VERIFY	Time at which CDS Function stored in CDS_Function was initiated.
CE_RESET	TRUE, FALSE	FALSE	6CE_RESET	To keep track if VC0 reset.
CE_RESET_TYPE	TRUE, FALSE	FALSE	6CE_RESET_TYPE	To keep track if the command 6CE_RESET_TYPE was used.
CE_SSR_DFLT_GRP	"GROUP0", "GROUP1"	"GROUP0"	6CE_SSR_DFLT_GRP	To keep track of the state set by the command 6CE_SSR_DFLT_GRP.
CE_SSR_DFLT_GRP_A	"GROUP0", "GROUP1"	"GROUP0"	6PS_CDS, 6CE_SSR_DFLT_GRP	To keep track of the state SSR default group of A.
CE_SSR_DFLT_GRP_B	"GROUP0", "GROUP1"	"GROUP0"	6PS_CDS, 6CE_SSR_DFLT_GRP	To keep track of the state SSR default group of B.
CE_SSR_GRP_EQV	"NOEQIV", "EQIV"	"NOEQIV"	6CE_SSR_GRP_EQV	To keep track of the state set by the command 6CE_SSR_GRP_EQV.
CE_SSR_GRP_EQV_A	"NOEQIV", "EQIV"	"NOEQIV"	6PS_CDS, 6CE_SSR_GRP_EQV	To keep track of the state SSR group equiv of A.

Attributes	Range	Default	Associated Commands	Description
CE_SSR_GRP_EQV_B	"NOEQIV", "EQIV"	"NOEQIV"	6PS_CDS, 6CE_SSR_GRP_EQV	To keep track of the state SSR group equiv of B.
CE_TIME_UPDATE	"DISABLE", "ENABLE", "?"	["?","?"]	6CE_TIME_UPDATE	To keep track of the state set by the command 6CE_TIME_UPDATE.
CE_XBA_DISCRETE	"DISABLE", "ENABLE"	"?"	6CE_XBA_DISCRETE	To keep track of the state set by the command 6CE_XBA_DISCRETE.
CHG_SC_TM_DIR	TRUE,FALSE	FALSE	6CHG_SC_TM_DIR	True if hex value in most recent 6CHG_SC_TM_DIR command is legal.
CHG_SC_TM_IMM	"TLM_MODE=S_N_ER_3", etc., any valid mode in command.	"TLM_MODE=?"	6CHG_SC_TM_IMM	Mode set by the command 6CHG_SC_TM_IMM.
EXT_MEM_LOAD_DEVICE	"CAPS" ,"CDA", "CIRS", "INMS", "NAC", "WAC", "MAG", "MIMI", "RADAR", "RPWS", "UVIS", "VIMS"	"?"	6EXT_MEM_LOAD	To keep track of the device being loaded.
EXT_MEM_LOAD_TIME[12]	ALL	[1997-001T0:0:0.000,1997-001T0:0:0.000,1997-001T0:0:0.000,1997-001T0:0:0.000,1997-001T0:0:0.000,1997-001T0:0:0.000,1997-001T0:0:0.000,1997-001T0:0:0.000,1997-001T0:0:0.000,1997-001T0:0:0.000,1997-001T0:0:0.000,1997-001T0:0:0.000]	6EXT_MEM_LOAD	TO keeip the times when 6EXT_MEM_LOAD is in use
Global300_321[22]	0…7FFF	[0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0]	6ASSIGN_NP	Contents of GV 300-321, telemetry modes in hex.
GND_RESET	TRUE, FALSE	FALSE	6GND_RESET, 6CE_RESET_TYPE	True iff most recent of (6GND_RESET,6CE_RESET_TYPE (WARMBOOT,WARMBOOT)) was 6GND_RESET. Constraint 1.0
Last_6POLY_NP_Cmd_Time	ALL	1997-001T00:00:00.000	6POLY_NP	Last time 6POLY_NP was issued.
NonVolatile_CRC[24]	ALL	["10CE_PYRO_SET1=?", "6CE_FORCE_RAM=?", "6CE_PRM_PWR_OFF=?", "6CE_BKUP_PWR_OFF=?", "4CE_REUA_CLAMP=?", "7CE_ISB_MASTER_A=?", "7CE_BC_A=?", "4CE_DST_POR1=?", "10CE_PR2=?",	10CE_PYRO_SET1, 6CE_FORCE_RAM, 6CE_PRM_PWR_OFF, 6CE_BKUP_PWR_OFF, 4CE_REUA_CLAMP, 7CE_ISB_MASTER_A, 7CE_BC_A, 4CE_DST_POR1,	To keep track of the state nonvolatile critical controller.

Attributes	Range	Default	Associated Commands	Description
		"10CE_PYRO_SET2=?", "7CE_PRIMEPWROFF=?", "7CE_BACKUPPWROFF=?", "4CE_REUB_CLAMP=?", "7CE_ISB_MASTER_B=?", "7CE_BC_B=?", "4CE_DST_POR2=?", "10CE_HPLV=?", "10CE_REA_ISO=?", "10CE_REA_LV_BYPS=?", "12CE_MAG_BM_DPLY=?", "80CE_PRB_SEP=?", "16CE_PRM_PWR_OFF=?", "16CE_BKUP_PWROFF=?", "6CE_SPARE55=?"]	10CE_PR2, 10CE_PYRO_SET2, 7CE_PRIMEPWROFF, 7CE_BACKUPPWROFF, 4CE_REUB_CLAMP, 7CE_ISB_MASTER_B, 7CE_BC_B, 4CE_DST_POR2, 10CE_HPLV, 10CE_REA_ISO, 10CE_REA_LV_BYPS, 12CE_MAG_BM_DPLY, 80CE_PRB_SEP, 16CE_PRM_PWR_OFF, 16CE_BKUP_PWROFF, 6CE_SPARE55	
POLY_NP_Cmd_Count	All non-negative	0	6POLY_NP	Number of 6POLY_NP commands so far in current second.
PS_CDS_A	"ON", "OFF"	"?"	6PS_CDS	To keep track of the power state of CDS A
PS_CDS_B	"ON", "OFF"	"?"	6PS_CDS	To keep track of the power state of CDS B
PS_CDS[4]	"CDSAPR=ON", "CDSABK=ON", "CDSBPR=ON", "CDSBBK=ON", "CDSAPR=OFF", "CDSABK=OFF", "CDSBPR=OFF", "CDSBBK=OFF"	["CDSAPR=?", "CDSABK=?", "CDSBPR=?", "CDSBBK=?"]	6PS_CDS	To keep track of the power state of CDS.
PS_CDSA_ONOFF_TIME	ALL	1997-001T00:00:00.000	6PS_CDS	To keep track of the REU time of ON and OFF.
PS_CDSB_ONOFF_TIME	ALL	1997-001T00:00:00.000	6PS_CDS	To keep track of the REU time of ON and OFF.
PS_EUA_ONOFF_TIME	ALL	1997-001T00:00:00.000	6PS_EU	To keep track of the REU time of ON and OFF.
PS_EUB_ONOFF_TIME	ALL	1997-001T00:00:00.000	6PS_EU	To keep track of the REU time of ON and OFF.
PS_PMS_REU[2]	"PMSA=ON", "PMSA=OFF", "PMSB=ON", "PMSB=OFF"	["?","?"]	6PS_PMS_REU	To keep track of the state set by the command 6PS_PMS_REU.

Attributes	Range	Default	Associated Commands	Description
PS_PMSA_REU_ONOFF_TIME	ALL	1997-001T00:00:00.000	6PS_PMS	To keep track of the REU time of ON and OFF.
PS_PMSB_REU_ONOFF_TIME	ALL	1997-001T00:00:00.000	6PS_PMS	To keep track of the REU time of ON and OFF.
PS_RSPA_REU_ONOFF_TIME	ALL	1997-001T00:00:00.000	6PS_RSP	To keep track of the REU time of ON and OFF.
PS_RSPB_REU_ONOFF_TIME	ALL	1997-001T00:00:00.000	6PS_RSP	To keep track of the REU time of ON and OFF.
SSPS_Mon_and_Resp	“DISABLE”,”ENABLE”	”ENABLE”	6CFP_FIL_CNTL	SSPS Monitor and Response selection.
SSR_FeedThru	ALL	0.00	6SSR_PASS_CMD_P, 6SSR_PASS_CMD_NP	To keep count of number SSR Feedthrough commands.
SSR_PARTITION_STATE[6]	“DEFINED”, “UNDEFINED”, “?”	["?","?","?","?","?","?"]	6SSR_CONFIG, 6SSR_DFLT_CONFIG	Keep track of status of SSR partitions

8.2.2 CDS_CE Model Attributes

Attributes	Range	Default	Associated Commands	Description
CRC[48]	"6CE_MASK0=MASK", "6CE_MASK1=MASK", "6CE_MASK2=MASK", "6CE_MASK3=MASK", "6CE_MASK4=MASK", "6CE_MASK5=MASK", "6CE_MASK6=MASK", "6CE_MASK7=MASK", "6CE_MASK8=MASK", "6CE_MASK9=MASK", "6CE_MASK10=MASK", "6CE_MASK11=MASK", "6CE_MASK12=MASK", "6CE_MASK13=MASK", "6CE_MASK14=MASK", "6CE_MASK15=MASK", "6CE_MASK16=MASK", "6CE_MASK17=MASK", "6CE_MASK18=MASK", "6CE_MASK19=MASK", "6CE_MASK20=MASK", "6CE_MASK21=MASK", "6CE_MASK22=MASK", "6CE_MASK23=MASK", "6CE_MASK32=MASK", "6CE_MASK33=MASK", "6CE_MASK34=MASK", "6CE_MASK35=MASK", "6CE_MASK36=MASK", "6CE_MASK37=MASK", "6CE_MASK38=MASK", "6CE_MASK39=MASK", "6CE_MASK40=MASK", "6CE_MASK41=MASK", 6CE_MASK42=MASK",	"6CE_MASK0=?", "6CE_MASK1=?", "6CE_MASK2=?", "6CE_MASK3=?", "6CE_MASK4=?", "6CE_MASK5=?", "6CE_MASK6=?", "6CE_MASK7=?", "6CE_MASK8=?", "6CE_MASK9=?", "6CE_MASK10=?", "6CE_MASK11=?", "6CE_MASK12=?", "6CE_MASK13=?", "6CE_MASK14=?", "6CE_MASK15=?", "6CE_MASK16=?", "6CE_MASK17=?", "6CE_MASK18=?", "6CE_MASK19=?", "6CE_MASK20=?", "6CE_MASK21=?", "6CE_MASK22=?", "6CE_MASK23=?", "6CE_MASK32=?", "6CE_MASK33=?", "6CE_MASK34=?", "6CE_MASK35=?", "6CE_MASK36=?", "6CE_MASK37=?", "6CE_MASK38=?", "6CE_MASK39=?", "6CE_MASK40=?", "6CE_MASK41=?", "6CE_MASK42=?", "6CE_MASK43=?", "6CE_MASK44=?", "6CE_MASK45=?", "6CE_MASK46=?", "6CE_MASK47=?", "6CE_MASK48=?", "6CE_MASK49=?", "6CE_MASK50=?", "6CE_MASK51=?", "6CE_MASK52=?", "6CE_MASK53=?", "6CE_MASK54=?", "6CE_MASK55=?"	6CE_MASK0, 6CE_MASK1, 6CE_MASK10, 6CE_MASK11, 6CE_MASK12, 6CE_MASK13, 6CE_MASK14, 6CE_MASK15, 6CE_MASK16, 6CE_MASK17, 6CE_MASK18, 6CE_MASK19, 6CE_MASK2, 6CE_MASK20, 6CE_MASK21, 6CE_MASK22, 6CE_MASK23, 6CE_MASK3, 6CE_MASK32, 6CE_MASK33, 6CE_MASK34, 6CE_MASK35, 6CE_MASK36, 6CE_MASK37, 6CE_MASK38, 6CE_MASK39, 6CE_MASK4, 6CE_MASK40, 6CE_MASK41, 6CE_MASK42, 6CE_MASK43, 6CE_MASK44, 6CE_MASK45, 6CE_MASK46, 6CE_MASK47,6CE_MASK48, 6CE_MASK49, 6CE_MASK5, 6CE_MASK50, 6CE_MASK51, 6CE_MASK52 6CE_MASK53,	CRC bits Mask Status

Attributes	Range	Default	Associated Commands	Description
	"6CE_MASK43=MASK", "6CE_MASK44=MASK", "6CE_MASK48=MASK", "6CE_MASK49=MASK", "6CE_MASK50=MASK", "6CE_MASK51=MASK", "6CE_MASK52=MASK", "6CE_MASK53=MASK", "6CE_MASK54=MASK", "6CE_MASK55=MASK", "6CE_MASK0=NOMASK", "6CE_MASK1=NOMASK", "6CE_MASK2=NOMASK", "6CE_MASK3=NOMASK", "6CE_MASK4=NOMASK", "6CE_MASK5=NOMASK", "6CE_MASK6=NOMASK", "6CE_MASK7=NOMASK", "6CE_MASK8=NOMASK", "6CE_MASK9=NOMASK", "6CE_MASK10=NOMASK", "6CE_MASK11=NOMASK", "6CE_MASK12=NOMASK", "6CE_MASK13=NOMASK", "6CE_MASK14=NOMASK", "6CE_MASK15=NOMASK", "6CE_MASK16=NOMASK", "6CE_MASK17=NOMASK", "6CE_MASK18=NOMASK", "6CE_MASK19=NOMASK", "6CE_MASK20=NOMASK", "6CE_MASK21=NOMASK", "6CE_MASK22=NOMASK", "6CE_MASK23=NOMASK", "6CE_MASK32=NOMASK", "6CE_MASK33=NOMASK", "6CE_MASK34=NOMASK", "6CE_MASK35=NOMASK", "6CE_MASK36=NOMASK", "6CE_MASK37=NOMASK",		6CE_MASK54, 6CE_MASK55, 6CE_MASK6, 6CE_MASK7, 6CE_MASK8, 6CE_MASK9	

Attributes	Range	Default	Associated Commands	Description
	"6CE_MASK38=NOMASK", "6CE_MASK39=NOMASK", "6CE_MASK40=NOMASK", "6CE_MASK41=NOMASK", "6CE_MASK42=NOMASK", "6CE_MASK43=NOMASK", "6CE_MASK44=NOMASK", "6CE_MASK45=NOMASK", "6CE_MASK46=NOMASK", "6CE_MASK47=NOMASK", "6CE_MASK48=NOMASK", "6CE_MASK49=NOMASK", "6CE_MASK50=NOMASK", "6CE_MASK51=NOMASK", "6CE_MASK52=NOMASK", "6CE_MASK53=NOMASK", "6CE_MASK54=NOMASK", "6CE_MASK55=NOMASK"			

8.2.3 CDS_SC_DEV_STATUS Model Attributes

Attributes	Range	Default	Associated Commands	Description
EXISTENCE[38]	"AACS_AFC_A=DEAD","AACS_AFC_B=DEAD","CDS_A=DEAD","CDS_B=DEAD","EU_A=DEAD","EU_B=DEAD","RSP_A=DEAD","RSP_B=DEAD","PPS_A=DEAD","PPS_B=DEAD","PSA_A=DEAD","PSA_B=DEAD","RFS_TCU_A=DEAD","RFS_TCU_B=DEAD","PMS_A=DEAD","PMS_B=DEAD","CAPS=DEAD","CDA=DEAD","CIRS=DEAD","INMS=DEAD","NAC=DEAD","WAC=DEAD","MAG=DEAD","MIMI=DEAD","RADAR=DEAD","RPWS=DEAD","UVIS=DEAD","VIMS=DEAD","SSR_A=DEAD","SSR_B=DEAD","BUS_A=DEAD","BUS_B=DEAD","RFS_DST_A=DEAD","RFS_DST_B=DEAD","RFS_TWTA_A=DEAD","RFS_TWTA_B=DEAD","REGULATOR_A=DEAD","REGULATOR_B=DEAD","AACS_AFC_A=ALIVE","AACS_AFC_B=ALIVE","CDS_A=ALIVE","CDS_B=ALIVE","EU_A=ALIVE","EU_B=ALIVE","RSP_A=ALIVE","RSP_B=ALIVE","PPS_A=ALIVE","PPS_B=ALIVE","PSA_A=ALIVE","PSA_B=ALIVE","RFS_TCU_A=ALIVE","RFS_TCU_B=ALIVE","PMS_A=ALIVE","PMS_B=ALIVE","CAPS=ALIVE","CDA=ALIVE","CIRS=ALIVE","INMS=ALIVE","NAC=ALIVE","WAC=ALIVE","MAG=ALIVE","MIMI=ALIVE","RADAR=ALIVE","RPWS=ALIVE","UVIS=ALIVE","VIMS=ALIVE","SSR_A=ALIVE","SSR_B=ALIVE","BUS_A=ALIVE","BUS_B=ALIVE","RFS_DST_A=ALIVE","RFS_DST_B=ALIVE","RFS_TWTA_A=ALIVE","RFS_TWTA_B=ALIVE","REGULATOR_A=ALIVE","REGULATOR_B=ALIVE"	["AACS_AFC_A=?", "AACS_AFC_B=?", "CDS_A=?", "CDS_B=?", "EU_A=?", "EU_B=?", "RSP_A=?", "RSP_B=?" "PPS_A=?", "PPS_B=?", "PSA_A=?", "PSA_B=?", "RFS_TCU_A=?", "RFS_TCU_B=?", "PMS_A=?", "PMS_B=?", "CAPS=?", "CDA=?", "CIRS=?", "INMS=?", "NAC=?", "WAC=?", "MAG=?", "MIMI=?", "RADAR=?", "RPWS=?", "UVIS=?", "VIMS=?", "SSR_A=?", "SSR_B=?", "BUS_A=?", "BUS_B=?", "RFS_DST_A=?", "RFS_DST_B=?", "RFS_TWTA_A=?", "RFS_TWTA_B=?", "REGULATOR_A=?", "REGULATOR_B=?"]	6SET_SC_DEV_STAT	Tracks the existence of a device specified in the 6SET_SC_DEV_STAT command.

Attributes	Range	Default	Associated Commands	Description
PRIME[38]	"AACS_AFC_A=BACKUP","AACS_AFC_B=BACKUP","CDS_A=BACKUP","CDS_B=BACKUP","EU_A=BACKUP","EU_B=BACKUP","RSP_A=BACKUP","RSP_B=BACKUP","PPS_A=BACKUP","PPS_B=BACKUP","PSA_A=BACKUP","PSA_B=BACKUP","RFS_TCU_A=BACKUP","RFS_TCU_B=BACKUP","PMS_A=BACKUP","PMS_B=BACKUP","CAPS=BACKUP","CDA=BACKUP","CIRS=BACKUP","INMS=BACKUP","NAC=BACKUP","WAC=BACKUP","MAG=BACKUP","MIMI=BACKUP","RADAR=BACKUP","RPWS=BACKUP","UVIS=BACKUP","VIMS=BACKUP","SSR_A=BACKUP","SSR_B=BACKUP","BUS_A=BACKUP","BUS_B=BACKUP","RFS_DST_A=BACKUP","RFS_DST_B=BACKUP","RFS_TWTA_A=BACKUP","RFS_TWTA_B=BACKUP","REGULATOR_A=BACKUP","REGULATOR_B=BACKUP","AACS_AFC_A=PRIME","AACS_AFC_B=PRIME","CDS_A=PRIME","CDS_B=PRIME","EU_A=PRIME","EU_B=PRIME","RSP_A=PRIME","RSP_B=PRIME","PPS_A=PRIME","PPS_B=PRIME","PSA_A=PRIME","PSA_B=PRIME","RFS_TCU_A=PRIME","RFS_TCU_B=PRIME","PMS_A=PRIME","PMS_B=PRIME","CAPS=PRIME","CDA=PRIME","CIRS=PRIME","INMS=PRIME","NAC=PRIME","WAC=PRIME","MAG=PRIME","MIMI=PRIME","RADAR=PRIME","RPWS=PRIME","UVIS=PRIME","VIMS=PRIME","SSR_A=PRIME","SSR_B=PRIME","BUS_A=PRIME","BUS_B=PRIME","RFS_DST_A=PRIME","RFS_DST_B=PRIME","RFS_TWTA_A=PRIME","RFS_TWTA_B=PRIME","REGULATOR_A=PRIME","REGULATOR_B=PRIME"	["AACS_AFC_A=?", "AACS_AFC_B=?", "CDS_A=?", "CDS_B=?", "EU_A=?", "EU_B=?", "RSP_A=?", "RSP_B=?" "PPS_A=?", "PPS_B=?", "PSA_A=?", "PSA_B=?", "RFS_TCU_A=?", "RFS_TCU_B=?", "PMS_A=?", "PMS_B=?", "CAPS=?", "CDA=?", "CIRS=?", "INMS=?", "NAC=?", "WAC=?", "MAG=?", "MIMI=?", "RADAR=?", "RPWS=?", "UVIS=?", "VIMS=?", "SSR_A=?", "SSR_B=?", "BUS_A=?", "BUS_B=?", "RFS_DST_A=?", "RFS_DST_B=?", "RFS_TWTA_A=?", "RFS_TWTA_B=?", "REGULATOR_A=?", "REGULATOR_B=?"]	6SET_SC_DEV_STAT	Tracks the prime status of a device specified in the 6SET_SC_DEV_STAT command.
VITAL[38]	"AACS_AFC_A=NON_VITAL","AACS_AFC_B=NON_VITAL","CDS_A=NON_VITAL"	["AACS_AFC_A=?", "AACS_AFC_B=?", "CDS_A=?",	6SET_SC_DEV_STAT	Tracks the vital status of a device specified in the

Attributes	Range	Default	Associated Commands	Description
	,"CDS_B=NON_VITAL","EU_A=NON_VITAL","EU_B=NON_VITAL","RSP_A=NON_VITAL","RSP_B=NON_VITAL","PPS_A=NON_VITAL","PPS_B=NON_VITAL","PSA_A=NON_VITAL","PSA_B=NON_VITAL","RFS_TCU_A=NON_VITAL","RFS_TCU_B=NON_VITAL","PMS_A=NON_VITAL","PMS_B=NON_VITAL","CAPS=NON_VITAL","CDA=NON_VITAL","CIRS=NON_VITAL","INMS=NON_VITAL","NAC=NON_VITAL","WAC=NON_VITAL","MAG=NON_VITAL","MIMI=NON_VITAL","RADAR=NON_VITAL","RPWS=NON_VITAL","UVIS=NON_VITAL","VIMS=NON_VITAL","SSR_A=NON_VITAL","SSR_B=NON_VITAL","BUS_A=NON_VITAL","BUS_B=NON_VITAL","RFS_DST_A=NON_VITAL","RFS_DST_B=NON_VITAL","RFS_TWTA_A=NON_VITAL","RFS_TWTA_B=NON_VITAL","REGULATOR_A=NON_VITAL","REGULATOR_B=NON_VITAL","AACS_AFC_A=VITAL","AACS_AFC_B=VITAL","CDS_A=VITAL","CDS_B=VITAL","EU_A=VITAL","EU_B=VITAL","RSP_A=VITAL","RSP_B=VITAL","PPS_A=VITAL","PPS_B=VITAL","PSA_A=VITAL","PSA_B=VITAL","RFS_TCU_A=VITAL","RFS_TCU_B=VITAL","PMS_A=VITAL","PMS_B=VITAL","CAPS=VITAL","CDA=VITAL","CIRS=VITAL","INMS=VITAL","NAC=VITAL","WAC=VITAL","MAG=VITAL","MIMI=VITAL","RADAR=VITAL","RPWS=VITAL","UVIS=VITAL","VIMS=VITAL","SSR_A=VITAL","SSR_B=VITAL","BUS_A=VITAL","BUS_B=VITAL","RFS_DST_A=VITAL","RFS_DST_B=VITAL","RFS_TWTA_A=VITAL","RFS_TWTA_B=VITAL","REGULATOR_A=VITAL","REGULATOR_B=VITAL"	"CDS_B=?", "EU_A=?", "EU_B=?", "RSP_A=?", "RSP_B=?" "PPS_A=?", "PPS_B=?", "PSA_A=?", "PSA_B=?", "RFS_TCU_A=?", "RFS_TCU_B=?", "PMS_A=?", "PMS_B=?", "CAPS=?", "CDA=?", "CIRS=?", "INMS=?", "NAC=?", "WAC=?", "MAG=?", "MIMI=?", "RADAR=?", "RPWS=?", "UVIS=?", "VIMS=?", "SSR_A=?", "SSR_B=?", "BUS_A=?", "BUS_B=?", "RFS_DST_A=?", "RFS_DST_B=?", "RFS_TWTA_A=?", "RFS_TWTA_B=?", "REGULATOR_A=?", "REGULATOR_B=?"]		6SET_SC_DEV_STAT command.

8.2.4 CDS_SFP Model Attributes

Attributes	Range	Default	Associated Commands	Description
MON_CNTL_NP[22]	"XCTR_RF_LOSS=ENABLE", "TWTA_RF_LOSS=ENABLE", "CDS_CMD_LOSS=ENABLE", "RFS_HB_LOSS=ENABLE", "UV_TRIP=ENABLE", "TANK_OP1=ENABLE", "TANK_OP2=ENABLE", "OT_1=ENABLE", "OT_2=ENABLE", "OT_3=ENABLE", "OT_4=ENABLE", "OT_5=ENABLE", "OT_6=ENABLE", "OT_7=ENABLE", "OT_8=ENABLE", "OT_9=ENABLE", "OT_10=ENABLE", "AACS_HB_LOSS=ENABLE", "ALERT_MSG_MON_1=ENABLE", "ALERT_MSG_MON_2=ENABLE", "ALERT_MSG_MON_3=ENABLE", "CDS_SAFING_REQ=ENABLE", "XCTR_RF_LOSS=DISABLE", "TWTA_RF_LOSS=DISABLE", "CDS_CMD_LOSS=DISABLE", "RFS_HB_LOSS=DISABLE", "UV_TRIP=DISABLE", "TANK_OP1=DISABLE", "TANK_OP2=DISABLE", "OT_1=DISABLE", "OT_2=DISABLE", "OT_3=DISABLE", "OT_4=DISABLE", "OT_5=DISABLE", "OT_6=DISABLE", "OT_7=DISABLE", "OT_8=DISABLE", "OT_9=DISABLE", "OT_10=DISABLE", "AACS_HB_LOSS=DISABLE", "ALERT_MSG_MON_1=DISABLE", "ALERT_MSG_MON_2=DISABLE", "ALERT_MSG_MON_3=DISABLE", "CDS_SAFING_REQ=DISABLE"	["XCTR_RF_LOSS=?", "TWTA_RF_LOSS=?", "CDS_CMD_LOSS=?", "RFS_HB_LOSS=?", "UV_TRIP=?", "TANK_OP1=?", "TANK_OP2=?", "OT_1=?", "OT_2=?", "OT_3=?", "OT_4=?", "OT_5=?", "OT_6=?", "OT_7=?", "OT_8=?", "OT_9=?", "OT_10=?", "AACS_HB_LOSS=?", "ALERT_MSG_MON_1=?", "ALERT_MSG_MON_2=?", "ALERT_MSG_MON_3=?", "CDS_SAFING_REQ=?"]	6SFP_MON_CNTL_NP	To keep track of the state set by the command 6SFP_MON_CNTL_NP.
MON_CNTL_P[22]	"XCTR_RF_LOSS=ENABLE", "TWTA_RF_LOSS=ENABLE",	["XCTR_RF_LOSS=?", "TWTA_RF_LOSS=?", "CDS_CMD_LOSS=?", "RFS_HB_LOSS=?",	6SFP_MON_CNTL_P	To keep track of the state set by the command 6SFP_MON_CNTL_P.

Attributes	Range	Default	Associated Commands	Description
	"CDS_CMD_LOSS=ENABLE", "RFS_HB_LOSS=ENABLE", "UV_TRIP=ENABLE", "TANK_OP1=ENABLE", "TANK_OP2=ENABLE", "OT_1=ENABLE", "OT_2=ENABLE", "OT_3=ENABLE", "OT_4=ENABLE", "OT_5=ENABLE", "OT_6=ENABLE", "OT_7=ENABLE", "OT_8=ENABLE", "OT_9=ENABLE", "OT_10=ENABLE", "AACS_HB_LOSS=ENABLE", "ALERT_MSG_MON_1=ENABLE", "ALERT_MSG_MON_2=ENABLE", "ALERT_MSG_MON_3=ENABLE", "CDS_SAFING_REQ=ENABLE", "XCTR_RF_LOSS=DISABLE", "TWTA_RF_LOSS=DISABLE", "CDS_CMD_LOSS=DISABLE", "RFS_HB_LOSS=DISABLE", "UV_TRIP=DISABLE", "TANK_OP1=DISABLE", "TANK_OP2=DISABLE", "OT_1=DISABLE", "OT_2=DISABLE", "OT_3=DISABLE", "OT_4=DISABLE", "OT_5=DISABLE", "OT_6=DISABLE", "OT_7=DISABLE", "OT_8=DISABLE", "OT_9=DISABLE", "OT_10=DISABLE", "AACS_HB_LOSS=DISABLE", "ALERT_MSG_MON_1=DISABLE", "ALERT_MSG_MON_2=DISABLE", "ALERT_MSG_MON_3=DISABLE", "CDS_SAFING_REQ=DISABLE"	"UV_TRIP=?", "TANK_OP1=?", "TANK_OP2=?", "OT_1=?", "OT_2=?", "OT_3=?", "OT_4=?", "OT_5=?", "OT_6=?", "OT_7=?", "OT_8=?", "OT_9=?", "OT_10=?", "AACS_HB_LOSS=?", "ALERT_MSG_MON_1=?", "ALERT_MSG_MON_2=?", "ALERT_MSG_MON_3=?", "CDS_SAFING_REQ=?"]		
RSP_CNTL_NP[13]	"XCTR_RF_LOSS=ENABLE", "TWTA_RF_LOSS=ENABLE", "CDS_CMD_LOSS=ENABLE", "RFS_HB_LOSS=ENABLE", "UV_TRIP=ENABLE", "TANK_OP1=ENABLE", "TANK_OP2=ENABLE",	["XCTR_RF_LOSS=?", "TWTA_RF_LOSS=?", "CDS_CMD_LOSS=?", "RFS_HB_LOSS=?", "UV_TRIP=?", "TANK_OP1=?", "TANK_OP2=?", "EMERGENCY_OT=?", "AACS_HB_LOSS=?", "AACS_SAFING_RQST=?", "ENGINE_B_PYRO=?", "CDS_LOSS=?",	6SFP_RSP_CNTL_NP	To keep track of the state set by the command 6SFP_RSP_CNTL_NP.

Attributes	Range	Default	Associated Commands	Description
	"EMERGENCY_OT=ENABLE", "AACS_HB_LOSS=ENABLE", "AACS_SAFING_RQST=ENABLE", "ENGINE_B_PYRO=ENABLE", "CDS_LOSS=ENABLE", "CDS_SC_SAFING=ENABLE", "XCTR_RF_LOSS=DISABLE", "TWTA_RF_LOSS=DISABLE", "CDS_CMD_LOSS=DISABLE", "RFS_HB_LOSS=DISABLE", "UV_TRIP=?", "TANK_OP1=DISABLE", "TANK_OP2=DISABLE", "EMERGENCY_OT=DISABLE", "AACS_HB_LOSS=DISABLE", "AACS_SAFING_RQST=DISABLE", "ENGINE_B_PYRO=DISABLE", "CDS_LOSS=DISABLE", "CDS_SC_SAFING=DISABLE"	"CDS_SC_SAFING=?"]		
RSP_CNTL_P[13]	"XCTR_RF_LOSS=ENABLE", "TWTA_RF_LOSS=ENABLE", "CDS_CMD_LOSS=ENABLE", "RFS_HB_LOSS=ENABLE", "UV_TRIP=ENABLE", "TANK_OP1=ENABLE", "TANK_OP2=ENABLE", "EMERGENCY_OT=ENABLE", "AACS_HB_LOSS=ENABLE", "AACS_SAFING_RQST=ENABLE", "ENGINE_B_PYRO=ENABLE", "CDS_LOSS=ENABLE", "CDS_SC_SAFING=ENABLE", "XCTR_RF_LOSS=DISABLE", "TWTA_RF_LOSS=DISABLE", "CDS_CMD_LOSS=DISABLE", "RFS_HB_LOSS=DISABLE", "UV_TRIP=?", "TANK_OP1=DISABLE", "TANK_OP2=DISABLE", "EMERGENCY_OT=DISABLE", "AACS_HB_LOSS=DISABLE",	["XCTR_RF_LOSS=?", "TWTA_RF_LOSS=?", "CDS_CMD_LOSS=?", "RFS_HB_LOSS=?", "UV_TRIP=?", "TANK_OP1=?", "TANK_OP2=?", "EMERGENCY_OT=?", "AACS_HB_LOSS=?", "AACS_SAFING_RQST=?", "ENGINE_B_PYRO=?", "CDS_LOSS=?", "CDS_SC_SAFING=?"]	6SFP_RSP_CNTL_P	To keep track of the state set by the command 6SFP_RSP_CNTL_P.

Attributes	Range	Default	Associated Commands	Description
	"AACS_SAFING_RQST=DISABLE", "ENGINE_B_PYRO=DISABLE", "CDS_LOSS=DISABLE", "CDS_SC_SAFING=DISABLE"			

8.3 Array Attribute Elements

8.3.1 Array Attribute Elements in CDS Model

Attribute	Element Number	Element
PS_CDS[4]	1	"CDSAPR"
	2	"CDSABK"
	3	"CDSBPR"
	4	"CDSBBK"
PS_PMS_REU[2]	1	"PMSA"
	2	"PMSB"
ATC_CNTL[12]	1	"ATC_1"
	2	"ATC_2"
	3	"ATC_3"
	4	"ATC_4"
	5	"ATC_5"
	6	"ATC_6"
	7	"ATC_7"
	8	"ATC_8"
	9	"ATC_9"
	10	"ATC_10"
	11	"ATC_11"
	12	"ATC_12"
ATC_CNTL_TIME[24]	1	"ATC_1=ENABLE"
	2	"ATC_2=ENABLE"
	3	"ATC_3=ENABLE"
	4	"ATC_4=ENABLE"
	5	"ATC_5=ENABLE"
	6	"ATC_6=ENABLE"
	7	"ATC_7=ENABLE"
	8	"ATC_8=ENABLE"
	9	"ATC_9=ENABLE"
	10	"ATC_10=ENABLE"
	11	"ATC_11=ENABLE"
	12	"ATC_12=ENABLE"

Attribute	Element Number	Element
	13	"ATC_1=DISABLE"
	14	"ATC_2=DISABLE"
	15	"ATC_3=DISABLE"
	16	"ATC_4=DISABLE"
	17	"ATC_5=DISABLE"
	18	"ATC_6=DISABLE"
	19	"ATC_7=DISABLE"
	20	"ATC_8=DISABLE"
	21	"ATC_9=DISABLE"
	22	"ATC_10=DISABLE"
	23	"ATC_11=DISABLE"
	24	"ATC_12=DISABLE"
EXT_MEM_LOAD_TIME[12]	1	"CAPS"
	2	"CDA"
	3	"CIRS"
	4	"INMS"
	5	"NAC"
	6	"WAC"
	7	"MAG"
	8	"MIMI"
	9	"RADAR"
	10	"RPWS"
	11	"UVIS"
	12	"VIMS"
NonVolatile_CRC[24]	1	"10CE_PYRO_SET1"
	2	"6CE_FORCE_RAM"
	3	"6CE_PRM_PWR_OFF"
	4	"6CE_BKUP_PWR_OFF"
	5	"4CE_REUA_CLAMP"
	6	"7CE_ISB_MASTER_A"
	7	"7CE_BC_A"
	8	"4CE_DST_POR1"
	9	"10CE_PR2"
	10	"10CE_PYRO_SET2"
	11	"7CE_PRIMEPWROFF"

Attribute	Element Number	Element
	12	"7CE_BACKUPPWROFF"
	13	"4CE_REUB_CLAMP"
	14	"7CE_ISB_MASTER_B"
	15	"7CE_BC_B"
	16	"4CE_DST_POR2"
	17	"10CE_HPLV"
	18	"10CE_REA_ISO"
	19	"10CE_REA_LV_BYPS"
	20	"12CE_MAG_BM_DPLY"
	21	"80CE_PRB_SEP"
	22	"16CE_PRM_PWR_OFF"
	23	"16CE_BKUP_PWROFF"
	24	"6CE_SPARE55"
SSR_PARTITION_STATE[6]	1	“A4”
	2	“A5”
	3	“A6”
	4	“B4”
	5	“B5”
	6	“B6”

8.3.2 Array Attribute Elements in CDS_CE Model

Attribute	Element Number	Element
CRC[48]	1	"6CE_MASK0"
	2	"6CE_MASK1"
	3	"6CE_MASK2"
	4	"6CE_MASK3"
	5	"6CE_MASK4"
	6	"6CE_MASK5"
	7	"6CE_MASK6"
	8	"6CE_MASK7"
	9	"6CE_MASK8"

Attribute	Element Number	Element
	10	"6CE_MASK9"
	11	"6CE_MASK10"
	12	"6CE_MASK11"
	13	"6CE_MASK12"
	14	"6CE_MASK13"
	15	"6CE_MASK14"
	16	"6CE_MASK15"
	17	"6CE_MASK16"
	18	"6CE_MASK17"
	19	"6CE_MASK18"
	20	"6CE_MASK19"
	21	"6CE_MASK20"
	22	"6CE_MASK21"
	23	"6CE_MASK22"
	24	"6CE_MASK23"
	25	"6CE_MASK32"
	26	"6CE_MASK33"
	27	"6CE_MASK34"
	28	"6CE_MASK35"
	29	"6CE_MASK36"
	30	"6CE_MASK37"
	31	"6CE_MASK38"
	32	"6CE_MASK39"
	33	"6CE_MASK40"
	34	"6CE_MASK41"
	35	"6CE_MASK42"
	36	"6CE_MASK43"
	37	"6CE_MASK44"
	38	"6CE_MASK45"
	39	"6CE_MASK46"
	40	"6CE_MASK47"
	41	"6CE_MASK48"
	42	"6CE_MASK49"
	43	"6CE_MASK50"
	44	"6CE_MASK51"
	45	"6CE_MASK52"

Attribute	Element Number	Element
	46	"6CE_MASK53"
	47	"6CE_MASK54"
	48	"6CE_MASK55"

8.3.3 Array Attribute Elements in CDS_SET_SC_DEV_STATUS Model

Attribute	Element Number	Element
EXISTENCE[38]	1	"AACS_AFC_A"
	2	"AACS_AFC_B"
	3	"CDS_A"
	4	"CDS_B"
	5	"EU_A"
	6	"EU_B"
	7	"RSP_A"
	8	"RSP_B"
	9	"PPS_A"
	10	"PPS_B"
	11	"PSA_A"
	12	"PSA_B"
	13	"RFS_TCU_A"
	14	"RFS_TCU_B"
	15	"PMS_A"
	16	"PMS_B"
	17	"CAPS"
	18	"CDA"
	19	"CIRS"
	20	"INMS"
	21	"NAC"
	22	"WAC"
	23	"MAG"
	24	"MIMI"
	25	"RADAR"
	26	"RPWS"

Attribute	Element Number	Element
	27	"UVIS"
	28	"VIMS"
	29	"SSR_A"
	30	"SSR_B"
	31	"BUS_A"
	32	"BUS_B"
	33	"RFS_DST_A"
	34	"RFS_DST_B"
	35	"RFS_TWTA_A"
	36	"RFS_TWTA_B"
	37	"REGULATOR_A"
	38	"REGULATOR_B"
PRIME[38]	1	"AACS_AFC_A"
	2	"AACS_AFC_B"
	3	"CDS_A"
	4	"CDS_B"
	5	"EU_A"
	6	"EU_B"
	7	"RSP_A"
	8	"RSP_B"
	9	"PPS_A"
	10	"PPS_B"
	11	"PSA_A"
	12	"PSA_B"
	13	"RFS_TCU_A"
	14	"RFS_TCU_B"
	15	"PMS_A"
	16	"PMS_B"
	17	"CAPS"
	18	"CDA"
	19	"CIRS"
	20	"INMS"
	21	"NAC"
	22	"WAC"
	23	"MAG"
	24	"MIMI"

Attribute	Element Number	Element
	25	"RADAR"
	26	"RPWS"
	27	"UVIS"
	28	"VIMS"
	29	"SSR_A"
	30	"SSR_B"
	31	"BUS_A"
	32	"BUS_B"
	33	"RFS_DST_A"
	34	"RFS_DST_B"
	35	"RFS_TWTA_A"
	36	"RFS_TWTA_B"
	37	"REGULATOR_A"
	38	"REGULATOR_B"
VITAL[38]	1	"AACS_AFC_A"
	2	"AACS_AFC_B"
	3	"CDS_A"
	4	"CDS_B"
	5	"EU_A"
	6	"EU_B"
	7	"RSP_A"
	8	"RSP_B"
	9	"PPS_A"
	10	"PPS_B"
	11	"PSA_A"
	12	"PSA_B"
	13	"RFS_TCU_A"
	14	"RFS_TCU_B"
	15	"PMS_A"
	16	"PMS_B"
	17	"CAPS"
	18	"CDA"
	19	"CIRS"
	20	"INMS"
	21	"NAC"
	22	"WAC"

Attribute	Element Number	Element
	23	"MAG"
	24	"MIMI"
	25	"RADAR"
	26	"RPWS"
	27	"UVIS"
	28	"VIMS"
	29	"SSR_A"
	30	"SSR_B"
	31	"BUS_A"
	32	"BUS_B"
	33	"RFS_DST_A"
	34	"RFS_DST_B"
	35	"RFS_TWTA_A"
	36	"RFS_TWTA_B"
	37	"REGULATOR_A"
	38	"REGULATOR_B"

8.3.4 Array Attribute Elements in CDS_SFP Model

Attribute	Element Number	Element
MON_CNTL_NP[22]	1	"XCTR_RF_LOSS"
	2	"TWTA_RF_LOSS"
	3	"CDS_CMD_LOSS"
	4	"RFS_HB_LOSS"
	5	"UV_TRIP"
	6	"TANK_OP1"
	7	"TANK_OP2"
	8	"OT_1"
	9	"OT_2"
	10	"OT_3"
	11	"OT_4"
	12	"OT_5"
	13	"OT_6"
	14	"OT_7"

Attribute	Element Number	Element
	15	"OT_8"
	16	"OT_9"
	17	"OT_10"
	18	"AACS_HB_LOSS"
	19	"ALERT_MSG_MON_1"
	20	"ALERT_MSG_MON_2"
	21	"ALERT_MSG_MON_3"
	22	"CDS_SAFING_REQ"
MON_CNTL_P[22]	1	"XCTR_RF_LOSS"
	2	"TWTA_RF_LOSS"
	3	"CDS_CMD_LOSS"
	4	"RFS_HB_LOSS"
	5	"UV_TRIP"
	6	"TANK_OP1"
	7	"TANK_OP2"
	8	"OT_1"
	9	"OT_2"
	10	"OT_3"
	11	"OT_4"
	12	"OT_5"
	13	"OT_6"
	14	"OT_7"
	15	"OT_8"
	16	"OT_9"
	17	"OT_10"
	18	"AACS_HB_LOSS"
	19	"ALERT_MSG_MON_1"
	20	"ALERT_MSG_MON_2"
	21	"ALERT_MSG_MON_3"
	22	"CDS_SAFING_REQ"
RSP_CNTL_NP[13]	1	"XCTR_RF_LOSS"
	2	"TWTA_RF_LOSS"
	3	"CDS_CMD_LOSS"
	4	"RFS_HB_LOSS"
	5	"UV_TRIP"
	6	"TANK_OP1"

Attribute	Element Number	Element
	7	"TANK_OP2"
	8	"EMERGENCY_OT"
	9	"AACS_HB_LOSS"
	10	"AACS_SAFING_RQST"
	11	"ENGINE_B_PYRO"
	12	"CDS_LOSS"
	13	"CDS_SC_SAFING"
RSP_CNTL_P[13]	1	"XCTR_RF_LOSS"
	2	"TWTA_RF_LOSS"
	3	"CDS_CMD_LOSS"
	4	"RFS_HB_LOSS"
	5	"UV_TRIP"
	6	"TANK_OP1"
	7	"TANK_OP2"
	8	"EMERGENCY_OT"
	9	"AACS_HB_LOSS"
	10	"AACS_SAFING_RQST"
	11	"ENGINE_B_PYRO"
	12	“CDS_LOSS"
	13	“CDS_SC_SAFING"

9. ATTITUDE AND ARTICULATION CONTROL SUBSYSTEM (AACS)

9.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR07E2	7POWER, 7HOME	AACS_POWER::POWER, AACS::HOME, AACS_MISC::IRU_Warmup	
FR07D4	Y-3000, Y-3001	AACS_Channel_ID::Solar_Distance, AACS_Channel_ID::SRU_Sun_Angle, AACS_Channel_ID::err_flag	This rule is implemented through the state table file smf. It expects the input data to come from PGT.
FR07E5	Y-3005, Y-3006, Y-3007, Y-3008, Y-3009, Y-3010, Y-3011, Y-3012, Y-3013, Y-3014, Y-3015, Y-3016, Y-3017, Y-3018	AACS_Channel_ID::err_flag	This rule is implemented through the state table file smf. It expects the input data to come from PGT.
FR07D6	7POWER, 7POWER_SRU_HTR	AACS_POWER::POWER	
FR07D7	ALL AACS COMMANDS	GLOBAL::ULO_IDAP_Cmd_Count, GLOBAL::RTO_IDAP_Cmd_Count, GLOBAL::AACS_Cmd_Size	This rule is implemented through the global smf file.
FR07A8	ALL AACS COMMANDS	GLOBAL::AACS_Crit_Cmd_Count	This rule is implemented through the global smf file.
FR07A9	7COAST, 7HOME	AACS::Mode, PPS::FIRED_PYROS	
FR07A10	7FP_MON_MASK, 7FP_RULE_MASK, 4EVENT_ENABLE, 4PS_PSU, 4PS_PSUI, 4PS_PYRO_ENA_RST, 4PS_PYRO_ENABLE, 4PYRO_CMD_DISA, 4PYRO_CMD_ENA, 80CE_PRB_SEP, 80PY_PRB_SEP	AACS::FP_MON_MASK, AACS::FP_RULE_MASK, PPS::FIRED_PYROS	
FR07B11	7POWER, 7PRIME, 7HOME	AACS_POWER::POWER, AACS_PRIME::PRIME, AACS::Mode	
FR07B12	7ALERT, 7BUS_WRITE, 7FP_ACTIVATE, 7MEM_WRITE_P, 7IOU_RESET	AACS::Mode	
FR07B14	7PS_SRU_DECON, 12PY_SC_LV_SEP	AACS_POWER::POWER, AACS_MISC::Launch	

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR07E15	Y-3000, Y-3003	AACS_Channel_ID::Solar_Distance, AACS_Channel_ID::SRUrad_Sun_Angle	This rule is implemented through the stf smf file.
FR07E17	7STROKE,	AACS_MISC::EGA_Cmd_Sequence	
FR07B19	7AKA_DELTA, 7DELTA_BASE, 7DELTA_BASE_LONG, 7DELTA_BODY, 7DELTA_BODY_LONG	SEQ_PROG::Critical	
FR07E24	7POWER, 7HOME	AACS_POWER::POWER, AACS_PRIME::PRIME, AACS::Mode, AACS_MISC::SRU_Warmup	
FR07D25	7TRANSFER, 7BC_RESET, 7FORCE_TIME_CHG, 7PIU_RESET, 7SAFE	AACS::Mode	
FR07E26	7POWER, 7PRIME	AACS_POWER::EGECUA, AACS_POWER::EGECUB, AACS_PRIME::EGECU, AACS_PRIME::Main_Engine_String	
FR07B33	7PS_ACCE, 7PS_BAIL, 7PS_EGECU, 7PS_EGED, 7PS_SSE, 7PS_SRU, 7PS_SRU_HTR, 7PS_IRU, 7PS_RWA, 7PS_VDECU, 7PS_VDE_BPLVD, 7PS_VDE_HELVD, 7PS_VDE_MEVD, 7PS_VDE_MPD	AACS::Mode	
FR07D35	7PROFILE, 7HOME, 7P_CMT, 7OFFSET, 7DELTA_BASE, 7DELTA_BASE_LONG, 7DELTA_BODY, 7DELTA_BODY_LONG	AACS::Mode, AACS::PROFILE, AACS::P_CMT	
FR07E37	7ME_BURN, 7RCS_BURN	AACS::RWA_RATE	
FR07C46	7DEADBAND	None	
FR07A47	7TARGET, 7HOME	AACS::TARGET	
FR07B48	7HOME	AACS::Mode	
FR07D50	7P_PMS_MGR	AACS::Mode	
FR07D51	7MASS_PROPERTIES	AACS::Mode	
FR07D52	7P_ACL_RCS	AACS::Mode	

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR07E55	7MEM_WRITE_L, 7MEM_WRITE_P, 7P_ATE, 7POLY_VEC	GLOBAL::AACS_Long_Cmd_Count	This rule is implemented through the global smf file.
FR07B60	7SSA_RANGE		
FR07E61	7POWER, 7EGE_LOOP, 7STROKE, 7ME_PREAIM	AACS_POWER::POWER, AACS_PRIME::PRIME	
FR07E62	7MOMENTUM, 7POWER, 7PRIME, 7RWA_RATE	AACS_PRIME::PRIME, AACS_POWER::POWER, AACS_MISC::Prime_States	
FR07D63	7POWER, 7LATCH, 7ME_OPEN	AACS_POWER::POWER, AACS_PRIME::PRIME, AACS_PRIME::PRIME_MPD,	
FR07B65	7HOME	AACS::Mode	
FR07E68	7TARGET, 7AKA_TARGET	AACS::TARGET_TIME	
FR07A70	7MODE_BLOCK, 7STOP	AACS::MODE, AACS::MODE_BLOCK	
FR07D72	7TLM_READOUT, 7TLM_TRICKLE	*none*	
FR07B78	7FP_MON_MASK , 7FP_RULE_MASK	AACS::FP_MON_MASK, AACS::FP_RULE_MASK	
FR07E80	7 DEADBAND	AACS::DEADBANDS_FR07E80_OK, AACS ::FR07E80_ DEADBANDS, AACS::DEADBAND_TIME, AACS::DEADBAND_X_AXIS_DB, AACS::DEADBAND_X_AXIS_DB	
FR07B87	7POWER, 7PRIME	AACS_POWER::POWER, AACS_PRIME::PRIME, AACS_POWER::POWER_7B87	
FR07B92	7PRIME	AACS::Mode	
FR07B97	7LATCH	AACS::LATCH	
FR07E105	7TLM_READOUT	AACS::FR07E105_CMD, AACS::FR07E105_GOTO_Time	
FR07D106	7RWA_RATE	AACS::Mode	
FR07D111	7ROTATE_CORD, 7ROTATE_VECT	*none*	
FR07B114	7GYRO_CAL	*none*	
FR07D115	7COAST	*none*	
FR07D116	7DELTA_BASE_LONG,	AACS::PROFILED_TURN_TIME	

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
	7DELTA_BODY_LONG, 7PROFILE		
FR07A117	7CATBED	AACS::CATBED[16]	
CC07G7	7TLM_BUILD	AACS::TLM_BUILD	
CC07G9	7ACCEL_CAL	AACS::ACCEL_CAL	
CC07G14	7POWER, 7SID_SPOT_LIST	AACS_PRIME::PRIME, AACS_POWER::POWER, AACS_MISC::SRU_Warmup, AACS::SID_SPOT_LIST	
CC07G16	7TLM_EVENT	CDS::CHG_SC_TM_IMM, AACS::TLM_EVENT	

9.2 Model Attributes

9.2.1 AACS Model Attributes

Attributes	Range	Default	Associated Commands	Description
ACCEL_CAL[4]	ALL	["Accel_Calibration=?", "ACC_Prime=?", "Start_Warmup=?", "Duration_Calibrate"]	7ACCEL_CAL	Tracks the state of accelerometer calibration, prime status, warmup time, and duration.
AKA_PROFILE[6]	ALL	["X=?", "Y=?", "Z=?", "XA=?", "YA=?, "ZA=?"]	7AKA_PROFILE	Keeps turn and acceleration rates about the spacecraft X, Y, and Z axis.
CATBED[16]	ALL	["Y1Y3_A_P=?", "Y2Y4_A_P=?", "Z1Z3_A_P=?", "Z2Z4_A_P=?", "Y1Y3_B_P=?", "Y2Y4_B_P=?", "Z1Z3_B_P=?", "Z2Z4_B_P=?", "Y1Y3_A_S=?", "Y2Y4_A_S=?", "Z1Z3_A_S=?", "Z2Z4_A_S=?", "Y1Y3_B_S=?", "Y2Y4_B_S=?", "Z1Z3_B_S=?", "Z2Z4_B_S=?"]	7CATBED	Tracks the control state of the catbed heaters.
CE_BACKUPPWROFF	"ENABLED", "IN_PROGRESS", "DISABLED", "?"	"?"	7CE_BACKUPPWROFF, 7PS_AFC	Tracks state of AFC-A/B Line A (primary) power OFF Critical Enable.
CE_PRIMEPWROFF	"ENABLED", "IN_PROGRESS", "DISABLED", "?"	"?"	7CE_BACKUPPWROFF, 7PS_AFC	Tracks state of AFC-A/B Line A (primary) power OFF Critical Enable.
CMD_TURN_ISSUE_TIME	ALL	1990-001T00:00:00	7DELTA_BASE, 7DELTA_BODY, 7DELTA_BASE_LONG, 7DELTA_BODY_LONG, 7OFFSET	Time of most recent command from associated commands list.
COAST_Time[2]	ALL	[1997-001T00:00:00.000, 1997-001T00:00:00.000]	7COAST	Tracks initiation of 7COAST and the exit time.
COMMANDED_TURN	“?”,”7DELTA_BASE”, ”7DELTA_BODY”, “7DELTA_BASE_LONG”, “7DELTA_BODY_LONG”, “7OFFSET”	“?”	7DELTA_BASE, 7DELTA_BODY, 7DELTA_BASE_LONG, 7DELTA_BODY_LONG, 7OFFSET	Most recent command issued in range.

Attributes	Range	Default	Associated Commands	Description
CONSTRAINT[10]	ALL	["CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?","CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?","CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?","CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?","CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?","CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?","CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?","CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?","CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?","CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"]	7CONSTRAINT	Tracks the states of 10 different constraints in 7CONSTRAINT
CONSTRAINT_CHG	ALL	"CONSTR_NAME=? CONSTR_MODE=?"	7CONSTRAINT_CHG	Tracks the states of the constraint

Attributes	Range	Default	Associated Commands	Description
				change.
DEADBAND_TIME	All	1990-001T00:00:00	7DEADBAND	Time of most recent 7DEADBAND
DEADBAND_X_AXIS_DB	0.5…3142.0	3142.0	7DEADBAND	X Axis value from 7DEADBAND
DEADBAND_Y_AXIS_DB	0.5…3142.0	3142.0	7DEADBAND	Y Axis value from 7DEADBAND
DEADBAND_Z_AXIS_DB	0.5…3142.0	3142.0	7DEADBAND	Z Axis value from 7DEADBAND
DELTA_BASE[3]	ALL	["X=?", "Y=?", "Z=?"]	7DELTA_BASE	Tracks turning values of the 7DELTA_BASE.
DELTA_BASE_LONG[3]	ALL	["X=?", "Y=?", "Z=?"]	7DELTA_BASE_LONG	Tracks turning values of the 7DELTA_BASE_LONG.
DELTA_BODY[3]	ALL	["X=?", "Y=?", "Z=?"]	7DELTA_BODY	Tracks turning values of the 7DELTA_BODY.
DELTA_BODY_LONG[3]	ALL	["X=?", "Y=?", "Z=?"]	7DELTA_BODY_LONG	Tracks turning values of the 7DELTA_BODY_LONG.
EGE_LOOP[3]	ALL	["EGA_ID=?","P_LOOP=?","Q_LOOP=?"]	7EGE_LOOP	Tracks engine gimbal electronics servo loop states.
FP_MON_MASK	ALL	"Monitor_State=?"	7FP_MON_MASK	Checks error monitor state.
FP_RULE_MASK	ALL	"Rule_State=?"	7FP_RULE_MASK	Checks activation rule state.
FR07E105_CMD	ALL	“7TLM_OK”	7TLM_READOUT 7AFC_GOTO RAM 7AFC_RESET	Tracks 7TLM_READOUT compliance with FR07E105
FR07E105_GOTO_Time	ALL	1990-001T00:00:00.000	7AFC_RESET 7AFC_GOTO_RAM	Tracks time of the last 7AFC_GOTO_RAM that followed a 7AFC_RESET
LATCH[6]	ALL	["MPA=?","MPB=?","HPA=?","HPB=?", "LPNTO=?","LPMMH=?"]	7LATCH	Tracks control states.
LATCH_TIME[12]	ALL	[1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000,	7LATCH	Tracks time for each latch valve.

Attributes	Range	Default	Associated Commands	Description
		1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000, 1997-001T00:00:00.000]		
ME_BURN	ALL	"Start_Burn_Time=? Max_Burn_Time=?"	7ME_BURN	Tracks main engine burn begin time and duration of burn
ME_VENT_STATE[2]	ALL	["Engine_ID=? Soft_V_State=?", “Engine_ID=? Soft_V_State=?"]	7ME_VENT_STATE	Verify engine id and vent state value.
Mode	"TEST","LAUNCH","READY", "PAUSE","COAST","DETUMBLE", "FIND_SUN","CENTER_SUN", "FIND_STARS", "HOME_BASE_INERTIAL_RCS", "HOME_BASE_CRUISE_RCS", "HOME_BASE_INERTIAL_RWA", "HOME_BASE_CRUISE_RWA", "ME_DELTAV","RCS_DELTAV"	"?"	7COAST, 7FLIGHT, 7HOME, 7LATCH, 7LAUNCH, 7ME_BURN, 7ME_CLOSE, 7ME_PROTECT, 7ME_VENT_STATE, 7PAUSE, 7RCS_BURN, 7READY, 7TEST	Tracks the AACS modes.
MODE_BLOCK[2]	ALL	[“BLOCK_STATE=? AACS_MODE=?”, “BLOCK_STATE=? AACS_MODE=?”]	7MODE_BLOCK	Tracks ME_DELTAV and RCS_DELTAV block modes respectively.
NO_POWER_SRUA	TRUE, FALSE	FALSE	7POWER, 7PRIME	Tracks if SRUA set to PRIME in the last second
NO_POWER_SRUB	TRUE, FALSE	FALSE	7POWER, 7PRIME	Tracks if SRUB set to PRIME in the last second
NO_PRIME_SRUA	TRUE, FALSE	FALSE	7POWER, 7PRIME	Tracks if SRUA was powered ON or OFF in the last second
NO_PRIME_SRUB	TRUE, FALSE	FALSE	7POWER, 7PRIME	Tracks if SRUB was powered ON or OFF in the last second
OFFSET[4]	ALL	["X=?","Y=?","Z=?", "?"]	7OFFSET, 7HOME	Tracks turning values of the 7OFFSET.
PROFILE[6]	ALL	["X=?","Y=?","Z=?", "XA=?", "YA=?", "ZA=?"]	7PROFILE	Keeps turn and acceleration rates about the spacecraft X, Y, and Z axis.
PROFILED_TURN_TIME	ALL	0.0	7DELTA commands	Calculated turn time for the last 7DELTA issued.
P_CMT[12]	ALL	["WMAX_RCS1", "WMAX_RCS2",	7P_CMT	Tracks constraint monitor rates.

Attributes	Range	Default	Associated Commands	Description
		"WMAX_RCS3", "WMAX_RWA1", "WMAX_RWA2", "WMAX_RWA3", "AMAX_RCS1", "AMAX_RCS2", "AMAX_RCS3", "AMAX_RWA1", "AMAX_RWA2", "AMAX_RWA3"]		
Prev_DEADBAND_GT_20	TRUE, FALSE	FALSE	7DEADBAND	Tracks if 7DEADBAND previous to the current one was greater than 20 mrad.
PS_AFC[4]	"A_PRIME=ON", "A_PRIME=OFF", "A_BACKUP=ON", "A_BACKUP=OFF", "B_PRIME=ON", "B_PRIME=OFF", "B_BACKUP=ON", "B_BACKUP=OFF"	["A_PRIME=?", "A_BACKUP=?", "B_PRIME=?", "B_BACKUP=?"]	7PS_AFC	Tracks the prime and backup control status.
PS_RWA[8]	ALL	["RWA1_LINE1=?", "RWA1_LINE2=?", "RWA2_LINE1=?", "RWA2_LINE2=?", "RWA3_LINE1=?", "RWA3_LINE2=?", "RWA4_LINE1=?", "RWA4_LINE2=?"]	7PS_RWA	Tracks the control states of each type of reaction wheel assembly.
RCS_BURN[2]	All	[“DV_MAG=? MIN_BURN_TIME=? MAX_BURN_TIME=?”, “Burn_Start_Time=1990-001T00:00:00.000”]	7RCS_BURN	Tracks RCS engine burn parameters.
RWA_RATE[4]	ALL	["RWA1=?", "RWA2=?", "RWA3=?", "RWA4=?"]	7RWA_RATE	Tracks reaction wheel assembly rates.
SID_SPOT_LIST[3]	ALL	[“SRU_SELECT=?”, ”PIXEL_OPTION=?”, “ReadoutCmd_end=1990-001T00:00:00.000”]	7SID_SPOT_LIST	Tracks 7SID_SPOT_LIST parameter values.
SID_SPOT_TIME	ALL	1990-001T00:00:00.000	7SID_SPOT_LIST	Tracks time of the last 7SID_SPOT_LIST command
STOP_TIME	ALL	1997-001T00:00:00.000	7STOP	Tracks the time of last 7STOP command.
STOPx_Time	ALL	1990-001T00:00:00.000	7OFFSET 7AKA_OFFSET 7DELTA_BODY 7DELTA_BODY_LONG 7DELTA_BASE 7DELTA_BASE_LONG	Tracks time of the last command from the list (7OFFSET, 7AKA_OFFSET, 7DELTA_BODY, 7DELTA_BODY_LONG, 7DELTA_BASE, 7DELTA_BASE_LONG)
STROKE[16]	ALL	"PA=-148","PB=-148","QA=-148", "QB=-148", "POSITION=-148",	7STROKE	Keeps track of values set by 7STROKE.

Attributes	Range	Default	Associated Commands	Description
		"LastSTROKE=1990-001T00:00:00.000", "STROKEend=1990-001T00:00:00.000", "POSITION=-148", "LastSTROKE=1990-001T00:00:00.000", "STROKEend=1990-001T00:00:00.000", "POSITION=-148", "LastSTROKE=1990-001T00:00:00.000", "STROKEend=1990-001T00:00:00.000", "POSITION=-148", "LastSTROKE=1990-001T00:00:00.000", "STROKEend=1990-001T00:00:00.000"		
TARGET	ALL	"PRIMARY_INERTIAL=?"	7TARGET	Tracks the primary inertial target.
TARGET_TIME	ALL	1997-001T00:00:00.000	7TARGET	Tracks the time intervals between 7TARGET commands.
TLM_BUILD[4]	ALL	["MINIPKT_ID=?", "N=?", "M=?", "SORT_INDEX=?"]	7TLM_BUILD	Tracks 7TLM_BUILD command parameter values.
TLM_EVENT[2]	ALL	[MINIPKT_TYPE=?", "TLM_EVENTend=1990T00:00:00.000"]	7TLM_EVENT	Tracks the time between 7TLM_EVENT commands.
TLM_READOUT[2]	0X000000…0X1FFFFF	0X000000, 0X000000	7TLM_READOUT	Tracks start and ending address from 7TLM_READOUT.
TLM_TRICKLE[8]	0X000000…0X1FFFFF	[0X000000, 0X000000, 0X000000, 0X000000, 0X000000, 0X000000, 0X000000, 0X000000]	7TLM_TRICKLE	Tracks start and ending address from 7TLM_TRICKLE.

9.2.2 AACS_IVP Model Attributes

Attributes	Range	Default	Associated Commands	Description
BODY_VEC	ALL	"X=? Y=? Z=? OBJECT_ID=?"	7BODY_VEC	Keeps coordinate values and object name.
FIXED_VEC	ALL	"X=? Y=? Z=? HEAD_OBJECT=?"	7FIXED_VEC	Keeps coordinate values and head object name.

9.2.3 AACS_Health Model Attributes

Attributes	Range	Default	Associated Commands	Description
HEALTH[106]	ALL	["RWA1=?","RWA2=?","RWA3=?", "RWA4=?","ACC=?","IRUA=?","IRUB=?", "SRUA=?","SRUB=?","SSAA=?","SSAB=?", "EGECUA=?","EGECUB=?","VDECUA=?", "VDECUB=?","EGEDA=?","EGEDB=?", "HELVDA=?","HELVDB=?","MEVDA=?", "MEVDB=?","MPDA=?","MPDB=?", "BPLVDA=?", "BPLVDB=?","MPA=?", "MPB=?","HPA=?","HPB=?", "LPNTO=?", "LPMMH=?","MEOA=?", "MEOB=?", "MEFA=?","MEFB=?", "Y1A=?","Y1B=?", "Y2A=?", "Y2B=?", "Y3A=?","Y3B=?", "Y4A=?", "Y4B=?", "Z1A=?","Z1B=?", "Z2A=?", "Z2B=?", "Z3A=?","Z3B=?", "Z4A=?", "Z4B=?", "Y1Y3_A_P=?", "Y2Y4_A_P=?", "Z1Z3_A_P=?", "Z2Z4_A_P=?","Y1Y3_B_P=?", "Y2Y4_B_P=?","Z1Z3_B_P=?", "Z2Z4_B_P=?","Y1Y3_A_S=?", "Y2Y4_A_S=?","Z1Z3_A_S=?", "Z2Z4_A_S=?","Y1Y3_B_S=?", "Y2Y4_B_S=?","Z1Z3_B_S=?", "Z2Z4_B_S=?","BUSA=?","BUSB=?", "MPA_OPEN=?","MPA_CLOSED=?", "MPB_OPEN=?","MPB_CLOSED=?", "MEFA_OPEN=?","MEFA_CLOSED=?", "MEFB_OPEN=?","MEFB_CLOSED=?", "MEOA_OPEN=?","MEOA_CLOSED=?", "MEOB_OPEN=?","MEOB_CLOSED=?", "HPA_OPEN=?","HPA_CLOSED=?", "HPB_OPEN=?","HPB_CLOSED=?", "LPMMH_OPEN=?","LPMMH_CLOSED=?", "LPNTO_OPEN=?","LPNTO_CLOSED=?", "BAIL=?","A1=?","A2=?","A3=?","A4=?", "B1=?","B2=?","B3=?","B4=?", "MEA_PRESSURE_A=?","MEA_TEMP1=?", "MEB_PRESSURE_A=?","MEB_TEMP1=?", "MEA_PRESSURE_B=?","MEA_TEMP2=?", "MEB_PRESSURE_B=?","MEB_TEMP2=?"]	7HEALTH	Tracks the health states.

9.2.4 AACS_PRIME Model Attributes

Attributes	Range	Default	Associated Commands	Description
PRIME[55]	ALL	["ACC=?","SRUA=?","SRUB=?","SSAA=?", "SSAB=?","EGECUA=?","EGECUB=?", "VDECUA=?","VDECUB=?","HPA=?", "HPB=?","Y1A=?","Y1B=?","Y2A=?", "Y2B=?","Y3A=?","Y3B=?","Y4A=?", "Y4B=?","Z1A=?","Z1B=?","Z2A=?", "Z2B=?","Z3A=?","Z3B=?","Z4A=?", "Z4B=?","Y1Y3_A_P=?","Y2Y4_A_P=?", "Z1Z3_A_P=?","Z2Z4_A_P=?", "Y1Y3_B_P=?","Y2Y4_B_P=?", "Z1Z3_B_P=?","Z2Z4_B_P=?", "Y1Y3_A_S=?","Y2Y4_A_S=?", "Z1Z3_A_S=?","Z2Z4_A_S=?", "Y1Y3_B_S=?","Y2Y4_B_S=?", "Z1Z3_B_S=?","Z2Z4_B_S=?", "RNOT1=?","RNOT2=?","RNOT3=?", "RNOT4=?","TIMER=?","BUSA=?", "BUSB=?","PPS_REU_A=?", "PPS_REU_B=?","ENGINEA=?", "ENGINEB=?","PRIME_GYRO_SET=?"]	7PRIME	Tracks the prime states.
PRIME_IRU[2]	"IRUA","IRUB",""	["",""]	7PRIME	Tracks the prime states of the IRUs
PRIME_MPD	"MPDA","MPDB", "MPDA_and_MPDB"	"MPDA"	7PRIME	Tracks the prime states of the monopropellant drivers.

9.2.5 AACS_POWER Model Attributes

Attributes	Range	Default	Associated Commands	Description
POWER[49]	ALL	["RWA1=?","RWA2=?","RWA3=?","RWA4=?","ACC=?","IRUA=?","IRUB=?","SRUA=?","SRUB=?","SSAA=?","SSAB=?", "EGECUA=?","EGECUB=?","VDECUA=?","VDECUB=?", "EGEDA=?","EGEDB=?","HELVDA=?","HELVDB=?","MEVDA=?", "MEVDB=?","MPDA=?","MPDB=?","BPLVDA=?","BPLVDB=?", "RWA_PRIME=?","RWA_BACKUP=?","IRU_PRIME=?", "IRU_BACKUP=?","SRU_PRIME=?","SRU_BACKUP=?", "SSA_PRIME=?","SSA_BACKUP=?","EGE_PRIME=?", "EGE_BACKUP=?","MEVD_PRIME=?","MEVD_BACKUP=?", "VDECU_PRIME=?","VDECU_BACKUP=?","BPLVD_PRIME=?", "BPLVD_BACKUP=?","MPD_PRIME=?","MPD_BACKUP=?", "SRUA_DECON=?","SRUB_DECON=?", "BAIL=?","SRU_PRIME_DECON=?","SRU_BACKUP_DECON=?", "ACC_PRIME=?"]	7POWER, 7PRIME	Tracks the power states.
POWER_7B87	ALL	"DEFAULT"	7POWER, 7PRIME	List of FR07B87 backup devices powered on.
POWER_ON_TIME[14]	ALL	["RWA1_ON=?","RWA2_ON=?", "RWA3_ON=?","RWA4_ON=?", "EGEDA_ON=?","EGEDB_ON=?", "HELVDA_ON=?","HELVDB_ON=?", "MEVDA_ON=?","MEVDB_ON=?", "MPDA_ON=?","MPDB_ON=?", "BPLVDA_ON=?","BPLVDB_ON=?"]	7POWER	Tracks the length of time the peripherals are powered ON.
POWER_ON_TIME_ALL[49]	ALL	["RWA1_ON=?","RWA2_ON=?",…] (see section 9.3.5)	7POWER, 7PRIME	Tracks the power ON time of all devices controlled by 7POWER command.
POWER_SRU_HTR[4]	ALL	["SRUA_SUPL_HTR=?", "SRUA_REPL_HTR=?", "SRUB_SUPL_HTR=?", "SRUB_REPL_HTR=?"]	7POWER_SRU_HTR, 7POWER	SRU heater power status.
POWER_SRU_HTR_Mode[4]	All	["SRUA_SUPL_HTR=?", "SRUA_REPL_HTR=?", "SRUB_SUPL_HTR=?", "SRUB_REPL_HTR=?"]	7POWER_SRU_HTR, 7POWER	SRU heater prime state.

9.2.6 AACS_MISC Model Attributes

Attributes	Range	Default	Associated Commands	Description
EGA_Cmd_Sequence[2]	ALL	[0,0]	7POWER	Tracks states of engine gimbal 7EGE_LOOP electronics and servo loops.
IRU_Warmup[2]	ALL	["?","?"]	7PRIME, 7POWER	Tracks the warmup time of the IRUs.
Launch	ALL	"?"	12PY_SC_LV_SEP	Records the time the last 12PY_SC_LV_SEP command was issued.
MODE_BLOCK_MODE	"RCS_DELTAV", "ME_DELTAV", "FIND_STARS", "RWA	"?"	7MODE_BLOCK	Saves the AACS_MODE parameter in 7MODE_BLOCK
Prime_States[4]	ALL	["?","?","?","?"]	7PRIME	Tracks if prime states have been powered.
PROFILE_ISSUED_IN_RCS	TRUE, FALSE	FALSE	7PROFILE	Tracks if mode was RCS when 7PROFILE was last issued.
RCS_Rate_Change	TRUE, FALSE	FALSE	7PROFILE	Tracks CMT RWA rate compliance.
SRU_Warmup[7]	ALL	["?","?","?","?","?","?","?"]	7PRIME, 7POWER	Tracks the warmup time of the SRUs.
Vector_Duration[4]	ALL	[00T00:00:00.000,00T00:00:00.000, 00T00:00:00.000,00T00:00:00.000]	7CONIC_VEC, 7POLY_VEC	Tracks the duration of each vector.
Vector_Update[4]	"TRUE","FALSE"	["FALSE", "FALSE", "FALSE", "FALSE"]	7CONIC_VEC, 7POLY_VEC	Tracks when the vectors are updated.

9.2.7 AACS_Channel_ID Model Attributes

Most of the attributes under AACS_Channel_ID model are set with SHOW equals NEVER, hence they will not appear in the PEF.
Except for END_TARGET, TARGETING_TAKEN, and Latest_Primary_Target, they are used to pass PGT-generated states contained in the State Ta
File to SEQ_GEN.

Attributes	Range	Defaults	Associated Commands	Description
ATE_quat1	ALL	0.0	A-1001	Attitude quaternion 1
ATE_quat2	ALL	0.0	A-1002	Attitude quaternion 2
ATE_quat3	ALL	0.0	A-1003	Attitude quaternion 3
ATE_quat4	ALL	0.0	A-1004	Attitude quaternion 4
CIRS_Sun_Boresight_Angle	0.0 … 180.0	180.0	Y-3090	Tracks the state of the dummy command: CIRS Sun boresight angle.
Earth_Ang_Size	ALL	0.0	Y-3010	Tracks the state of the dummy command: Earth Angular Size
END_TARGET	ALL	1997-001T00:00:00	TARGETING_CLAIM	End of current TARGET
err_flag[17]	"Mercury","Venus","Earth","Mars", "Jupiter","Saturn","Sun","Moon", "SRUrad1","SRUrad2","SRU_Boresight","SRU_Assembly","ISS1","ISS2a", "ISS2b","ISS2c","VIMS",""	["",""]	Y-3000, Y-3001, Y-3002, Y-3003, Y-3005, Y-3006, Y-3007, Y-3008, Y-3009, Y-3010, Y-3011, Y-3012, Y-3013, Y-3014, Y-3015, Y-3016, Y-3017, Y-3018, Y-3051, Y-3053	Error flags
ISS_Sun_Angle	0.0...180.0	180.0	Y-3051	Tracks the state of the dummy command: ISS Boresight-Sun Angle
ISSrad_Sun_Angle	0.0...180.0	180.0	Y-3052	Tracks the state of the dummy command: ISS Radiator Boresight-Sun Angle
ISS_Sun_Viewed	TRUE, FALSE	FALSE	Y-3000, Y-3051	Boolean flag indicates if ISS is viewing the Sun or not
ISS_Sun_View_Time	ALL	1997-001T00:00:00	Y-3000, Y-3051	Time ISS viewed the Sun
Jupiter_Ang_Size	ALL	0.0	Y-3016	Tracks the state of the dummy command: Jupiter Angular Size
Latest_Primary_Target	ALL	"?"	TARGET_DATA	Used to aid SEG in determining when S/C goes off earth-point.
Mars_Ang_Size	ALL	0.0	Y-3014	Tracks the state of the dummy command: Mars Angular Size

Attributes	Range	Defaults	Associated Commands	Description
Mercury_Ang_Size	ALL	0.0	Y-3006	Tracks the state of the dummy command: Mercury Angular Size
Moon_Ang_Size	ALL	0.0	Y-3012	Tracks the state of the dummy command: Moon Angular Size
Minus_X	ALL	0.0	Y-3059	Tracks the state of the dummy command: spacecraft -X Axis
Minus_Y	ALL	0.0	Y-3060	Tracks the state of the dummy command: spacecraft -Y Axis
Minus_Z	ALL	0.0	Y-3061	Tracks the state of the dummy command: spacecraft -Z Axis
Off_Sun_Time	00:00:00...08:00:00	00:00:00	Y-3100	Tracks the state of the dummy command: Off Sun Time
Probe_Ref_Sun_Angle	0.0...180.0	180.0	Y-3055	Tracks the state of the dummy command: Probe Reference-Sun Angle
Saturn_Ang_Size	ALL	0.0	Y-3018	Tracks the state of the dummy command: Saturn Angular Size
Solar_Distance	0.3...15.0	1.0	Y-3000	Tracks the state of the dummy command: spacecraft_Solar Distance
SRU_Earth_Angle	0.0...180.0	180.0	Y-3009	Tracks the state of the dummy command: SRU Boresight-Earth Angle
SRU_Jupiter_Angle	0.0...180.0	180.0	Y-3015	Tracks the state of the dummy command: SRU Boresight-Jupiter Angle
SRU_Mars_Angle	0.0...180.0	180.0	Y-3013	Tracks the state of the dummy command: SRU Boresight-Mars Angle
SRU_Mercury_Angle	0.0...180.0	180.0	Y-3005	Tracks the state of the dummy command: SRU Boresight-Mercury Angle
SRU_Moon_Angle	0.0...180.0	180.0	Y-3011	Tracks the state of the dummy

Attributes	Range	Defaults	Associated Commands	Description
				command: SRU Boresight-Moon
SRUrad_Sun_Angle	0.0...180.0	180.0	Y-3003	Tracks the state of the dummy command: SRU Radiator-Sun Angle
SRU_Saturn_Angle	0.0...180.0	180.0	Y-3017	Tracks the state of the dummy command: SRU Boresight-Saturn Angle
SRU_Sun_Angle	0.0...180.0	180.0	Y-3001	Tracks the state of the dummy command: SRU Boresight-Sun Angle
SRU_Venus_Angle	ALL	180.0	Y-3007	Tracks the state of the dummy command: SRU Boresight-Venus Angle
Sun_Ang_Size	ALL	0.0	Y-3002	Tracks the state of the dummy command: Sun Angular Size
TARGETING_TAKEN	TRUE, FALSE	FALSE	target_claim	Tracks whether a target SCART is active.
UVIS_Sun_Angle	ALL	180.0	Y-3054	Tracks the state of the dummy command: UVIS Boresight-Sun Angle
Venus_Ang_Size	ALL	0.0	Y-3008	Tracks the state of the dummy command: Venus Angular Size
VIMS_Sun_Angle	0.0...180.0	180.0	Y-3053	Tracks the state of the dummy command: VIMS Boresight-Sun Angle
X	ALL	0.0	Y-3056	Tracks the state of the dummy command: spacecraft X Axis
X_Rate	ALL	0.0	A1005	Tracks the state of the dummy command: X component of angular rate
Y	ALL	0.0	Y-3057	Tracks the state of the dummy command: spacecraft Y Axis
Y_Rate	ALL	0.0	A1006	Tracks the state of the dummy command: Y component of

Attributes	Range	Defaults	Associated Commands	Description
				angular rate
Z	ALL	0.0	Y-3058	Tracks the state of the dummy command: spacecraft Z Axis
Z_Rate	ALL	0.0	A1007	Tracks the state of the dummy command: Z component of angular rate

9.3 Elements of Array Attributes

9.3.1 Array Attribute Elements in AACS Model

Attribute	Element Number	Element
ACCEL_CAL[4]	1	"Accel_Calibration"
	2	"ACC_Prime"
	3	"Start_Warmup"
	4	"Duration_Calibrate"
AKA_PROFILE[6]	1	"X"
	2	"Y"
	3	"Z"
	4	"XA"
	5	"YA"
	6	"ZA"
CATBED[16]	1	"Y1Y3_A_P"
	2	"Y2Y4_A_P"
	3	"Z1Z3_A_P"
	4	"Z2Z4_A_P"
	5	"Y1Y3_B_P"
	6	"Y2Y4_B_P"
	7	"Z1Z3_B_P"
	8	"Z2Z4_B_P"
	9	"Y1Y3_A_S"
	10	"Y2Y4_A_S"
	11	"Z1Z3_A_S"
	12	"Z2Z4_A_S"
	13	"Y1Y3_B_S"
	14	"Y2Y4_B_S"
	15	"Z1Z3_B_S"
	16	"Z2Z4_B_S"
COAST_Time[2]	1	Time of 7COAST command
	2	Time of 7COAST command + EXIT_TIME parameter
CONSTRAINT[10]	1	"CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"

Attribute	Element Number	Element
	2	"CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"
	3	"CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"
	4	"CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"
	5	"CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"
	6	"CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"
	7	"CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"
	8	"CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"
	9	"CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"
	10	"CONSTR_NAME=? BODY_OBJECT=? INERTIAL_OBJECT=? MAX_EXP_TIME=? DECAY_RATE=? CONSTR_ANGLE=? DROP_FLAG=? CONSTR_STATE=?"
DELTA_BASE[3]	1	"X"
	2	"Y"
	3	"Z"
DELTA_BASE_LONG[3]	1	"X"
	2	"Y"
	3	"Z"
DELTA_BODY[3]	1	"X"
	2	"Y"
	3	"Z"
DELTA_BODY_LONG[3]	1	"X"
	2	"Y"
	3	"Z"
EGE_LOOP[3]	1	"EGA_ID"
	2	"P_LOOP"
	3	"Q_LOOP"
LATCH[6]	1	"MPA"

Attribute	Element Number	Element
	2	"MPB"
	3	"HPA"
	4	"HPB"
	5	"LPNTO"
	6	"LPMMH"
LATCH_TIME[12]	1	"MPA=OPEN"
	2	"MPB=OPEN"
	3	"HPA=OPEN"
	4	"HPB=OPEN"
	5	"LPNTO=OPEN"
	6	"LPMMH=OPEN"
	7	"MPA=CLOSED"
	8	"MPB=CLOSED"
	9	"HPA=CLOSED"
	10	"HPB=CLOSED"
	11	"LPNTO=CLOSED"
	12	"LPMMH=CLOSED"
OFFSET[4]	1	"X"
	2	"Y"
	3	"Z"
	4	"?"
PROFILE[6]	1	"X"
	2	"Y"
	3	"Z"
	4	"XA"
	5	"YA"
	6	"ZA"
P_CMT[12]	1	"WMAX_RCS1"
	2	"WMAX_RCS2"
	3	"WMAX_RCS3"
	4	"WMAX_RWA1"
	5	"WMAX_RWA2"
	6	"WMAX_RWA3"
	7	"AMAX_RCS1"
	8	"AMAX_RCS2"

Attribute	Element Number	Element
	9	"AMAX_RCS3"
	10	"AMAX_RWA1"
	11	"AMAX_RWA2"
	12	"AMAX_RWA3"
PS_AFC[4]	1	"A_PRIME"
	2	"A_BACKUP"
	3	"B_PRIME"
	4	"B_BACKUP"
PS_RWA[8]	1	"RWA1_LINE1"
	2	"RWA1_LINE2"
	3	"RWA2_LINE1"
	4	"RWA2_LINE2"
	5	"RWA3_LINE1"
	6	"RWA3_LINE2"
	7	"RWA4_LINE1"
	8	"RWA4_LINE2"
RWA_RATE[4]	1	"RWA1"
	2	"RWA2"
	3	"RWA3"
	4	"RWA4"
TLM_READOUT[2]	1	0X000000
	2	0X000000
TLM_TRICKLE[8]	1	0X000000
	2	0X000000
	3	0X000000
	4	0X000000
	5	0X000000
	6	0X000000
	7	0X000000
	8	0X000000
STROKE[4]	1	"PA=-148"
	2	"PB=-148"
	3	"QA=-148"
	4	"QB=-148"
STOP_TIME	1	1997-001T00:00:00.000

9.3.2 Array Attribute Elements in AACS_HEALTH Model

Attribute	Element Number	Element
HEALTH[106]	1	"RWA1"
	2	"RWA2"
	3	"RWA3"
	4	"RWA4"
	5	"ACC"
	6	"IRUA"
	7	"IRUB"
	8	"SRUA"
	9	"SRUB"
	10	"SSAA"
	11	"SSAB"
	12	"EGECUA"
	13	"EGECUB"
	14	"VDECUA"
	15	"VDECUB"
	16	"EGEDA"
	17	"EGEDB"
	18	"HELVDA"
	19	"HELVDB"
	20	"MEVDA"
	21	"MEVDB"
	22	"MPDA"
	23	"MPDB"
	24	"BPLVDA"
	25	"BPLVDB"
	26	"MPA"
	27	"MPB"
	28	"HPA"
	29	"HPB"
	30	"LPNTO"
	31	"LPMMH"

Attribute	Element Number	Element
	32	"MEOA"
	33	"MEOB"
	34	"MEFA"
	35	"MEFB"
	36	"Y1A"
	37	"Y1B"
	38	"Y2A"
	39	"Y2B"
	40	"Y3A"
	41	"Y3B"
	42	"Y4A"
	43	"Y4B"
	44	"Z1A"
	45	"Z1B"
	46	"Z2A"
	47	"Z2B"
	48	"Z3A"
	49	"Z3B"
	50	"Z4A"
	51	"Z4B"
	52	"Y1Y3_A_P"
	53	"Y2Y4_A_P"
	54	"Z1Z3_A_P"
	55	"Z2Z4_A_P"
	56	"Y1Y3_B_P"
	57	"Y2Y4_B_P"
	58	"Z1Z3_B_P"
	59	"Z2Z4_B_P"
	60	"Y1Y3_A_S"
	61	"Y2Y4_A_S"
	62	"Z1Z3_A_S"
	63	"Z2Z4_A_S"
	64	"Y1Y3_B_S"
	65	"Y2Y4_B_S"
	66	"Z1Z3_B_S"
	67	"Z2Z4_B_S"

Attribute	Element Number	Element
	68	"BUSA"
	69	"BUSB"
	70	"MPA_OPEN"
	71	"MPA_CLOSED"
	72	"MPB_OPEN"
	73	"MPB_CLOSED"
	74	"MEFA_OPEN"
	75	"MEFA_CLOSED"
	76	"MEFB_OPEN"
	77	"MEFB_CLOSED"
	78	"MEOA_OPEN"
	79	"MEOA_CLOSED"
	80	"MEOB_OPEN"
	81	"MEOB_CLOSED"
	82	"HPA_OPEN"
	83	"HPA_CLOSED"
	84	"HPB_OPEN"
	85	"HPB_CLOSED"
	86	"LPMMH_OPEN"
	87	"LPMMH_CLOSED"
	88	"LPNTO_OPEN"
	89	"LPNTO_CLOSED"
	90	"BAIL"
	91	"A1"
	92	"A2"
	93	"A3"
	94	"A4"
	95	"B1"
	96	"B2"
	97	"B3"
	98	"B4"
	99	"MEA_PRESSURE_A"
	100	"MEA_TEMP1"
	101	"MEB_PRESSURE_A"
	102	"MEB_TEMP1"
	103	"MEA_PRESSURE_B"

Attribute	Element Number	Element
	104	"MEA_TEMP2"
	105	"MEB_PRESSURE_B"
	106	"MEB_TEMP2"

9.3.3 Array Attribute Elements in AACS_PRIME Model

Attribute	Element Number	Element
PRIME[55]	1	"ACC"
	2	"SRUA"
	3	"SRUB"
	4	"SSAA"
	5	"SSAB"
	6	"EGECUA"
	7	"EGECUB"
	8	"VDECUA"
	9	"VDECUB"
	10	"HPA"
	11	"HPB"
	12	"Y1A"
	13	"Y1B"
	14	"Y2A"
	15	"Y2B"
	16	"Y3A"
	17	"Y3B"
	18	"Y4A"
	19	"Y4B"
	20	"Z1A"
	21	"Z1B"
	22	"Z2A"
	23	"Z2B"
	24	"Z3A"
	25	"Z3B"
	26	"Z4A"
	27	"Z4B"

Attribute	Element Number	Element
	28	"Y1Y3_A_P"
	29	"Y2Y4_A_P"
	30	"Z1Z3_A_P"
	31	"Z2Z4_A_P"
	32	"Y1Y3_B_P"
	33	"Y2Y4_B_P"
	34	"Z1Z3_B_P"
	35	"Z2Z4_B_P"
	36	"Y1Y3_A_S"
	37	"Y2Y4_A_S"
	38	"Z1Z3_A_S"
	39	"Z2Z4_A_S"
	40	"Y1Y3_B_S"
	41	"Y2Y4_B_S"
	42	"Z1Z3_B_S"
	43	"Z2Z4_B_S"
	44	"RNOT1"
	45	"RNOT2"
	46	"RNOT3"
	47	"RNOT4"
	48	"TIMER"
	49	"BUSA"
	50	"BUSB"
	51	"PPS_REU_A"
	52	"PPS_REU_B"
	53	"ENGINEA"
	54	"ENGINEB"
	55	"PRIME_GYRO_SET", "A1A2A3_A4", "B1B2B3_B4", "A2A3B4_A4", "A1A2A3_B1", "B1B2B3_A1", "A2A3B4_B1", "A2B1B3_A1", "A1A3B2_B1", "A2B3B4_B1", "A3B2B4_B1", "A2A3B3_B2", "A2A4B1_A3", "A1A4B2_B3", "B1B2B3_A4", "A4B2B4_B3", "A1A4B2_A2", "A1A4B3_A3", "A1A2A3_B2", "A1A2A3_B3", "B1B2B3_A2", "B1B2B3_A3", "A2A4B1_B2", "A3A4B1_B3", "A4B2B4_A2", "A4B3B4_A3", "A2A3B4_B2", "A2A3B4_B3", "A1A2B3_B2", "A1A3B2_B3", "A3B1B2_A2", "A2B1B3_A3", "A1B1B2_A2", "A1A3B1_B3", "A2B3B4_B2", "A3B2B4_B3", "A2B1B4_B2", "A3B1B4_B3", "A1A2A3_A3", "A2A3A4_A4", "A1A3A4_A4", "A1A2A4_A4", "B1B2B3_B3", "B2B3B4_B4", "B1B3B4_B4", "B1B2B4_B4"
PRIME_IRU[2]	1	"IRUA"
	2	"IRUB"

9.3.4 Array Attribute Elements in AACS_POWER Model

Attribute	Element Number	Element
POWER[49]	1	"RWA1"
	2	"RWA2"
	3	"RWA3"
	4	"RWA4"
	5	"ACC"
	6	"IRUA"
	7	"IRUB"
	8	"SRUA"
	9	"SRUB"
	10	"SSAA"
	11	"SSAB"
	12	"EGECUA"
	13	"EGECUB"
	14	"VDECUA"
	15	"VDECUB"
	16	"EGEDA"
	17	"EGEDB"
	18	"HELVDA"
	19	"HELVDB"
	20	"MEVDA"
	21	"MEVDB"
	22	"MPDA"
	23	"MPDB"
	24	"BPLVDA"
	25	"BPLVDB"
	26	"RWA_PRIME"
	27	"RWA_BACKUP"
	28	"IRU_PRIME"
	29	"IRU_BACKUP"
	30	"SRU_PRIME"
	31	"SRU_BACKUP"
	32	"SSA_PRIME"

Attribute	Element Number	Element
	33	"SSA_BACKUP"
	34	"EGE_PRIME"
	35	"EGE_BACKUP"
	36	"MEVD_PRIME"
	37	"MEVD_BACKUP"
	38	"VDECU_PRIME"
	39	"VDECU_BACKUP"
	40	"BPLVD_PRIME"
	41	"BPLVD_BACKUP"
	42	"MPD_PRIME"
	43	"MPD_BACKUP"
	44	"SRUA_DECON"
	45	"SRUB_DECON"
	46	"BAIL"
	47	"SRU_PRIME_DECON"
	48	"SRU_BACKUP_DECON"
	49	"ACC_PRIME"
POWER_ON_TIME[14]	1	"RWA1"
	2	"RWA2"
	3	"RWA3"
	4	"RWA4"
	5	"EGEDA"
	6	"EGEDB"
	7	"HELVDA"
	8	"HELVDB"
	9	"MEVDA"
	10	"MEVDB"
	11	"MPDA"
	12	"MPDB"
	13	"BPLVDA"
	14	"BPLVDB"
POWER_ON_TIME_ALL[49]	1	"RWA1_ON=?"
	2	"RWA2_ON=?"
	3	"RWA3_ON=?"
	4	"RWA4_ON=?"

Attribute	Element Number	Element
	5	"ACC_ON=?"
	6	"IRUA_ON=?"
	7	"IRUB_ON=?"
	8	"SRUA_ON=?"
	9	"SRUB_ON=?"
	10	"SSAA_ON=?"
	11	"SSAB_ON=?"
	12	"EGECUA_ON=?"
	13	"EGECUB_ON=?"
	14	"VDECUA_ON=?"
	15	"VDECUB_ON=?"
	16	"EGEDA_ON=?"
	17	"EGEDB_ON=?"
	18	"HELVDA_ON=?"
	19	"HELVDB_ON=?"
	20	"MEVDA_ON=?"
	21	"MEVDB_ON=?"
	22	"MPDA_ON=?"
	23	"MPDB_ON=?"
	24	"BPLVDA_ON=?"
	25	"BPLVDB_ON=?"
	26	"RWA_PRIME_ON=?"
	27	"RWA_BACKUP_ON=?"
	28	"IRU_PRIME_ON=?"
	29	"IRU_BACKUP_ON=?"
	30	"SRU_PRIME_ON=?"
	31	"SRU_BACKUP_ON=?"
	32	"SSA_PRIME_ON=?"
	33	"SSA_BACKUP_ON=?"
	34	"EGE_PRIME_ON=?"
	35	"EGE_BACKUP_ON=?"
	36	"MEVD_PRIME_ON=?"
	37	"MEVD_BACKUP_ON=?"
	38	"VDECU_PRIME_ON=?"
	39	"VDECU_BACKUP_ON=?"

Attribute	Element Number	Element
	40	"BPLVD_PRIME_ON=?"
	41	"BPLVD_BACKUP_ON=?"
	42	"MPD_PRIME_ON=?"
	43	"MPD_BACKUP_ON=?"
	44	"SRUA_DECON_ON=?"
	45	"SRUB_DECON_ON=?"
	46	"BAIL_ON=?"
	47	"SRU_PRIME_DECON_ON=?"
	48	"SRU_BACKUP_DECON_ON=?"
	49	"ACC_PRIME_ON=?"

9.3.5 Array Attribute Elements in AACS_MISC Model

Attribute	Element Number	Element
EGA_Cmd_Sequence[2]	1	EGA_A
	2	EGA_B
IRU_Warmup[2]	1	IRU_A
	2	IRU_B
Prime_States[4]	1	RNOT1 Time
	2	RNOT2 Time
	3	RNOT3 Time
	4	RNOT4 Time
PROFILE_ISSUED_IN_RCS	1	FALSE
RCS_Rate_Change	1	FALSE
SRU_Warmup[7]	1	A Warmup
	2	B Warmup
	3	SRUA=PRIME Warmup
	4	SRUB=PRIME Warmup
	5	SRUA=BACKUP Warmup
	6	SRUA=BACKUP Warmup
	7	SID_SPOT_LIST Issued
Vector_Update[4]	1	Conic Vectors Update for FR07B22
	2	Conic Vectors Update for FR07C23

Attribute	Element Number	Element
	3	Poly Vectors Update for FR07B22
	4	Poly Vectors Update for FR07C23
Vector_Duration[4]	1	Duration of Conic Vectors for FR07B22
	2	Duration of Conic Vectors for FR07C23
	3	Duration of Poly Vectors for FR07B22
	4	Duration of Poly Vectors for FR07C23

10. PROPULSION MODULE SUBSYSTEM (PMS)

10.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR10A2	7ME_BURN, 6ATC_CNTL, 10PS_REA_HTR	CDS::ATC_CNTL_TIME, PMS::PS_REA_HTR_TIME, PMS::ME_Burn, PMS::ME_BurnBegin, PMS::ME_BurnEnd, GLOBAL::Mission_Phase	
FR10B6	7ME_BURN	PMS::ME_BurnEnd	
FR10B8	7LATCH, 7ME_BURN, 7POWER	AACS::LATCH, AACS::LATCH_TIME, PMS::Last_LP_he_Valve, PMS::ME_BurnEnd, AACS_POWER::POWER	
FR10E10	6PS_PMS_REU, 7ME_BURN, 7DELTA_BASE, 7DELTA_BASE_LONG, 7DELTA_BODY, 7DELTA_BODY_LONG, 7OFFSET, 7RCS_BURN	PMS_REU::PMS_A, PMS_REU::PMS_B, PMS_ME::Burn, PMS_thrusters::THRUST_ACTIVE	
FR10B11	7CATBED, 7DELTA_BASE, 7DELTA_BASE_LONG, 7DELTA_BODY, 7DELTA_BODY_LONG, 7OFFSET, 7ME_BURN, 7RCS_BURN	AACS::CATBED, AACS_PRIME::PRIME, PMS::Prime_Catbeds_Auto, PMS::Prime_Catbeds_Auto_Time, PMS::CATBEDS_WARM	
FR10A12	10PY_PMS	PMS::PY_PMS	
FR10B13	7ME_BURN, 10PS_REAOX_HTR	PMS::PS_REAOX_HTR, PMS::PS_REAOX_HTR_TIME, PMS::REAOX_Heaters_in_use, CDS::ATC_CNTL, CDS::ATC_CNTL_TIME, PMS::ME_BurnEnd	Part 1 of this rule cannot be done by SEQ_GEN.
FR10B14	7LATCH, 6ATC_CNTL, 10PS_PCAPANL_HTR, 10PY_PMS	PMS::Pressure_State, AACS::LATCH, PMS::PY_PMS, PMS::PS_PCAPANL_HTR, PMS::PS_PCAPANL_HTR_TIME, CDS::ATC_CNTL, CDS::ATC_CNTL_TIME	
FR10B16	10PS_PCALINE_HTR,	PMS::PS_PCAPANL_HTR, PMS::PS_PCALINE_HTR,	

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
	10PS_PCAPANL_HTR	PMS::Pressure_State	
FR10D23	7LATCH	AACS::LATCH, AACS::LATCH_TIME	
FR10E24	7LATCH	AACS::LATCH	
FR10E25	10PS_PXDCR	PMS::PS_PXDCR	
FR10E33	10PY_PMS	PMS::Last_Pyro_Fired, PMS::Last_Pyro_Fire_Time	
FR10A34	10PS_BTA_HTR	PMS::PS_BTA_HTR	
FR10A35	10PY_PMS	PMS::PY_PMS	
FR10B36	6SFP_MON_CNTL_NP, 6SFP_MON_CNTL_P, 6SFP_RSP_CNTL_NP, 6SFP_RSP_CNTL_NP, 7LATCH, 10PY_PMS	AACS::LATCH, CDS_SFP::MON_CNTL_NP, CDS_SFP::MON_CNTL_P, CDS_SFP::RSP_CNTL_NP, CDS_SFP::RSP_CNTL_NP, PMS::PY_PMS, PMS::Pressure_State, PPS::FIRED_PYROS	
FR10B37	10PY_PMS	PPS::EVENT_ENABLE	

10.2 PMS Model Attributes

Attributes	Range	Default	Associated Commands	Description
CATBEDS_WARM	TRUE, FALSE	FALSE	7CATBED, 7PRIME	TRUE if PMS::Prime_Catbeds_Auto has been true for at least 90 minutes.
Last_LP_he_Valve	ALL	""	7LATCH	Contains the name of the last low pressure helium latch valve to change position.
Last_Pyro_Fire_Time	ALL	1997-279T00:00:00	79PY_COVER 12PY_ARWM_UNLAT 12PY_LG_PRB_DPLY 12PY_MAG_BM_DPLY 12PY_MEA_COVER 12PY_SC_LV_SEP 74PY_COVER 80_PY_PRB_SEP 10PY_PMS 37PY_COVER	Tracks time of the most recent fired pyro
Last_Pyro_Fired	ALL	"?"	79PY_COVER 12PY_ARWM_UNLAT 12PY_LG_PRB_DPLY 12PY_MAG_BM_DPLY 12PY_MEA_COVER 12PY_SC_LV_SEP	Tracks name of the most recent fired pyro

Attributes	Range	Default	Associated Commands	Description
			74PY_COVER 80_PY_PRB_SEP 10PY_PMS 37PY_COVER	
ME_Burn	ALL	FALSE	7ME_Burn	TRUE if a burn is currently in progress.
ME_BurnBegin	ALL	1990-001T0:0:0	7ME_Burn	Contains the start time of the previous Main Engine Burn.
ME_BurnEnd	ALL	1990-001T0:0:0	7ME_Burn	Contains the end time of the previous Main Engine Burn.
Pressure_State	"NOT_PRESSURIZED", "PRESSURIZED", "ISOLATED", "FINAL_ISOLATION"	"NOT_PRESSURIZED"	10PY_PMS, 7LATCH	Contains pressurization state of the bipropellant tanks.
Prime_Catbeds_Auto	TRUE, FALSE	FALSE	7CATBED, 7PRIME	TRUE if all Prime Catbed heaters on all Prime Thrusters are in Auto control mode.
Prime_Catbeds_Auto_Time	ALL	1990-001T0:0:0	7CATBED, 7PRIME	Time that PMS::Prime_Catbeds_Auto became TRUE.
PS_BTA_HTR[4]	"BTA_OX_PRM_HTR=ON", "BTA_OX_PRM_HTR=OFF", "BTA_OX_SEC_HTR=ON", "BTA_OX_SEC_HTR=OFF", "BTA_FU_PRM_HTR=ON", "BTA_FU_PRM_HTR=OFF", "BTA_FU_SEC_HTR=ON", "BTA_FU_SEC_HTR=OFF"	["BTA_OX_PRM_HTR=?", "BTA_OX_SEC_HTR=?", "BTA_FU_PRM_HTR=?", "BTA_FU_SEC_HTR=?"]	10PS_BTA_HTR	Contains the current power states of Bipropellant Tank heaters controlled by the 10PS_BTA_HTR command.
PS_PCALINE_HTR[2]	"PRM_HTR=ON", "PRM_HTR=OFF", "SEC_HTR=ON", "SEC_HTR=OFF"	["PRM_HTR=?","SEC_HTR=?"]	10PS_PCALINE_HTR	Contains the current power states of PCA Line heaters controlled by the 10PS_PCALINE_HTR command.
PS_PCAPANL_HTR[3]	"HTR_1=ON", "HTR_1=OFF", "HTR_2=ON", "HTR_2=OFF",	["HTR_1=?", "HTR_2=?", "HTR_SEC=?"]	10PS_PCAPANL_HTR	Contains the current power states of PCA Panel heaters controlled by the

Attributes	Range	Default	Associated Commands	Description
	"HTR_SEC=ON", "HTR_SEC=OFF"			10PS_PCAPANL_HTR command.
PS_PCAPANL_HTR_Time[6]	ALL	["HTR_1_ON=1990-001T0:0:0","HTR_2_ON=1990-001T0:0:0","HTR_SEC_ON=1990-001T0:0:0","HTR_1_OFF=1990-001T0:0:0","HTR_2_OFF=1990-001T0:0:0","HTR_SEC_OFF=1990-001T0:0:0"]	10PS_PCAPANL_HTR	Contains the times that the power states of PCA Panel heaters controlled by the 10PS_PCAPANL_HTR changed to their present values.
PS_PCAPANL_HTR2_ON_TIME	ALL	1997-001T00:00:00	10PS_PCAPANL_HTR	Tracks the ON times of the HTR_2 heater controlled by 10PS_ PCAPANL_HTR command.
PS_PCAPANL_HTR2_OFF_TIME	ALL	1997-001T00:00:00	10PS_PCAPANL_HTR	Tracks the OFF times of the HTR_2 heater controlled by 10PS_ PCAPANL_HTR command.
PS_PXDCR[2]	"SSPS1=ON", "SSPS1=OFF", "SSPS2=ON", "SSPS2=OFF"	["SSPS1=?","SSPS2=?"]	10PS_PXDCR	Contains the current power states of Pressure Transducer Sets controlled by the 10PS_PXDCR command.
PS_REA_HTR[4]	"REA_A_LINE_A=ON", "REA_A_LINE_A=OFF", "REA_A_LINE_B=ON", "REA_A_LINE_B=OFF", "REA_B_LINE_A=ON", "REA_B_LINE_A=OFF", "REA_B_LINE_B=ON", "REA_B_LINE_B=OFF"	["REA_A_LINE_A=?", "REA_A_LINE_B=?", "REA_B_LINE_A=?", "REA_B_LINE_B=?"]	10PS_REA_HTR	Contains the current power states of REA replacement heaters controlled by the 10PS_REA_HTR command.
PS_REA_HTR_Time[8]	ALL	["REA_A_LINE_A_ON=1990-001T0:0:0","REA_A_LINE_B_ON=1990-001T0:0:0","REA_B_LINE_A_ON=1990-001T0:0:0","REA_B_LINE_B_ON=1990-001T0:0:0","REA_A_LINE_A_OFF=1990-001T0:0:0","REA_A_LINE_B_OFF=1990-001T0:0:0","REA_B_LINE_A_OFF=1990-001T0:0:0","REA_B_LINE_B_OFF=1990-001T0:0:0"]	10PS_REA_HTR	Contains the times that the power states of REA replacement heaters controlled by the 10PS_REA_HT changed to their present values.
PS_REA_HTR_ON_TIME[4]	ALL	[1997-001T00:00:00,1997-001T00:00:00,1997-001T00:00:00,1997-001T00:00:00]	10PS_REA_HTR	PMS REA Heater ON time
PS_REA_HTR_OFF_TIME[4]	ALL	[1997-001T00:00:00,1997-001T00:00:00,1997-001T00:00:00,1997-001T00:00:00]	10PS_REA_HTR	PMS REA Heater OFF time

Attributes	Range	Default	Associated Commands	Description
PS_REAOX_HTR[2]	"PRM_HTR=ON", "PRM_HTR=OFF", "SEC_HTR=ON", "SEC_HTR=OFF"	["PRM_HTR=?","SEC_HTR=?"]	10PS_REAOX_HTR	Contains the current power states of REA Oxidizer Valve heaters controlled by the 10PS_REAOX_HTR command.
PS_REAOX_HTR_Time[4]	ALL	["PRM_HTR_ON=1990-001T0:0:0","SEC_HTR_ON=1990-001T0:0:0","PRM_HTR_OFF=1990-001T0:0:0","SEC_HTR_OFF=1990-001T0:0:0"]	10PS_REAOX_HTR	Contains the times that the power states of REA Oxidizer Valve heaters controlled by the 10PS_REAOX_HTR changed to their present values.
PY_PMS[24]	ALL	["PV1=NOT_FIRED", "PV2=NOT_FIRED", "PV3=NOT_FIRED", "PV4=NOT_FIRED", "PV5=NOT_FIRED", "PV6=NOT_FIRED", "PV7=NOT_FIRED", "PV8=NOT_FIRED", "PV9=NOT_FIRED", "PV10_22=NOT_FIRED", "PV11_23", "PV12_24=NOT_FIRED", "PV13_25=NOT_FIRED", "PV14_26=NOT_FIRED", "PV15_27=NOT_FIRED", "PV2W=NOT_FIRED", "PV2Y_31=NOT_FIRED", "PV2Z_32=NOT_FIRED", "PV20=NOT_FIRED", "PV28=NOT_FIRED", "PV29=NOT_FIRED", "PV30=NOT_FIRED", "PV33=NOT_FIRED", "PV40_41=NOT_FIRED"]	10PY_PMS	Contains the current states of Propellant Valves controlled by the 10PS_REAOX_HTR command.
PyroValveState[24]	ALL	["PV1=CLOSED", "PV2=OPEN", "PV3=CLOSED", "PV4=CLOSED", "PV5=CLOSED", "PV6=OPEN", "PV7=CLOSED","PV8=OPEN", "PV9=CLOSED", "PV10_22=OPEN", "PV11_23=CLOSED", "PV12_24=OPEN", "PV13_25=CLOSED", "PV14_26=OPEN", "PV15_27=CLOSED", "PV2W=CLOSED", "PV2Y_31=OPEN", "PV2Z_32=CLOSED", "PV20=CLOSED", "PV28=OPEN", "PV29=CLOSED", "PV30=CLOSED", "PV33=CLOSED", "PV40_41=CLOSED"]	10PY_PMS	Contains the current positions of Propellant Valves controlled by the 10PS_REAOX_HTR command.

10.3 Array Attribute Elements in PMS Model

Attribute	Element Number	Element
PS_BTA_HTR[4]	1	"BTA_OX_PRM_HTR"
	2	"BTA_OX_SEC_HTR"
	3	"BTA_FU_PRM_HTR"
	4	"BTA_FU_SEC_HTR"
PS__PCALINE_HTR[2]	1	"PRM_HTR"
	2	"SEC_HTR"
PS__PCAPANL_HTR[3]	1	"HTR_1"
	2	"HTR_2"
	3	"HTR_SEC"
PS_PCAPANL_HTR_Time[6]	1	"HTR_1_ON"
	2	"HTR_2_ON"
	3	"HTR_SEC_ON"
	4	"HTR_1_OFF"
	5	"HTR_2_OFF"
	6	"HTR_SEC_OFF"
PS_PXDCR[2]	1	"SSPS1"
	2	"SSPS2"
PS_REA_HTR[4]	1	"REA_A_LINE_A"
	2	"REA_A_LINE_B"
	3	"REA_B_LINE_A"
	4	"REA_B_LINE_B"
PS_REA_HTR_Time[8]	1	"REA_A_LINE_A_ON"
	2	"REA_A_LINE_B_ON"
	3	"REA_B_LINE_A_ON"
	4	"REA_B_LINE_B_ON"
	5	"REA_A_LINE_A_OFF"
	6	"REA_A_LINE_B_OFF"
	7	"REA_B_LINE_A_OFF"
	8	"REA_B_LINE_B_OFF"

Attribute	Element Number	Element
PS_REA_HTR_OFF_TIME[4]	1	"REA_A_LINE_A_OFF"
	2	"REA_A_LINE_B_OFF"
	3	"REA_B_LINE_A_OFF"
	4	"REA_B_LINE_B_OFF"
PS_REAOX_HTR[2]	1	"PRM_HTR"
	2	"SEC_HTR"
PS_REAOX_HTR_Time[4]	1	"PRM_HTR_ON"
	2	"SEC_HTR_ON"
	3	"PRM_HTR_OFF"
	4	"SEC_HTR_OFF"
PY_PMS[24]	1	"PV1"
	2	"PV2"
	3	"PV3"
	4	"PV4"
	5	"PV5"
	6	"PV6"
	7	"PV7"
	8	"PV8"
	9	"PV9"
	10	"PV10_22"
	11	"PV11_23"
	12	"PV12_24"
	13	"PV13_25"
	14	"PV14_26"
	15	"PV15_27"
	16	"PV2W"
	17	"PV2Y_31"
	18	"PV2Z_32"
	19	"PV20"
	20	"PV28"
	21	"PV29"
	22	"PV30"
	23	"PV33"
	24	"PV40_41"

Attribute	Element Number	Element
PyroValveState[24]	1	"PV1"
	2	"PV2"
	3	"PV3"
	4	"PV4"
	5	"PV5"
	6	"PV6"
	7	"PV7"
	8	"PV8"
	9	"PV9"
	10	"PV10_22"
	11	"PV11_23"
	12	"PV12_24"
	13	"PV13_25"
	14	"PV14_26"
	15	"PV15_27"
	16	"PV2W"
	17	"PV2Y_31"
	18	"PV2Z_32"
	19	"PV20"
	20	"PV28"
	21	"PV29"
	22	"PV30"
	23	"PV33"
	24	"PV40_41"

11. TEMPERATURE CONTROL SUBSYSTEM(TEMP)

11.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR11C2	6ATC_CNTL 10PS_PCAPANL_HTR 10PS_REA_HTR 10PS_REAOX_HTR 12PS_MAG_BM_HTR 80PS_RFE_HTR,	PROBE::PS_RFE_HTR_OFF_TIME DEV::PS_MAG_BM_HTR_OFF_TIME PMS::PS_PCAPANL_HTR2_OFF PMS::PS_REA_HTR_OFF_TIME	
FR11B3	6ATC_CNTL	PROBE::PS_RFE_HTR, CDS_ATC::ATC_CNTL	
FR11C5	1PS_RSP_HTR	STRU::PS_RSP_HTR, STRU::PS_RSP_HTR_TIME	

11.2 Model Attributes

The models and attributes associated with the Temperature Control Subsystem are part of the Structure Subsystem and Huygens Probe.

12. MECHANICAL DEVICES SUBSYSTEM (DEV)

12.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR12D1	12PS_ATICUL_RWM, 7HEALTH	DEV::PS_ATICUL_RWM, AACS_HEALTH::HEALTH	
FR12A3	12PS_MEA_MOTR_A, 12PS_MEA_MOTR_B, 12PY_MEA_COVER, 7ME_BURN, 12PY_SC_LV_SEP	DEV::PS_MEA_MOTR_A, DEV::PS_MEA_MOTR_B, DEV::PS_MEA_MOTR_A_TIME, DEV::PS_MEA_MOTR_B_TIME, PMS::ME_BurnBegin, PMS::ME_BurnEnd	
FR12B4	12PS_ATICUL_RWM, 12ARWM_POL_CW, 12ARWM_POL_CCW	DEV::PS_ATICUL_RWM, DEV::ARWM_POL	

12.2 DEV Model Attributes

Attributes	Range	Default	Associated Commands	Description
ARWM_POL[2]	"RWM_A=CW", "RWM_A=CCW", "RWM_B=CW", "RWM_B=CCW"	["?","?"]	12ARWM_POL_CCW, 12ARWM_POL_CW	Tracks state of the 12ARWM_POL_CCW and 12ARWM_POL_CW commands
CE_MAG_BM_DPLY	"DISABL", "ENABLE"	"DISABL"	12CE_MAG_BM_DPLY	Tracks state of the 12CE_MAG_BM_DPLY command
MEA_Cover_State	"MEA_Cover_State=OPEN", "MEA_Cover_State=CLOSED"	"MEA_Cover_State=?"	12PS_MEA_MOTR_A, 12PS_MEA_MOTR_B	Tracks state of MEA micrometeroid cover
PS_ATICUL_RWM[2]	"RWM_A=ON", "RWM_A=OFF", "RWM_B=ON", "RWM_B=OFF"	["?","?"]	12PS_ATICUL_RWM	Tracks state of the 12PS_ATICUL_RWM command
PS_ATICUL_RWM_Off_Time[2]	ALL	[1997-001T0:0:0,1997-001T0:0:0]	12PS_ATICUL_RWM	Tracks OFF time of the 12PS_ATICUL_RWM command
PS_ATICUL_RWM_ON_Time[2]	ALL	[1997-001T0:0:0,1997-001T0:0:0]	12PS_ATICUL_RWM	Tracks first issuance of ON time of the 12PS_ATICUL_RWM command
PS_MAG_BM_HTR_OFF_TIME[2]	ALL	[1997-001T0:0:0,1997-001T0:0:0]	12PS_MAG_BM_HTR	
PS_MAG_BM_HTR_ON_TIME				
PS_MAG_BM_HTR[2]	"MAGLA=ON", "MAGLA=OFF", "MAGLB=ON" ,"MAGLB=OFF"	["?","?"]	12PS_MAG_BM_HTR	Tracks state of the 12PS_MAG_BM_HTR command
PS_MEA_MOTR_A[2]	"ON", "OFF", "D", "S"	["?","?"]	12PS_MEA_MOTR_A	Tracks state of the 12PS_MEA_MOTR_A command
PS_MEA_MOTR_B[2]	"ON", "OFF", "D", "S"	["?","?"]	12PS_MEA_MOTR_B	Tracks state of the 12PS_MEA_MOTR_B command
PS_MEA_MOTR_A_TIME[2]	ALL	[1997-001T00:00:00.00, 1997-001T00:00:00.00]	12PS_MEA_MOTR_A	Tracks time of the 12PS_MEA_MOTR_A command

Attributes	Range	Default	Associated Commands	Description
PS_MEA_MOTR_B_TIME[2]	ALL	[1997-001T00:00:00.00, 1997-001T00:00:00.00]	12PS_MEA_MOTR_A	Tracks time of the 12PS_MEA_MOTR_B command
PS_MEA_MOTR_STIME	ALL	1997-001T00:00:00.00	12PS_MEA_MOTR_A, 12PS_MEA_MOTR_B	
PS_MEA_MOTR_SDUR	ALL	000T00:00:00.00	12PS_MEA_MOTR_A, 12PS_MEA_MOTR_B	
PS_MEA_UNUSED[2]	"A=ON", "A=OFF", "B=ON", "B=OFF"	["?","?"]	12PS_MEA_UNUSED	Tracks state of the 12PS_MEA_UNUSED command
PS_REA_HTR_OFF_TIME	ALL	[1997-001T00:00:00, 1997-001T00:00:00, 1997-001T00:00:00, 1997-001T00:00:00]	10PS_REA_HTR	Stores OFF Time for each of the 4 REA Heaters
PS_REA_HTR_ON_TIME	ALL	[1997-001T00:00:00, 1997-001T00:00:00, 1997-001T00:00:00, 1997-001T00:00:00]	10PS_REA_HTR	Stores ON Time for each of the 4 REA Heaters
PS_PCAPANL_HTR2_OFF_TIME	ALL	1997-001T00:00:00	10PS_PCAPANL_HTR	PMS PCAPANL Heater OFF Time
PS_PCAPANL_HTR2_ON_TIME	ALL	1997-001T00:00:00	10PS_PCAPANL_HTR	PMS PCAPANL Heater ON Time
PY_ARWM_UNLAT	"UNLATCHED", "LATCHED"	"LATCHED"	12PY_ARWM_UNLAT	Tracks state of the 12PY_ARWM_UNLAT command
PY_LG_PRB_DPLY	"UNDEPLOYED", "DEPLOYED"	"UNDEPLOYED"	12PY_LG_PRB_DPLY	Tracks state of the 12PY_LG_PRB_DPLY command
PY_MAG_BM_DPLY	"UNDEPLOYED", "DEPLOYED"	"UNDEPLOYED"	12PY_MAG_BM_DPLY	Tracks state of the 12PY_MAG_BM_DPLY command
PY_MEA_COVER	"FIRED", "NOT_FIRED"	"NOT_FIRED"	12PY_MEA_COVER	Tracks state of the 12PY_MEA_COVER command
PY_SC_LV_SEP	"FIRED", "NOT_FIRED"	"NOT_FIRED"	12PY_SC_LV_SEP	Tracks state of the 12PY_SC_LV_SEP command
PY_SC_LV_SEP_TIME	ALL	1997-001T00:00:00.00	12PY_SC_LV_SEP	Tracks time of the 12PY_SC_LV_SEP command

12.3 Array Attribute Elements in DEV Model

Attribute	Element Number	Element
ARWM_POL[2]	1	"A"
	2	"B"
PS_ATICUL_RWM[2]	1	"RWM_A"
	2	"RWM_B"
PS_ATICUL_RWM_ON_Time[2]	1	"RWM_A"
	2	"RWM_B"
PS_ATICUL_RWM_Off_Time[2]	1	"RWM_A"
	2	"RWM_B"
PS_MAG_BM_HTR[2]	1	"MAGLA"
	2	"MAGLB"
PS_MAG_BM_HTR_OFF_TIME[2]	1	Motor A OFF time
	2	Motor B OFF time
PS_MEA_MOTR_A[2]	1	position
	2	state
PS_MEA_MOTR_B[2]	1	position
	2	state
PS_MEA_MOTR_TIME_A[2]	1	"ON"
	2	"OFF"
PS_MEA_MOTR_TIME_B[2]	1	"ON"

Attribute	Element Number	Element
	2	"OFF"
PS_MEA_UNUSED[2]	1	"A"
	2	"B"

13. SOLID STATE RECORDER (SSR)

13.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR16E15	6SSR_PASS_CMD_P, 6SSR_PASS_CMD_NP	CDS::SSR_FeedThru	
FR16B16	6MRO_SSR, 6SSR_MLD_REPAIR, 6SSR_MLD_COPY, 6SSR_MLD_VERIFY, 6SSR_PASS_CMD_P, 6SSR_PASS_CMD_NP	CDS::CDS_Function, CDS::CDS_Function_Time	
FR16E22	6SSR_PASS_CMD_P		
FR16C23	6SSR_PASS_CMD_P		
FR16E25	16PS_SSR	SSR::PS_SSR_A, SSR::PS_SSR_B, SSR::PS_SSR_PCU	
FR16E28	16PS_SSR	SSR::PS_SSR_A, SSR::PS_SSR_B, SSR::PS_SSR_PCU	
FR16B29	16PS_SSR	SSR::PS_SSR_A, SSR::PS_SSR_B, SSR::PS_SSR_PCU	

13.2 SSR Model Attributes

Attributes	Range	Default	Associated Commands	Description
PS_SSR_A	"ON","OFF","?"	"?"	16PS_SSR	SSR_A power
PS_SSR_B	"ON","OFF","?"	"?"	16PS_SSR	SSR_B power
PS_SSR_PCU[4]	"SSR_A_PRM=ON","SSR_A_BK=ON","SSR_B_PRM=ON","SSR_B_BK=ON","SSR_A_PRM=OFF","SSR_A_BK=OFF","SSR_B_PRM=OFF","SSR_B_BK=OFF"	["SSR_A_PRM=?","SSR_A_BK=?","SSR_B_PRM=?","SSR_B_BK=?"]	16PS_SSR	Save the state of the SSR power

13.3 Array Attribute Elements in SSR Model

Attribute	Element Number	Element
PS_SSR_PCU[4]	1	"SSR_A_PRM"
	2	"SSR_A_BK"
	3	"SSR_B_PRM"
	4	"SSR_B_BK"

14. RADIO SCIENCE SUBSYSTEM (RSS)

14.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR18C3	2RFIS, 18PS_KA_BND_TWTA	RFS::RFIS, RSS::PS_KA_BND_TWTA, RSS::PS_KA_BND_TWTA_MODE	
FR18C4	2RFIS, 18PS_KA_BND_TWTA	RFS::RFIS, RSS::PS_KA_BND_TWTA, RSS::PS_KA_BND_TWTA_TIME	

14.2 RSS Model Attributes

Attributes	Range	Default	Associated Commands	Description
PS_KA_BND_EXCT	"PS_KA_BND_EXCT=ON", "PS_KA_BND_EXCT=OFF"	"PS_KA_BND_EXCT=?"	18PS_KA_BND_EXCT	Tracks the power state of the Ka Band Exciter
PS_KA_BND_TRNS	"PS_KA_BND_TRNS=ON", "PS_KA_BND_TRNS=OFF	"PS_KA_BND_TRNS=?"	18PS_KA_BND_TRNS	Tracks the power state of the Ka Band Translator
PS_KA_BND_TWTA	"PS_KA_BND_TWTA=ON", "PS_KA_BND_TWTA=OFF", "PS_KA_BND_TWTA=WARM-UP"	"PS_KA_BND_TWTA=?"	18PS_KA_BND_TWTA	Tracks the power state of the Ka Band TWTA
PS_KA_BND_TWTA_MODE	"PS_KA_BND_TWTA_MODE=STANDB	"PS_KA_BND_TWTA_MODE=?"	18PS_KA_BND_TWTA	Tracks the preceding mode of the Ka

Attributes	Range	Default	Associated Commands	Description
	Y", "PS_KA_BND_TWTA_MODE=OPERATE","?"			Band TWTA
PS_KA_BND_TWTA_TIME	ALL	"PS_KA_BND_TWTA_TIME_OFF=1997-279T00:00:00"	18PS_KA_BND_TWTA	Tracks the warm-up requirements of the Ka Band TWTA
PS_S_BND_TRNS	"PS_S_BND_TRNS=ON", "PS_S_BND_TRNS=OFF"	"PS_S_BND_TRNS=?"	18PS_S_BND_TRNS	Tracks the power state of the S Band Transmitter

15. MAGNETOMETER (MAG)

15.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR35C2	35PS_SENSOR_HTR	None	

16. IMAGING SCIENCE SUBSYSTEM (ISS)

16.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR36B1	Y-3000, Y-3002, Y-3051	AACS_Channel_ID::Solar_Distance, AACS_Channel_ID::ISS_Sun_Angle, AACS_Channel_ID::Sun_Ang_Size, AACS_Channel_ID::ISS_Sun_View_Time, AACS_Channel_ID::ISS_Sun_Viewed, AACS_Channel_ID::err_flag	
FR36B2	36PS_NAC, 36PS_NAC_HTR, 6EXT_MEM_LOAD, 36PS_WAC, 36PS_WAC_HTR	ISS::PS_NAC, ISS::PA_NAC_HTR, CDS::EXT_MEM_LOAD_TIME, ISS::PS_WAC, ISS::PS_WAC_HTR	
FR36E4	12PY_SC_LV_SEP, 36PS_NAC_DECON1, 36PS_NAC_DECON2, 36PS_WAC_DECON1, 36PS_WAC_DECON2,	ISS::PS_NAC_DECON1, ISS::PS_WAC_DECON1, ISS::PS_NAC_DECON1_TIME, ISS::PS_WAC_DECON1_TIME, ISS::WAC_CYCLE_COUNT, ISS::NAC_CYCLE_COUNT, ISS::PS_WAC_DECON2, ISS::PS_NAC_DECON2, ISS::PS_WAC_DECON2_TIME, ISS::PS_NAC_DECON2_TIME	Need to know when Probe Checkout, Gravity Wave Experiment, and Delta Vs occur
FR36C5	36PS_NAC_DECON1, 36PS_WAC_DECON1	ISS::PS_NAC_DECON1_TIME, ISS::PS_WAC_DECON1_TIME	
FR36E6	36NAC_TRIGGER, 36WAC_TRIGGER	ISS::PS_NAC, ISS::PS_NAC_TIME, ISS::PS_WAC, ISS::PS_WAC_TIME, ISS::IS_TRIGGER_TIME	
FR36E8	36PS_NAC, 36PS_WAC	ISS::PS_NAC, ISS::PA_WAC	

16.2 ISS Model Attributes

Attributes	Range	Default	Associated Commands	Description
DECON1_CYCLE_COUNT IS_TRIGGER_TIME[2]	ALL	[1997-001T0:0:0.000, 1997-001T0:0:0.000]	36NAC_TRIGGER, 36WAC_TRIGGER	Not used; mistakenly left in Seqgen.
NAC_ALF_TIME[2]	ALL	[1997-001T0:0:0.000, 1997-001T0:0:0.000]	36NAC_ALF, 36NAC_ALF_END	
NAC_CYCLE_COUNT	ALL	0	36PS_NAC_DECON1, 36PS_NAC_DECON2	
NAC_UPLOAD_TIME	ALL	1997-001T0:0:0.000	36NAC_TRIGGER, 36WAC_TRIGGER, 36NAC_UPLOAD,	
PS_NAC	"36PS_NAC=OFF", "36PS_NAC=ON"	"36PS_NAC=?"	6EXT_MEM_LOAD, 36NAC_TRIGGER, 36PS_NAC, 36PS_NAC_HTR	Tracks state of 36PS_NAC command
PS_NAC_TIME[2]	ALL	[1997-001T0:0:0.000, 1997-001T0:0:0.000]	36NAC_TRIGGER, 36PS_NAC	Keeps track of time NAC was turned on and off
PS_NAC_DECON1	"36PS_NAC_DECON1=OFF", "36PS_NAC_DECON1=ON"	"36PS_NAC_DECON1=?"	36PS_NAC_DECON1	Tracks state of 36PS_NAC_DECON1 command
PS_NAC_DECON2	"36PS_NAC_DECON2=OFF", "36PS_NAC_DECON2=ON"	"36PS_NAC_DECON2=?"	36PS_NAC_DECON2	
PS_NAC_DECON1_TIME[2]	ALL	[1997001T0:0:0.000, 1997-001T0:0:0.000]	36PS_NAC_DECON1	tracks first time 36PS_NAC_DECON1 was turned ON, and OFF time
PS_NAC_DECON2_TIME[2]	ALL	[1997001T0:0:0.000, 1997-001T0:0:0.000]	36PS_NAC_DECON2	
PS_NAC_HTR	"36PS_NAC_HTR=OFF", "36PS_NAC_HTR=ON"	"36PS_NAC_HTR=?"	6EXT_MEM_LOAD, 36PS_NAC, 36PS_NAC_HTR	Tracks state of 36PS_NAC_HTR command
PS_WAC	"36PS_WAC=OFF", "36PS_WAC=ON"	"36PS_WAC=?"	36PS_WAC,	Tracks state of 36PS_WAC

Attributes	Range	Default	Associated Commands	Description
			36PS_WAC_HTR, 6EXT_MEM_LOAD, 36WAC_TRIGGER	command
PS_WAC_DECON1	"36PS_WAC_DECON1=OFF", "36PS_WAC_DECON1=ON"	"36PS_WAC_DECON1=?"	36PS_WAC_DECON1	Tracks state of 36PS_WAC_DECON1 command
PS_WAC_DECON2	"36PS_WAC_DECON2=OFF", "36PS_WAC_DECON2=ON"	"36PS_WAC_DECON2=?"	36PS_WAC_DECON2	
PS_WAC_DECON1_TIME[2]	ALL	[1997-001T0:0:0.000, 1997-001T0:0:0.000]	36PS_WAC_DECON1	Tracks ON time of 36PS_WAC_DECON1
PS_WAC_DECON2_TIME[2]	ALL	[1997-001T0:0:0.000, 1997-001T0:0:0.000]	36PS_WAC_DECON12	Tracks ON time of 36PS_WAC_DECON1
PS_WAC_HTR	"36PS_WAC_HTR=OFF", "36PS_WAC_HTR=ON"	"36PS_WAC_HTR=?"	36PS_WAC, 36PS_WAC_HTR, 6EXT_MEM_LOAD	Tracks state of 36PS_WAC_HTR command
PS_WAC_TIME[2]	ALL	[1997-001T0:0:0.000, 1997-001T0:0:0.000]	36PS_WAC, 36WAC_TRIGGER	Keeps track of time WAC was turned on
RT_NAC_SAFE	"36RT_NAC_SAFE=NOSAFE", "36RT_NAC_SAFE=SAFE"	"36RT_NAC_SAFE=?"	36RT_NAC_SAFE	Tracks state of 36RT_NAC_SAFE command
RT_WAC_SAFE	"36RT_WAC_SAFE=NOSAFE", "36RT_WAC_SAFE=SAFE"	"36RT_WAC_SAFE=?"	36RT_WAC_SAFE	Tracks state of 36RT_WAC_SAFE command
RT_WDTERR_NAC	"36RT_WDTERR_NAC=CLEAR", "36RT_WDTERR_NAC=SET"	"36RT_WDTERR_NAC=?"	36RTWDTERR_NAC	Tracks state of the command 36RT_WDTERR_NAC
RT_WDTERR_WAC	"36RT_WDTERR_WAC=CLEAR", "36RT_WDTERR_WAC=SET"	"36RT_WDTERR_WAC=?"	36RTWDTERR_WAC	Tracks state of the command 36RT_WDTERR_WAC
RT_WPERR_NAC	"36RT_WPERR_NAC=CLEAR", "36RT_WPERR_NAC=SET"	"36RT_WPERR_NAC=?"	36RT_WPERR_NAC	Tracks state of the command 36RT_WPERR_NAC
RT_WPERR_WAC	"36RT_WPERR_WAC=CLEAR", "36RT_WPERR_WAC=SET"	"36RT_WPERR_WAC=?"	36RT_WPERR_WAC	Tracks state of the command 36RT_WPERR_WAC
RT_WPFNC_NAC	"36RT_WPFNC_NAC=ENABLE", "36RT_WPFNC_NAC=DISABLE"	"36RT_WPFNC_NAC=?"	36RT_WPFNC_NAC	Tracks state of the command 36RT_WPFNC_NAC

Attributes	Range	Default	Associated Commands	Description
RT_WPFNC_WAC	"36RT_WPFNC_WAC=ENABLE", "36RT_WPFNC_WAC=DISABLE"	"36RT_WPFNC_WAC=?"	36RT_WPFNC_WAC	Tracks state of the command 36RT_WPFNC_WAC
WAC_ALF_TIME[2]	ALL	[1997-001T0:0:0.000, 1997-001T0:0:0.000]	36WAC_ALF, 36WAC_ALF_END,	
WAC_CYCLE_COUNT	ALL	0	36PS_WAC_DECON1, 36PS_WAC_DECON2	
WAC_UPLOAD_TIME	ALL	1997-001T0:0:0.000	36NAC_TRIGGER, 36WAC_TRIGGER, 36WAC_UPLOAD,	

16.3 Array Attribute Elements in ISS Model

Attribute	Element Number	Element
IS_TRIGGER_TIME[2]	1	NAC Trigger Time
	2	WAC Trigger Time
NAC_ALF_TIME[2]	1	NAC ALF Start Time
	2	NAC ALF End Time
WAC_ALF_TIME[2]	1	WAC ALF Start Time
	2	WAC ALF End Time
PS_NAC_TIME[2]	1	"ON"
	2	"OFF"
PS_NAC_DECON1_TIME[2]	1	"ON"
	2	"OFF"
PS_NAC_DECON2_TIME[2]	1	"ON"
	2	"OFF"
PS_WAC_DECON1_TIME[2]	1	"ON"
	2	"OFF"
PS_WAC_DECON2_TIME[2]	1	"ON"
	2	"OFF"
PS_WAC_ON_TIME[2]	1	"ON"
	2	"OFF"

17. VISIBLE AND INFRARED MAPPING SPECTROMETER (VIMS)

17.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR37B1	37PS_VIMS_HTR, 37PS_VIMS, 37RT_SLEEP	VIMS::PS_VIMS, VIMS::PS_VIMS_HTR, VIMS::RT_SLEEP	
FR37B2	Y-3000, Y-3002, Y-3053, 37PY_COVER	VIMS::VIMS_Cover_Deployed, AACS_Channel_ID::VIMS_Sun_Angle, AACS_Channel_ID::Sun_Ang_Size, AACS_Channel_ID::err_flag	
FR37C3	37PS_IRSHD_DECON, 37PS_IROPT_DECON, 37PS_VOPT_DECON, 37TRIGGER	VIMS::Sci_Data_Acq, VIMS:: PS_IRSHD_DECON, VIMS:: PS_IRSHD_DECON_Off_Time, VIMS:: PS_IROPT_DECON, VIMS:: PS_IROPT_DECON_Off_Time, VIMS::PS_VOPT_DECON, VIMS:: PS_VOPT_DECON_Off_Time	
FR37C7	37RT_FPA_HTR	None	
FR37C14	37PS_VIMS, 37RT_SLEEP, 37IDLE, 6EXT_MEM_LOAD	VIMS::PS_VIMS, VIMS::RT_SLEEP, VIMS::No_37IDLE_after_VIMS_on, VIMS::IDLE_Time	

17.2 VIMS Model Attributes

Attributes	Range	Default	Associated Commands	Description
IDLE_Time	ALL	1997-001T00:00:00	37IDLE	Tracks time of 37IDLE command for checking FR37C14
No_37IDLE_after_VIMS_on	ALL	FALSE	37IDLE, 37PS_VIMS	Tracks state of 37IDLE for checking FR37C14
PS_IROPT_DECON[2]	“HTR1=ON”,“HTR1=OFF”, “HTR2=ON”, “HTR2=OFF”	[“HTR1=?”, “HTR2=?”]	37PS_IROPT_DECON	Stores status of VIMS IR O decon heaters power.
PS_IROPT_DECON_Off_Time [2]	All	[1997-001T00:00:00, 1997-001T00:00:00]	37PS_IROPT_DECON	Stores time of most recent 37PS_IROPT_DECON,OFF command (that changed the state from ON to OFF) for HTR1 and HTR2 respectively.
PS_IRSHD_DECON	"ON","OFF","?"	"?"	37PS_IRSHD_DECON	Stores status of VIMS IR shield decon heater power
PS_IRSHD_DECON_Off_Time	All	1997-001T00:00:00	37PS_IRSHD_DECON	Stores time of most recent 37PS_IRSHD_DECON,OFF command (that changed the state from ON to OFF)
PS_VIMS_HTR	"ON","OFF","?"	"?"	37PS_VIMS_HTR	Tracks power state of VIMS_HTR
PS_VIMS	"ON","OFF","?"	"?"	37PS_VIMS	Tracks power state of VIMS
PS_VOPT_DECON	"ON","OFF","?"	"?"	37PS_VOPT_DECON	Tracks state of VIMS V O decon heater power
PS_VOPT_DECON_Off_Time	All	1997-001T00:00:00	37PS_VOPT_DECON	Stores time of most recent 37PS_VOPT_DECON,OFF command (that changed the state from ON to OFF)
RT_SLEEP	"ACTIVE","SLEEP","?"	"?"	37RT_SLEEP	Tracks state of 37RT_SLEEP

Attributes	Range	Default	Associated Commands	Description
RT_CCD_HTR	"HTRON","HTROFF","?"	"?"	37RT_CCD_HTR	Tracks state of 37RT_CCD_HTR command
Sci_Data_Acq	TRUE, FALSE	FALSE	37RT_SLEEP, 37SLEEP, 37TRIGGER	Indicates if VIMS science data can be acquired.
VIMS_Cover_Deployed	TRUE, FALSE	FALSE	37PY_COVER	Indicates if VIMS Cover have been deployed or not

18. SCIENCE CALIBRATION SUBSYSTEM (SCAS)

18.1 SCAS Models Attributes

Attributes	Range	Default	Associated Commands	Description
Mag_Coil_Power	"ON", "OFF","?"	"?"	40PS_MAG_COIL	Magnetic Coil Power status

19. RADIO AND PLASMA WAVE SCIENCE SUBSYSTEM (RPWS)

19.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR73E1	6EXT_MEM_LOAD, 73RT_SLEEP	RPWS::RT_SLEEP	
FR73E2	ALL RPWS COMMANDS EXCEPT THE THREE ALF COMMANDS	RPWS::RT_RESET_TIME	
FR73B3	73ANT_CNTL	RPWS::ANT_CNTL, RPWS::ANT_CNTL_TIME, RPWS::PS_ANT_MOTOR, RPWS::PS_RPWS	
FR73E4	73RT_EX_MINUS, 73RT_EX_PLUS, 73RT_EZ_PLUS	RPWS::RT_CNTL	
FR73B5	73IEB_TRIGGER, 73POWER_CNTL, 73RT_SLEEP, 73RT_RESET, 73PS_RPWS	RPWS::Ps_Rpws_Sleep_Cmd_Pairs, RPWS::Rt_Sleep_Cmd_Pairs, RPWS::Power_Cntl_Cmd_Pairs, RPWS::Rt_Reset_Cmd_Sets	
FR73C6	73PS_ANT_MOTOR(ON), 73ANT_CNTL, 73RT_EX_P_CNTL(ENABLE), 73RT_EX_N_CNTL(ENABLE), 73RT_EZ_P_CNTL(ENABLE)	none	

19.2 RPWS Model Attributes

Attributes	Range	Default	Associated Commands	Description
ANT_CNTL[3]	"EX_MINUS=IN", "EX_PLUS=IN", "EZ_PLUS=IN", "EX_MINUS=OUT", "EX_PLUS=OUT", "EZ_PLUS=OUT"	["EX_MINUS=?", "EX_PLUS=?", "EZ_PLUS=?"]	73ANT_CNTL	To keep the information on the antennas if it was deployed or retracted.
ANT_CNTL_TIME[3]	ALL	[1997-001T00:00:00.000,1997-001T00:00:00.000,1997-001T00:00:00.000]	73RT_EX_N_CNTL, 73RT_EX_P_CNTL, 73RT_EX_P_CNTL	Keep track of the time between antenna deployment and the time it is disabled.
HFR_RELAY_ENA	"?","OPEN","CLOSED"	"?"	73HFR_RELAY_ENA	Store the state of the last 73HFR_RELAY_ENA command for checking FR82E3
IEB_TRIGGER	ALL	"?"	73IEB_TRIGGER	Store the state of 73IEB_TRIGGER
POWER_CNTL	"?","HFR=OFF","HFR=ON","HFR=ACTIVE","HFR=SLEEP","ANALOG=OFF","ANALOG=ON","ANALOG=ACTIVE","ANALOG=SLEEP","LPROBE=OFF","LPROBE=ON","LPROBE=ACTIVE","LPROBE=SLEEP","SLEEP=OFF","SLEEP=ON","SLEEP=ACTIVE","SLEEP=SLEEP"	"?"	73POWER_CNTL	Store the state of 73POWER_CNTL
Power_Cntl_Cmd_Pairs[2]	"?","HFR=OFF","HFR=ON", "HFR=ACTIVE","HFR=SLEEP", "ANALOG=OFF","ANALOG=ON", "ANALOG=ACTIVE", "ANALOG=SLEEP","LPROBE=OFF", "LPROBE=ON","LPROBE=ACTIVE", "LPROBE=SLEEP","SLEEP=OFF", "SLEEP=ON","SLEEP=ACTIVE", "SLEEP=SLEEP"	["?","?"]	73POWER_CNTL	Store the preceding two 73POWER_CNTL commands required for checking FR73B5
Power_On_Cmd	TRUE, FALSE	FALSE	73IEB_TRIGGER, 73_POWER_CNTL, 73PS_RPWS, 73RT_SLEEP,	To mark if there is one of the Power On Commands required for checking FR73B5
Ps_Rpws_Sleep_Cmd_Pairs[2]	"?","SLEEP","ACTIVE", "ON","OFF"	["?","?"]	73RT_SLEEP, 73PS_RPWS	Store the preceding two 73RT_SLEEP and 73PS_RPWS commands required for checking FR73B5

Attributes	Range	Default	Associated Commands	Description
PS_RPWS	"?","ON","OFF"	"?"	73PS_RPWS	Store the state of 73PS_RPWS
RT_CNTL[3]	"EX_MINUS=ENABLE", "EX_PLUS=ENABLE", "EZ_PLUS=ENABLE", "EX_MINUS=DISABLE", "EX_PLUS=DISABLE", "EZ_PLUS=DISABLE"	["EX_MINUS=?","EX_PLUS=?", EZ_PLUS=?"]	73RT_EX_PLUS, 73RT_EX_MINUS, 73RT_EZ_PLUS, 73ANT_CNTL	To keep track if the antennas was disabled or enabled.
Rt_Reset_Cmd_Sets[3]	"?", "RESET", "RELEASE"	["?", "?", "?"]	73RT_RESET	Store the preceding three 73RT_RESET commands required for checking FR73B5
RT_RESET_TIME	ALL	1997-001T00:00:00.000	All RPWS commands (except 73RT_RESET)	Keep track of the time between a RPWS command and the 73RT_RESET cmd.
RT_SLEEP	"ACTIVE", "SLEEP", "?"	"?"	73RT_SLEEP	Store the state of 73RT_SLEEP
Rt_Sleep_Cmd_Pairs	All	"?"	73RT_SLEEP	The preceding two 73RT_SLEEP commands required for checking FR73B5

19.3 Array Attribute Elements in RPWS Model

Attribute	Element Number	Element
ANT_CNTL[3]	1	"EX_MINUS"
	2	"EX_PLUS"
	3	"EZ_PLUS"
ANT_CNTL_TIME[3]	1	"EX_MINUS"
	2	"EX_PLUS"
	3	"EZ_PLUS"
Power_Cntl_Cmd_Pairs[2]	1	first 73POWER_CNTL command
	2	second 73POWER_CNTL command
Ps_Rpws_Sleep_Cmd_Pairs[2]	1	state of 73PS_RPWS
	2	state of 73RT_SLEEP
RT_CNTL[3]	1	"EX_MINUS"
	2	"EX_PLUS"
	3	"EZ_PLUS"

20. ION AND NEUTRAL MASS SPECTROMETER (INMS)

20.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR74B1	74PS_HTR, 74PS_INMS	INMS::PS_HTR_INMS, INMS::PS_INMS	
FR74B2	74PY_COVER	GLOBAL::Mission_Phase	

20.2 INMS Model Attributes

Attributes	Range	Default	Associated Commands	Description
GX_BA_TEST	“FALSE”, “TRUE”, “?”	“?”	74GX_BA_TEST	BA test sequence
PS_HTR_INMS	“ON","OFF","?"	"?"	74PS_HTR	Store the state of 74PS_HTR command
PS_INMS	“ON","OFF","?"	"?"	74PS_INMS	Store the state of 74PS_INMS command
PY_COVER	“FALSE”, “TRUE”	“FALSE”	74PY_COVER	INMS cover pyro fire
RT_SLEEP	“SLEEP”, “ACTIVE”, “?”	“?”	74RT_SLEEP	INMS Sleep Hold

21. MAGNETOSPHERIC IMAGING INSTRUMENT (MIMI)

21.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR76C1	76PS_DECON, 76PS_MIMI, 76PWR_CNTL, 76PS_L_HTR	MIMI::PWR_CNTL, MIMI::LEMMS_REPL_HTR	
FR76E7	All MIMI Commands	GLOBAL::Last_MIMI_Cmd, GLOBAL::Last_MIMI_Cmd_Time	

21.2 MIMI Model Attributes

Attributes	Range	Default	Associated Commands	Description
DECON_ON_TIME	ALL	1997-001T00:00:00.000	76PS_DECON	Tracks the last time a 76PS_DECON ON was issued
DECON_OFF_TIME	ALL	1997-001T00:00:00.000	76PS_DECON	Tracks the last time a 76PS_DECON OFF was issued
LEMMS_DECON	ALL	"LEMMS_DECON=?"	76PS_DECON	Tracks the state of LEMMS Decontamination power.
LEMMS_MOT_CNTL	ALL	"LEMMS_MOT_CNTL=?"	76L_MOT_CNTL	Tracks the LEMMS Motor control state
LEMMS_MOT_EXER_COUNT	ALL	0	76L_MOT_GOTO	Tracks the number of times the LEMMS motor is exercised
LEMMS_MOT_POS	0…89	0	76L_MOT_GOTO	Tracks the LEMMS motor position.
LEMMS_REPL_HTR	ALL	"LEMMS_REPL_HTR=?"	76PS_L_HTR	Tracks the state of LEMMS Replacement Heater power.
MAINT_MODE_TIME	ALL	1997-001T00:00:00.000	76MODE	Tracks the time for LEMMS motor maintenance.
MIMI_MODE	ALL	"MIMI_MODE=?"	76MODE	Tracks the state of MIMI mode.
MIMI_POWER	ALL	"MIMI_POWER=?"	76PS_MIMI	Tracks the state of MIMI power.
PWR_CNTL[7]	ALL	"LEMMS_SEN=?", "LEMMS_MOT=?", "INCA_PROC=?", "INCA_HV=?", "CHEMS_PROC=?", "CHEMS_MCP=?", "CHEMS_DPPS=?"	76PWR_CNTL	Tracks the states of Power Relays for MIMI Subsystems.
RT_SLEEP	ALL	"RT_SLEEP=?"	76L_MOT_GOTO, 76RT_SLEEP	Tracks the state of MIMI software.

21.3 Array Attribute Elements in MIMI Model

Attribute	Element Number	Element
PWR_CNTL[7]	1	Tracks state of LEMMS_SEN
	2	Tracks state of LEMMS_MOT
	3	Tracks state of INCA_PROC
	4	Tracks state of INCA_HV
	5	Tracks state of CHEMS_PROC
	6	Tracks state of CHEMS_MCP
	7	Tracks state of CHEMS_DPPS

22. COSMIC DUST ANALYZER (CDA)

22.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR79B1	79PS_HTR, 79PS_CDA	CDA::PS_HTR_CDA, CDA::PS_CDA	

22.2 CDA Model Attributes

Attributes	Range	Default	Associated Commands	Description
PS_CDA	"ON","OFF","?"	"?"	79PS_CDA	Store the state of 79PS_CDA command
PS_DECON_HTR	"ON","OFF","?"	"?"	79PS_DECON_HTR	Decontamination heater state.
PS_HTR_CDA	"ON","OFF","?"	"?"	79PS_HTR	Store the state of 79PS_HTR command

23. HUYGENS PROBE (PROBE)

23.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR80A4	2PS_TWTA, 2XTWTA, 6CHG_SC_TM_IMM	PS_X_TWTA, X_TWTA, PS_X_TWTB, PS_KA_BND_TWTA, RFIS, PS_S_BND_TRNS, RADAR::PS_DSS, RADAR::PS_ESS, RADAR::PS_RFES	
FR80E5	6CHG_SC_TM_IMM, 2RFIS, 2XTWTA, 18PS_KA_BND_TWTA, 18PS_S_BND_TRNS, 80PS_PROBE_PWR, 81PS_DSS, 81PS_ESS, 81PS_RFES	CDS::CHG_SC_TM_IMM, RFS::RFIS, RFS::ANTENNA, RSS::PS_KA_BND_TWTA, RSS::PS_S_BND_TRNS, PROBE::PS_PROBE_PWR, RADAR::PS_DSS, RADAR::PS_ESS, RADAR::PS_RFES	
FR80E7	6CHG_SC_TM_IMM, 80PS_PROBE_PWR	CDS::CHG_SC_TM_IMM, PROBE::PS_PSA_PWR	
FR80A8	80PY_PRB_SEP, 7COAST	AACS::COAST_Time, PROBE::PY_PRB_SEP_TIME	
FR80A10	80PS_PROBE_PWR, 6CHG_SC_TM_IMM	CDS::CHG_SC_TM_IMM, PROBE::PS_PROBE_PWR	

23.2 PROBE Model Attributes

Attributes	Range	Default	Associated Commands	Description
PSA_TIME	ALL	1997-001T00:00:00	80PSA_A, 80PSA_B	Tracks time of last 80PSA_A or 80PSA_B command.
PS_PROBE_PWR[7]	"INP1=ON", "INP2A=ON", "INP2B=ON", "INP3=ON", "INP4A=ON", "INP4B=ON", "INP5=ON", "INP1=OFF", "INP2A=OFF", "INP2B=OFF", "INP3=OFF", "INP4A=OFF", "INP4B=OFF", "INP5=OFF"	["INP1=?", "INP2A=?", "INP2B=?", "INP3=?", "INP4A=?", "INP4B=?", "INP5=?"]	80PS_PROBE_PWR	Tracks state of Probe power inputs from the spacecraft
PS_PSA_PWR[4]	"PSAALA=OFF", "PSAALA=ON", "PSAALB=OFF", "PSAALB=ON", "PSABLA=OFF", "PSABLA=ON", "PSABLB=OFF", "PSABLB=ON"	["PSAALA=?". "PSAALB=?". "PSABLA=?". "PSABLB=?"]	80PS_PSA_PWR	Tracks state of 80PS_PSA_PWR command.
PS_RFE_HTR[2]	"HTRA=ON","HTRA=OFF", "HTRB=ON", "HTRB=OFF"	["HTRA=?", "HTRB=?"]	80PS_RFE_HTR	Tracks state of RFE Heater
PS_RFE_HTR_OFF_TIME[2]	ALL	[1997-001T00:00:00,1997-001T00:00:00]	80PS_RFE_HTR	Probe RFE Heater OFF time
PS_RFE_HTR_ON_TIME[2]	ALL	[1997-001T00:00:00,1997-001T00:00:00]	80PS_RFE_HTR	Probe RFE Heater ON time
PY_PRB_SEP_TIME	ALL	1997-001T00:00:00	80PY_PRB_SEP	Time of issuance of first PY_PRB_SEP command.
PPS_PRB_PWR_OFF_TIME	ALL	1997-001T00:00:00	80PS_PROBE_PWR	Time probe switches to internal power. i.e. all SSPSs are OFF

23.3 Array Attribute Elements in PROBE Model

Attribute	Element Number	Element
PS_PROBE_PWR[7]	1	"INP1"
	2	"INP2A"
	3	"INP2B"
	4	"INP3"
	5	"INP4A"
	6	"INP4B"
	7	"INP5"
PS_PSA_PWR[4]	1	"PSAALA"
	2	"PSAALB"
	3	"PSABLA"
	4	"PSABLB"
PS_RFE_HTR[2]	1	"HTRA"
	2	"HTRB"
PS_RFE_HTR_OFF_TIME[2]	1	HTRA OFF time
	2	HTRB OFF time

24. RADAR SUBSYSTEM (RADAR)

24.1 Radar Model Attributes

Attributes	Range	Default	Associated Commands	Description
PS_DSS	"ON", "OFF"	"?"	81PS_DSS	Tracks state of DSS Power
PS_ESS	"ON", "OFF"	"?"	81PS_ESS	Tracks state of ESS Power
PS_RFES	"ON", "OFF"	"?"	81PS_RFES	Tracks state of RFES Power

25. CASSINI PLASMA SPECTROMETER (CAPS)

25.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR82B1	73HFR_RELAY_ACC	CAPS::PS_CAPS, CAPS::PS_HTR	
FR82E3	82PS_CAPS, 82PS_HTR, 73HFR_RELAY_ENA	RPWS::HFR_RELAY_ENA	
FR82B8	37RT_RESET	CAPS::RT_RESET	
FR82D11	82TRIGGER	CAPS::RT_OPMODE	

25.2 CAPS Model Attributes

Attributes	Range	Default	Associated Commands	Description
PS_CAPS	"ON","OFF","?"	"?"	82PS_CAPS	Tracks power state of CAPS
PS_HTR	"ON","OFF","?"	"?"	82PS_HTR	Tracks power state of CAPS HTR
RT_OPMODE	"SLEEP","SLEEP2","OP", "OPWART","?"	"?"	82RT_OPMODE	Tracks state of 82RT_OPMODE command
RT_RESET	"RELEASE","HOLD","?"	"?"	82RT_RESET	Tracks state of 82RT_RESET command

26. ULTRAVIOLET IMAGING SPECTROMETER (UVIS)

26.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR84B1	84PS_HTR, 84PS_UVIS	UVIS::PS_HTR_UVIS, UVIS::PS_UVIS	

26.2 UVIS Model Attributes

Attributes	Range	Default	Associated Commands	Description
PS_HTR_UVIS	"ON","OFF","?"	"?"	84PS_HTR	Store the state of 84PS_HTR command
PS_UVIS	"ON","OFF","?"	"?"	84PS_UVIS	Store the state of 84PS_UVIS command

27. COMPOSITE INFRARED SPECTROMETER (CIRS)

27.1 Modeled Flight Rules

Flight Rules	Associated Commands	Associated Models and Attributes	Notes
FR89B7	89PS_HTR	CIRS::PS_HTR_CIRS, CIRS::PS_CIRS	
FR89B11	89PS_HTR, 89EJECT_TELES_1, 89EJECT_TELES_2, 89PS_DECON3	CIRS::PS_HTR_CIRS, CIRS::TELESCOPE_COVER_EJECT, CIRS::PS_DECON3	

27.2 Attributes

Attributes	Range	Default	Associated Commands	Description
BIU_RESET_TIME	ALL	1997-001T00:00:00	89PS_CIRS, 89RT_CIRS_RESET	Most recent command issued of (89PS_CIRS,ON) and (89RT_CIRS_RESET,RESET)
PS_HTR_CIRS	“ON","OFF","?"	"?"	89PS_HTR	Store the state of 89PS_HTR command
PS_CIRS	"ON","OFF","?"	"?"	89PS_CIRS	Store the state of 89PS_CIRS command
TELESCOPE_COVER_EJECT	“TRUE”, “FALSE”	“FALSE”	89EJECT_TELES_1, 89EJECT_TELES_2	Store the “string-boolean” state of 89EJECT_TELES_1 or 89EJECT_TELES_2 Command
PS_DECON1	"ON","OFF","?"	"?"	89PS_DECON1	Store the state of 89PS_DECON1 command.
PS_DECON2	"ON","OFF","?"	"?"	89PS_DECON2	Store the state of 89PS_DECON2 command.
PS_DECON3	"ON","OFF","?"	"?"	89PS_DECON3	Store the state of 89PS_DECON3 command.

28. SUPPORT MODELS AND ATTRIBUTES

The support.smf is used to hold models and subroutines that are used in several subsystems or in some cases by commands.

28.1 Global Model Attributes

Attributes	Range	Default	Associated Commands	Description
AACS_Crit_Cmd_Count	ALL	0	All AACS Commands	AACS Critical command
AACS_Cmd_Count	ALL	0	All AACS Commands	AACS_Cmd_Count
AACS_Cmd_Size	ALL	0	All AACS Commands	AACS_Cmd_Size
AACS_Long_Cmd_Count	ALL	0	All AACS long commands	AACS_Long_Cmd_Count
All_Non_PPS_Cmd_Count	ALL	0	All Non-PPS commands	All Non-PPS command counts
Cmd_Size	ALL	0	All Commands	Command size
Last_AACS_Cmd_Time	ALL	1997-001T00:00:00	All AACS Commands	Time of last AACS command
Last_AACS_Long_Cmd_Time	ALL	1997-001T00:00:00	All AACS long commands	Time of last AACS long command
Last_Cmd_Stem	ALL	""	All Commands	Last command stem
Last_Cmd_Time	ALL	1997-001T00:00:00	All Commands	Time of last command
Last_MIMI_Cmd	ALL	""	All MIMI commands	Last MIMI command stem
Last_MIMI_Cmd_Time	ALL	1997-001T00:00:00	All MIMI command	Time of last MIMI command
Last_Non_PPS_Cmd_Time	ALL	1997-001T00:00:00	All Non-PPS command	Time of last Non-PPS command
Mission_Phase	"LAUNCH", "INNER_CRUISE", "OUTER_CRUISE", "SCIENCE_CRUISE", "SOI", "PRM", "PROBE", "TOUR", "?"	"?"	All Commands	Mission Phase

Attributes	Range	Default	Associated Commands	Description
Non_PPS_Cmd_Count	ALL	0	All Non-PPS command	Count Non-PPS commands
Non_PPS_Cmd_RTO_IDAP_Count	ALL	0	All Non-PPS command	Count Non-PPS commands in RTO IDAP
Non_PPS_Cmd_ULO_IDAP_Count	ALL	0	All Non-PPS command	Count Non-PPS commands in ULO IDAP

28.2 SEQ_PROG Model Attributes

Attributes	Range	Default	Associated Commands	Description
Condition	TRUE, FALSE	FALSE	Sequence commands	Indicates a Condition sequence
Critical	TRUE, FALSE	FALSE	Sequence commands	Indicates a Critical sequence
Normal	TRUE, FALSE	FALSE	Sequence commands	Indicates a Minseq sequence
Minseq	TRUE, FALSE	FALSE	Sequence commands	Indicates a Normal sequence
Reset	TRUE, FALSE	FALSE	Sequence commands	Indicates a Reset sequence
RTO_IDAP	TRUE, FALSE	FALSE	Sequence commands	Indicates a RTO IDAP
TCMseq	TRUE, FALSE	FALSE	Sequence commands	Indicates a TCM sequence
ULO_IDAP	TRUE, FALSE	FALSE	Sequence commands	Indicates a ULO IDAP

29. OPMODE MODELS AND ATTRIBUTES

The opmode.smf is used to hold models and subroutines involving multiple subsystems in support of opmodes.

29.1 OPMODE_AUX Model Attributes

Attributes	Range	Default	Associated Commands	Description
ISS_States	All	[“NAC=?”,”WAC=?]	36PS_NAC, 36PS_WAC, 36NAC_WAKEUP, 36WAC_WAKEUP, 36RT_NAC_SLEEP, 36RT_WAC_SLEEP	SLEEP/ON/WAKING state of WAC and NAC
RADAR_States	All	[“DSS=?”,”ESS=?”,”RFES=?”]	81PS_DSS, 81PS_ESS, 81PS_RFES	RADAR states ON/OFF for DSS, ESS, and RFES

29.2 OPMODE Model Attributes

Attributes	Range	Default	Associated Commands	Description
Mode	"ORS_RWAF","ORS_RCS", "DFPW_normal", "DFPW_TCM","RWA_Unload", "RADAR_WuRad","RADAR_RWA","RADAR_RCS","RSSWU_RWAL", "RSS3_RCS","RSS2_RWAF", "RSS3_RWAL", "RSS3_RWAF","TCM_RCS", "TCM_ME","DFPW_PEM", "UNIQUE_SEQUENCE", "TRANSITION","?"	"?"		
States	All	["CIRS=?","ISS=?","UVIS=?","VIMS=?","CAPS=?","CDA=?","INMS=?","MAG=?","MIMI=?","RPWS=?","SCAS=?","RADAR=?","RSS=?","AFC=?","SRU=?","SRU_Sup_Htr=?","SRU_Repl_Htr=?","Sun_Sensor=?","IRU=?","RWA=?","VDECU=?","MPD=?","Thrusters=?","Catbed_Htrs=?","Accelerometer=?","REA_Heaters=?","REA_valve=?","REA_OX_htr=?","EGA=?","Press_Xdcrs=?","RSP_Rhtr=?","ATCs=?","XTWTA=?","DST=?","TCU=?","USO=?","CDS=?","CDS_EU=?","PMS_REU=?","RSP_REU=?","REU_delta=?","SSR=?","Pwr_Control=?","Pwr_Distrib=?","PPS_REU=?","SSPS_Losses=?","Cable_Losses=?","Rad_Age=?","Thermal_Flux=?"]		