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Mission Data Format Control Book Joint Polar Satellite System-2/3/4 (JPSS-2/3/4) (MDFCB)

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Goddard Space Flight Center
Greenbelt, Maryland

Mission Data Format Control Book Joint Polar Satellite Systems-2/3/4 (JPSS-2/3/4) (MDFCB) Review/Signature/Approval Page

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Preface

This document is under JPSS Flight configuration control. Once this document is approved, JPSS approved changes are handled in accordance with Class I and Class II change control requirements as described in the JPSS Configuration Management Procedures, and changes to this document shall be made by complete revision.

Any questions should be addressed to:

JPSS Configuration Management Office
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Change History Log

Revision	Effective Date	Description of Changes
Original	9/24/20	Baseline release per 472-CCR-19-1724.

Table of TBDs/TBRs/TBSs

Item No.	Location	Summary	Individual/ Organization	Due Date

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1 INTRODUCTION

1.1 Scope

This control book describes the data formats and contents of the Joint Polar Satellite System 2/3/4 (JPSS-2/3/4) mission data. The JPSS-2/3/4 mission data are transmitted via two (2) different radio frequency (RF) links: Ka-band for Stored Mission Data (SMD) and Sounder Data and X-band for High-Rate Data (HRD). This control book provides the packet level description of the downlinked SMD, Sounder and HRD data.

This document references the instrument specific documents that provide details on how and when each instrument outputs science, calibration, engineering, dwell and diagnostic data. The instrument specific documents also provide the details of the instrument mission data packet structures, including header format, user field bit offsets, conversion coefficients, state values, etc. The packet structures are provided in ingestible Extensible Markup Language (XML) file format to allow for ingest into the Ground System. These files will be included in the Common Ground System's (CGS) Data Product Generation Database (DPGD), which resides in the Common Format Control Repository (CFCR). The instrument-specific mission data packet structure documents are the following:

472-00725 JPSS-2/3/4 OMPS Mission Data Packet Structures
472-00727 JPSS-2/3/4 CrIS Mission Data Packet Structures
472-00726 JPSS-2/3/4 ATMS Mission Data Packet Structures
472-00724 JPSS-2/3/4 VIIRS Mission Data Packet Structures

It is outside the scope of this document to provide detailed information, such as calibration values, compression schemes, etc., required to interpret every data point inside the packets or to perform science data analyses. Instrument-specific documentation should be consulted for that information.

This document describes the Consultative Committee for Space Data Systems (CCSDS) Path Protocol Data Unit (CP_PDU) source packet formats of all Ka-band and X-band downlinked mission data. The 472-00289, JPSS-2 Mission Data Format Interface Control Document (ICD) provides additional data format descriptions of all CCSDS protocol layers, including the Multiplexing Protocol Data Unit (M_PDU), Virtual Channel Data Unit (VCDU), Coded Virtual Channel Data Unit (CVCDU), and Channel Access Data Unit (CADU).

1.2 Responsibility/Configuration Management Process

During the JPSS-2/3/4 development and in-orbit checkout (IOC) and calibration phases, it is the responsibility of the National Aeronautics and Space Administration (NASA) to maintain the contents of this document.

This document will be maintained as a Class I document because its contents provide the information needed by the user community to successfully unpack the mission data for product generation.

1.3 Organization

Section 1 is this introduction.

Section 2 lists the Related Documents including Information Documents that are used as references herein.

Section 3 describes the general characteristics of the Mission Data Systems. Provided is an overview of the mission data including processing, storage, and downlinking of the data by the spacecraft. Also provided is a description of the spacecraft state and spacecraft modes affecting the mission data streams.

Section 4 is the detailed description of the Mission Data Formats for the selected data generated by the spacecraft. The Mission Data Formats for the four instruments are described in their mission data packet structure documents listed in section 1.1.

Appendix A contains the XML formatted files that define the Spacecraft mission data packet structures.

Appendix B is a listing of acronyms and abbreviations used in this document.

1.4 Document Conventions

The following general conventions are used in this document:

- Byte and word numbers are counted from the first byte transmitted and start with zero (0).
- Bit numbers start with zero (0), which designates the most significant bit (MSB), the left-most bit, and the first bit transmitted (per CCSDS standards).
- All numbers shown are in decimal unless otherwise noted.
  0bnnn or b'nn' = binary, 0xnnnn or x'nnnn' = hexadecimal.
- The term spacecraft refers to the spacecraft bus and its subsystems (e.g. Command and Data Handling [C&DH], attitude determination and control, RF, thermal, propulsion, and power)
- The term satellite refers to the spacecraft plus the instruments.
- Instruments output mission data in packets. Some of the instrument reference documents use the term "Raw Data Record" (RDR) whereas this document consistently uses "packet".
- "Grouped" or "segmented" packets contain mission data exceeding the size of a single CCSDS packet.
- The Data Types listed in the packets' User Data Field tables have the following meaning:

Abbreviation	Data Type
B	Bit Field
U	Unsigned Integer
S	Signed Integer
F	Floating Point

2 RELATED DOCUMENTATION

The latest versions of all documents listed below should be used. The latest JPSS documents can be obtained from URL: https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm. JPSS Project documents have a document number starting with 470, 472 or 474 indicating the governing Configuration Control Board (CCB) (Program, Flight or Ground) that has the control authority of the document.

2.1 Applicable Documents

The following documents are the Applicable Documents from which this document has been derived. Any modification to an Applicable Document will be reviewed to identify the impact upon this document.

472-00289	JPSS-2 Mission Data Format Interface Control Document (ICD)
472-00371	JPSS Application Packet Schema
472-00725	JPSS-2/3/4 OMPS Mission Data Packet Structures
472-00727	JPSS-2/3/4 CrIS Mission Data Packet Structures
472-00726	JPSS-2/3/4 ATMS Mission Data Packet Structures
472-00724	JPSS-2/3/4 VIIRS Mission Data Packet Structures
472-00846	JPSS-2 APID to VCID Map

2.2 Information Documents

The following documents are referenced herein and amplify or clarify the information presented in this document. These documents are not binding on the content of this document. Note that documents listed as JPSS-2 also apply to JPSS-3 and JPSS-4.

301.0-B-4	Consultative Committee for Space Data Systems (CCSDS) Recommendations for Space Data System Standards – Time Code Formats
701.0-B-3-S	Consultative Committee for Space Data Systems (CCSDS) Recommendations for Advanced Orbiting Systems (AOS) - Networks and Data Links: Architectural Specification
	JPSS-2 Command and Telemetry (C&T) Database
472- 00337	JPSS-2 Spacecraft Stored Mission Data (SMD) to Ground Segment (GS) Radio Frequency (RF) Interface Control document (ICD)
472-00340	JPSS-2 Spacecraft High Rate Date (HRD) to Direct Broadcast Stations (DBS) Radio Frequency (RF) Interface Control Document (ICD)
470-00205	Joint Polar Satellite System (JPSS-2/3/4) Radio Frequency (RF) Interface Requirements Document (IRD)
472-00280	JPSS-2 Satellite Requirements Document (SRD)

472-00244	JPSS Data Formats Requirements Document (DFRD)
474-00448-02 Parts 1 thru 30	JPSS Algorithm Specification Volume II: Data Dictionary Parts 1 thru 30

3 MISSION DATA SYSTEMS

3.1 Mission Data Overview

Mission data are collected from each of the four instruments:

- VIIRS
- OMPS
- CrIS
- ATMS

These data, along with instrument and spacecraft housekeeping (HK) data, are merged to generate SMD and HRD. The SMD are stored onboard and nominally downlinked at 300 Mega symbols per second (Msps) (CADU rate). The SMD contain:

- Science and calibration data from the JPSS instruments
- Diagnostic data from the JPSS instruments when commanded
- Engineering data from the instruments
- Sounder data
- Spacecraft attitude and ephemeris data
- Spacecraft command echoes and housekeeping, diagnostic/engineering data

ATMS and CrIS data, considered high priority data and used in weather prediction models, is also stored in a second mass storage location as Sounder data. This allows it to be prioritized and played back (via SMD) first to minimize data latency. For the purposes of this document, the Sounder data is treated as a subset of the SMD.

The HRD is similar to the SMD as it consists of instrument and spacecraft housekeeping, science, calibration and engineering data, but it generally does not contain data from instrument diagnostic activities nor the satellite command echoes, spacecraft diagnostic data. The HRD is constantly transmitted in real time by the spacecraft to distributed direct-broadcast users. Downlink of the HRD is at a constant 25 Msps (CADU rate). Oversubscribed data is dropped, and fill data is added as needed to maintain the rate.

3.1.1 Spacecraft Processing of Mission Data

The spacecraft performs several processing functions of the JPSS mission data:

- Provides a data collection/filtering/formatting/multiplexing operation
- Provides CCSDS formatting for the Stored Mission Data
- Provides CCSDS formatting for the High-Rate Data

The spacecraft collects the science and HK data from the instruments, and it collects HK, ephemeris, and attitude data from the spacecraft components. The data is then merged together to form the contents of the HRD and SMD. A filter capability is provided to selectively exclude

data from either channel or both data streams if an operational mode exceeds the 25 Msps (CADU rate) maximum rate while allowing higher rate data to be recorded as SMD. The spacecraft formats the SMD and HRD independently due to the different interfaces with the separate transmitters. The JPSS HRD and SMD Data Format Interface Control Documents describe the details of the formatting processes.

The filter capability mentioned above is achieved through satellite, user-configurable tables. These tables assign specific application process identifiers (APIDs) to a specific Virtual Channel (VC), and assign specific VCIDs to the HRD, SMD or both mission data streams. The mapping of virtual channels to HRD and SMD and the mapping of APIDs to VCIDs are documented in 472-00846 JPSS-2 APID to VCID Map.

3.1.2 Mission Data Storage

The spacecraft's Flash Memory Card (FMC) provides back-orbit storage of the SMD between ground station contacts. The FMC contains 500 gigabits of memory separated into three different memory partitions for SMD, Sounder, and HK data. The FMC accommodates eight hours of SMD input, eight hours of Sounder and 28 hours of HK at orbit average rates.

3.1.3 Mission Data Downlinking

The communication links that carry the satellite's mission data to the ground are made up of two separate downlinks from two separate transmitters on the spacecraft. The HRD is downlinked constantly to Direct Broadcast Users, while the SMD is downlinked via Ka-band from the FMC during satellite contacts with the Norway ground station, McMurdo ground station, Troll ground station, Fairbanks ground station or through the Tracking and Data Relay Satellite System (TDRSS). Figure 3.1.3-1 illustrates the JPSS-2/3/4 mission communications structure and the HRD and SMD links within that structure. Detailed information, including RF characteristics, may be found in the 472-00340 JPSS-2 Spacecraft HRD to Direct Broadcast Stations RF ICD and 472-00337 JPSS-2 Spacecraft SMD to Ground Segment RF ICD.

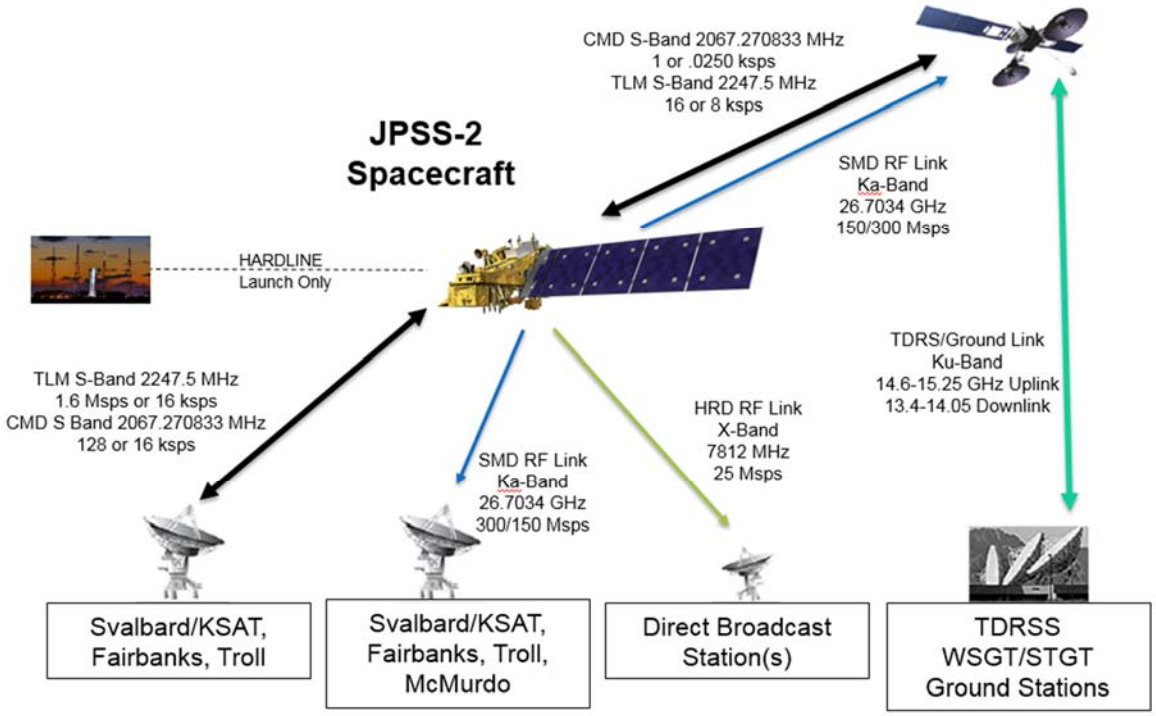

Figure 3.1.3-1. JPSS-2 Satellite Communication Links

3.1.4 HRD Fill Data

Output to the HRD transmitter is at a constant 25 Msps (CADU rate) and fill data are added as needed to maintain that rate. The fill data are inserted at the Virtual Channel Data Unit (VCDU) level (Virtual Channel 63). Lower level (Multiplexing Protocol Data Unit (M_PDU) and packet level) formatting is not valid within the VCDU for VC 63. The VCDU data zone does not contain a M_PDU or a Source Packet, but the entire 886 octets contain the repeating pattern "0xD67A".

3.2 Operational Modes

3.2.1 Satellite Modes

A "mode" defines the operational status of the satellite with the spacecraft and instruments commanded to a specific configuration to perform required operations. During a specific mission phase, the satellite may be operated in more than one mode. The mode dictates a specific spacecraft state, but the spacecraft state does not dictate a specific satellite mode (i.e., the spacecraft (S/C) may be in Point State to support Science Mode, but the instruments and supporting components must also be properly configured to support full Science Mode.) The mode requires the appropriate configuration of spacecraft state, components, and instrument operations.

The JPSS-2/3/4 satellites support three modes in which mission data is available as shown in Table 3.2.1-1.

Table 3.2.1-1. JPSS-2 Satellite Mode

Satellite Mode	Mode Description
Mission Mode	Spacecraft maintains fine attitude pointing/determination (Point State).
	Instruments are on, commanded to appropriate operational mode
	Mission data collected and stored on Flash Memory Card (FMC)
	Real-time Science data transmitted on High-Rate Data link
	Playback Stored Mission Data transmitted on Ka-band link
Engineering Mode	Spacecraft performs special calibration maneuvers, including roll, yaw and pitch-over
	Spacecraft remains in Point State
	Instruments are on, commanded to appropriate operational mode
	Inst. calibration data collected and stored on FMC
	HRD is suspended when pointing constraints exist
Orbit Adjust Mode	Spacecraft is in Delta-V State
	Spacecraft nominally exits Delta-V to Point State (non-thruster based mode)
	Instrument modes controlled via ground or stored command
	Mission data collected and stored on FMC (but instruments may be safed) HRD may be suspended due to pointing constraints

3.2.2 Instrument Operational Modes

For details on specific instrument modes, reference the ATMS, CrIS, OMPS, and VIIRS specific mission data packet structure documents. The instrument modes of operation are configurable by ground or stored command or by autonomous command for fault situations. The Mission Management Center (MMC) configures instruments to a number of operational modes within a given satellite mode as required.

During the post-launch commissioning phase of the mission, instruments are transitioned from their Off Mode to Survival Mode, through their Outgas Mode, and ultimately to their Operational Modes. Instruments may also transition through their Safe and Diagnostic Modes as part of their activation and calibration activities, but the exact series of mode changes during commissioning, as well as how each instruments' modes are defined, is instrument-specific. However, for all instruments the Operational Mode is the default configuration for nominal science data collection, and Safe Mode is literally a 'safe' configuration to which the instrument can transition as a way to protect instrument hardware and software in the case of an anomaly or during activities deemed to have inherent risks.

Table 3.2.2-1 shows the relationship between instrument modes and satellite modes.

Table 3.2.2-1 JPSS Operational Modes and Instrument Modes

JPSS Mode	ACS State	Inst. Power	ATMS	CrIS	OMPS	VIIRS
Mission	Point	On	Operational	Operational,	Operational	Operational, Diagnostic
Engineering	Point	On	Operational, Diagnostic	Operational, Diagnostic	Operational, Diagnostic**	Operational, Diagnostic
Orbit Adjust	Delta-V	On	Operational*	Operational*	Operational*	Operational*

NOTES:
* The instrument mode during Orbit Adjust is at the instruments/operations team discretion: Instruments may remain in Operational Mode or may be transitioned to Safe Mode.
** OMPS can generate diagnostic APIDs but does not have a diagnostic 'mode'

The majority of the instruments output mission data only when in their Operational and Diagnostic Modes. The CrIS outputs a subset of its mission data in its Outgas and Safe Modes. No mission data are generated when JPSS is in its Launch Mode, Mission-Pointing Mode (MPM) Safehold or Earth-Pointing Mode (EPM) Safehold Mode. All the instruments generate mission data when in Orbit Adjust Mode unless the flight operations team configures them to Safe Mode.

4 MISSION DATA FORMATS

This section provides detailed information that is needed for the Ground Segment (GS) to interpret downlinked mission data. The satellite mission data packet header format is defined, and each packet user field bit position, description, units or state value, conversion coefficients, and data type are listed herein. The instrument mission data packet header format is defined, and each packet user field bit position, description, units or state value, conversion coefficients, and data type are listed in the instrument specific documents in section 1.1.
For each mission data packet, the expected data rate and packet size are listed for each instrument. For the Housekeeping and Launch, Early Orbit, and Activation (LEO&A) Packets, this information is contained in the JPSS-2 C&T Handbook or individual instrument documentation. In some cases, noted below, the packet size is configurable and therefore not specified here. Refer to the 474-00448-02 Parts 1 thru 30, JPSS Algorithm Specification Volume II: Data Dictionary Parts 1 thru 30 for the maximum allowable packet sizes.

As specified in the 472-00244 JPSS Data Formats Requirement Document, each mission data packet has a primary header containing three 16-bit words (one 16-bit word = 2 octets). Additionally, standalone packets and the first packet in a grouped packet have a secondary header containing a 64-bit JPSS Universal Time Code (UTC). The format for standalone packets is shown in Figure 4-1. The format for first, middle, and last packets in a grouped pack are shown in Figure 4-2, Figure 4-3, and Figure 4-4, respectively. Exceptions to these formats are noted in individual instrument specific documents. The UTC contains 4 words (8 octets) and represents the time, accurate to 1 μsec. The format of the UTC is provided in Table 4-1.

Field Name	Primary Header							Secondary Header	Data Field
SubField Name	Packet ID				Packet Seq Control (PCS)		Packet Length		
Subfield Lenth (bits)	3	1	1	11	2	14	16	64	Variable
Subfield Value	000	0	*1*	(0 - 2047)	*11*	(0 - 16383)	(0 - 65535)	X	Variable
SubField Bit Definitions	Forced by CCSDS	Type is Telemetry	Secondary Header Flag	APID	Sequence Flag (11 = Standalone Packet)	Packet Sequence Count	Packet Data Length (Secondary Header plus Data Fields - 1)	CCSDS Time Code	

Figure 4-1. Standalone Packet Format

Field Name	Primary Header							Secondary Header			Data Field
SubField Name	Packet ID				Packet Seq Control (PCS)		Packet Length				
Subfield Lenth (bits)	3	1	1	11	2	14	16	64	8	8	Variable
Subfield Value	000	0	1	(0 - 2047)	01	(0 - 16383)	(0 - 65535)	X	X	00000000	Variable
SubField Bit Definitions	Forced by CCSDS	Type is Telemetry	Secondary Header Flag	APID	Sequence Flag (01 = 1st Packet)	Packet Sequence Count	Packet Data Length (Secondary Header plus Data Fields - 1)	CCSDS Time Code	PCS Type = 01 # of Packet Segments - 1	Spare	

Figure 4-2. First Packet Format

Field Name	Primary Header							Data Field
SubField Name	Packet ID				Packet Seq Control (PCS)		Packet Length	
Subfield Lenth (bits)	3	1	1	11	2	14	16	Variable
Subfield Value	000	0	0	(0 - 2047)	00	(0 - 16383)	(0 - 65535)	Variable
SubField Bit Definitions	Forced by CCSDS	Type is Telemetry	Secondary Header Flag	APID	Sequence Flag (00 = Cont. Packet)	Packet Sequence Count	Packet Data Length (Octets) (Data Fields - 1)	

Figure 4-3. Middle Packet Format

Field Name	Primary Header							Data Field
SubField Name	Packet ID				Packet Seq Control (PCS)		Packet Length	
Subfield Lenth (bits)	3	1	1	11	2	14	16	Variable
Subfield Value	000	0	0	(0 - 2047)	10	(0 - 16383)	(0 - 65535)	Variable
SubField Bit Definitions	Forced by CCSDS	Type is Telemetry	Secondary Header Flag	APID	Sequence Flag (10 = Last Packet)	Packet Sequence Count	Packet Data Length (Octets) (Data Fields - 1)	

Figure 4-4. Last Packet Format

Table 4-1. JPSS Universal Time Code Format

Time Code Format				
Bits	0 to 15	16 to 47		48 to 63
Parameter	Day	msec of Day		µsec of msec
Range of Values	0 to (2^{16}-1)	0 to 86,399,999 (Days without leap second)	0 to 86,398,999 or 86,400,999 (When leap second adjustments are introduced)	0 to 999

For additional information on the instruments' functions, refer to the individual instrument references listed in section 2.1.

4.1 Spacecraft

4.1.1 Introduction

Generally, the data the spacecraft bus generates is not considered mission data although there are exceptions.

One exception is a fill packet the spacecraft generates to ensure that small instrument memory dumps are transmitted completely and expeditiously. This packet with fixed content can be commanded into APID 2047. A combination of factors makes this packet necessary. Because only complete frames are transmitted and because packets can span frames, it is possible for the end of a packet to be in an incomplete frame. For packet types output frequently, the next packet generated will fill the frame and make it ready for transmission. But since memory dumps occur infrequently, the end of memory dump packet may remain in an incomplete frame for a significant time. Memory dump packets are the most likely to have fill but other packet types may also have fill. The spacecraft fill packet fixes this.
The second spacecraft packet included in the MDFCB is the Attitude and Ephemeris Packet data (APID 11), which are required to geolocate the science data. A description of the science data is incomplete and meaningless if the attitude and ephemeris data are not included.

The third exception is the data used to determine ACS Mode.

All fields in the spacecraft mission data packet documented below are big endian.

4.1.2 Mission Data – Attitude and Ephemeris Packet

Table 4.1.2-1 shows the Attitude and Ephemeris packet APID, data rate and packet size.

Table 4.1.2-1 Spacecraft Mission Data Packet Types

APID	Telemetry Packet Name	Data Rate (bps)	Packet Size (octets)
11	Ephemeris/Attitude Message	568	71

All fields in the spacecraft mission data packet documented below are big endian.

The spacecraft generates Attitude and Ephemeris Packet (APID 11) at a 10Hz rate. Each packet contains a time field for position and velocity, the position and velocity coordinates of the satellite, a time field for attitude, and attitude quaternions of the satellite. The position and velocity coordinates are in Global Positioning System (GPS) Earth Centered Earth Fixed (ECEF) coordinates. The position and velocity units are meters (m) and meters/second (m/s) respectively. The Control Frame Attitude Quaternions are relative to J2000, The quaternion Q is defined as Q = Q1i + Q2j + Q3k + Q4. The quantity Q4 is the scalar part of the quaternion and Q1i + Q2j + Q3k is the vector part. The packets are 71 bytes fixed length. The Attitude and Ephemeris Packet header and user field structure is attached in an XML formatted file specified in Appendix A

4.1.3 Mission Data – ACS Maneuver and Mode

Table 4.1.3-1 shows the ACS target mode command telemetry and where it is found in APID 37.

Table 4.1.3-1 Spacecraft ACS Target Mode Command

SAMC_MODE		
Description	ACS target mode command	
APID	37	
Freq	1 Hz	
DecommWord	33	
Start Bit	0	
End Bit	7	
Discrete States	0	NONE
	1	SAFEMODE
	5	ENG_SUN
	6	ENG_EARTH
	7	ENG_CAL
	8	ENG_INERTIAL
	9	DV_WHLSTBY
	12	MSN_OBS
	13	MSNCAL_OFFSET
	14	MSNCAL_BKFLIP

Table 4.1.3-2 shows the active ACS mode telemetry and where it is found in APID 30.

Table 4.1.3-2 Spacecraft Active ACS Mode

SAMC_ACTIVE_MODE		
Description	Active ACS Mode	
APID	30	
Freq	10 Hz	
DecommWord	27	
Start Bit	0	
End Bit	7	
Discrete States	0	IDLE
	1	SAF_RATCAP
	2	SAF_SUNACQ
	4	SLEW
	5	ENG_SUN
	6	ENG_EARTH
	7	ENG_CAL
	8	ENG_INERTIAL
	9	DV_WHLSTBY
	10	DV_THRSTBY
	11	DV_BURN
	12	MSN_OBS
	13	MSNCAL_OFFSET
	14	MSNCAL_BKFLIP

Table 4.1.3-3 shows the spacecraft post maneuver ACS mode and where it is found in APID 30.

Table 4.1.3-3 Spacecraft Post Maneuver ACS Mode

SAMC_SLEWTOMODE		
Description	Mode ACS will enter after Maneuver completes. Only applicable for Maneuver mode.	
APID	30	
Freq	10 Hz	
DecommWord	28	
Start Bit	0	
End Bit	7	
Discrete States	5	ENG_SUN
	6	ENG_EARTH
	7	ENG_CAL
	8	ENG_INERTIAL

	9	DV_WHLSTBY
	10	DV_THRSTBY
	11	DV_BURN
	12	MSN_OBS
	13	MSNCAL_OFFSET
	14	MSNCAL_BKFLIP
	20	DEFAULT

If the commanded and active modes are MSN_OBS (12), then the J2 SC is in normal operations. If the commanded and active modes are MSNCALOFFSET (13) or MSNCAL_BKFLIP (14), then these are the calibration maneuvers. If the commanded mode is DV_WHLSTBY (9) and the active mode is either any of the DV_* modes (9, 10 or 11), then the mode is an Orbit Adjust. Any other values are Unknown (this is the catch-all state). This is summarized in Table 4.1.3-4

Table 4.1.3-4 Spacecraft ACS Mode Summary

SC Mode	ACS Target Mode Command	Active ACS Mode
Science	SAMC_MODE=12 AND	SAMC_ACTIVE_MODE=12
Science Calibration	SAMC_MODE=13 OR SAMC_MODE=14	SAMC_ACTIVE_MODE=13 OR SAMC_ACTIVE_MODE=14
Orbit Adjust	SAMC_MODE=9	SAMC_ACTIVE_MODE=9 to 11
Unknown	N/A	

.

Appendix A Spacecraft Mission Data Packet Structure XML Files

The Spacecraft Mission Data Packet Structure XML files can be extracted from the attached file, 472-00717_AppendixA-Spacecraft_Packet_XMLs.zip.

The Flight Project provided 472-00371 JPSS Application Packet Schema was used to generate the application packet structure XMLs.

Appendix B Abbreviations and Acronyms

µsec	microsecond
-A-	
ACS	Attitude Control System
AOS	Advanced Orbiting Systems
APID	Application Process Identifier
ATMS	Advanced Technology Microwave Sounder
-B-	
bps	Bits per seconds
-C-	
C&T	Command and Telemetry
C&DH	Command and Data Handling
CADU	Channel Access Data Unit
CCB	Configuration Control Board
CCSDS	Consultative Committee for Space Data Systems
CFCR	Common Format Control Repository
CP_PDU	CCSDS path Protocol Data Unit
CrIS	Cross-track Infrared Sounder
CVCDU	Coded Virtual Channel Data Unit
-D-	
DBS	Direct Broadcast Stations
DPGD	Data Product Generation Database
-E-	
ECEF	Earth Centered Earth Fixed
EEPROM	Electronically Erasable Programmable Read Only Memory
EPM	Earth-Pointing Mode
-F-	
FMC	Flash Memory Card
-G-	
GPS	Global Positioning System
GS	Ground Segment
GSFC	Goddard Space Flight Center
-H-	
HK	Housekeeping
HRD	High-Rate Data
Hz	Hertz

-I-

ICD	Interface Control Document
ID	Identifier
IOC	In-orbit Checkout
Inst	Instrument
IR	Infrared
IRD	Interface Requirements Document

-J-

JPSS	Joint Polar Satellite System

-K-

kbps	kilobits per second
ksps	kilo symbols per second

-L-

LEO&A	Launch, Early Orbit & Activation

-M-

M_PDU	Multiplexing Protocol Data Unit
Mb	Megabit
Mbps	Megabits per second
MDFCB	Mission Data Format Control Book
MMC	Mission Management Center
MPM	Mission-Pointing Mode
MSB	Most Significant Bit
Msps	Mega symbols per second

-N-

NASA	National Aeronautics and Space Administration

-O-

OMPS	Ozone Mapping Profiling Suite

-P-

-Q-

-R-

RF	Radio Frequency

-S-

S/C	Spacecraft
SMD	Stored Mission Data
SNR	Signal to Noise Ratio

SPA	Signal Processing Assembly
SPM	Sun-Pointing Mode
-T-	
TBD	To be determined
TBS	To be supplied
TBR	To be resolved
TDRSS	Tracking and Data Relay Satellite System
-U-	
UTC	Coordinated Universal Time
-V-	
VC	Virtual Channel
VCDU	Virtual Channel Data Unit
VCID	Virtual Channel Identifier
VIIRS	Visible Infrared Imaging Radiometer Suite
-W-	
-X-	
XML	Extensible Markup Language
-YZ-	