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Joint Polar Satellite System (JPSS) Algorithm Specification Volume II: Data Dictionary for the OMPS Limb RDR

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Joint Polar Satellite System (JPSS) Algorithm Specification Volume II: Data Dictionary for the OMPS Limb RDR

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Preface

This document is under JPSS Ground Segment 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
NASA/GSFC
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Greenbelt, MD 20771

Change History Log

Revision	Effective Date	Description of Changes (Reference the CCR & CCB/ERB Approve Date)	Sections Affected
0200-	Aug 22, 2013	This version incorporates 474-CCR-13-1177 which was approved by JPSS Ground ERB on the effective date shown.	All
0200A	Jan 23, 2014	This version incorporates 474-CCR-13-1459 which was approved by JPSS Ground ERB on the effective date shown.	All
0200A1	Oct 23, 2014	This version incorporates 474-CCR-14-2091 which was approved by the JPSS Ground ERB for CO10 on the effective date shown.	All
0200B	Oct 23, 2014	This version incorporates 474-CCR-14-2168 and 474-CCR-14-2072 which was approved by the JPSS Ground ERB on the effective date shown.	All
0200C	Jul 28, 2015	This version incorporates 474-CCR-15-2288 and 474-CCR-15-2506 which was approved by the JPSS Ground ERB on the effective date shown.	All
0200D	Jun 07, 2016	This version incorporates 474-CCR-15-2657, and 474-CCR-16-2939 which was approved by the JPSS Ground ERB on the effective date shown.	All
E	Oct 24, 2019	This CCR was approved by the Ground Segment ERB on Oct 21, 2019. This version incorporates 474-CCR-19-4439 which was approved by the JPSS Ground Segment CCB on the effective date shown.	All
F	Jul 30, 2020	This version incorporates 474-CCR-19-4697 which was approved by the JPSS Ground ERB on Nov 26, 2019 and by the JPSS Ground Segment CCB on Dec 5, 2019; 474-CCR-20-4984 which was approved by the JPSS Ground Segment CCB on the effective date shown.	
G	Aug 26, 2021	This version incorporates 474-CCR-21-5518 which was approved by the JPSS Ground ERB on Jun 09, 2021 and by the JPSS Ground Segment CCB on Jun 25, 2021; 474-CCR-21-5445 which was approved by the JPSS Ground ERB on May 07, 2021 and by the JPSS Ground Segment CCB on the effective date shown.	

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1 INTRODUCTION

1.1 Scope

The Joint Polar Satellite System (JPSS) Algorithm Specification for OMPS Limb RDR - Volume II: Data Dictionary contains the specifications for the format of the OMPS Limb Raw Data Records (RDRs). This specification includes the format of the Hierarchical Data Format Release 5 (HDF5) files, as well as the product definitions. These formats are available to external users of the JPSS. For an overview of the data product formats, see 474-00001-01, JPSS CDFCB-X Vol I. For an overview of the metadata formats for data products, see 474-00448-02-01, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms.

1.2 Organization

Section	Contents
Section 1	Provides information regarding the scope, and organization of this document, as reference material only.
Section 2	Lists parent documents and related documents that were used as sources of information for this document or that provide additional background information to aid understanding of the interface implementations.
Section 3	Provides an overview of the HDF5 UML for the data product types.
Section 4	Provides a description of the contents of each JPSS RDR.
Section 5	Provides a description of the contents of each JPSS TDR if applicable.
Section 6	Provides a description of the contents of each JPSS SDR if applicable.
Section 7	Provides a description of relevant Look-Up Tables (LUTs) and Processing Coefficient Tables (PCTs).
Section 8	Provides a description of each Intermediate Product if applicable.
Appendix A	Provides the Data Mnemonic to Interface Mapping for the data products in this volume.
Appendix B	Provides common RDR static header values in this volume.
Appendix C	Provides a mapping of the quality flags by sensor and product that are reportable to the associated data product quality flag Test ID used in the processing environment.
Appendix D	Provides reference to acronyms and glossary of terms found within the JPSS Program Lexicon (470-00041).
Attachment A	Provides the list of applicable xml files for this Data Dictionary.

2 RELATED DOCUMENTATION

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 Parent Documents

The following reference documents are the Parent Documents from which this document has been derived. Any modification to a Parent Document will be reviewed to identify the impact upon this document. In the event of a conflict between a Parent Document and the content of this document, the JPSS Program Configuration Change Board has the final authority for conflict resolution.

Document Number	Title
474-00448-01-28	JPSS Algorithm Specification Volume I: Software Requirements Specification (SRS) for the OMPS Limb RDR

2.2 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. In the event of conflict between an Applicable Document and the content of this document, the JPSS Program Configuration Change Board has the final authority for conflict resolution.

Document Number	Title
None	

3 UML FOR HDF5 PRODUCTS

3.1 RDR HDF5 Details

Figure 3.1-1, Science and Diagnostic RDR Generalized UML Diagram, depicts the HDF5 RDR file organization as a Unified Modeling Language (UML) class diagram for Science and Diagnostic RDRs. This also describes the science calibration RDRs generated by OMPS. Figure 3.1-2, Dwell, Dump, and Telemetry RDR Generalized UML Diagram, depicts the HDF5 RDR file organization as a UML Class Diagram for Dwell, Dump and Telemetry RDRs.

Each HDF5 RDR file contains an HDF5 Root Group, '/', a Data_Products Group, one or more Product Groups (CollectionShortName), and an All_Data Group containing one or more (CollectionShortName)_All groups. The latter group contains the Dataset_Array which holds the common RDR structures of Consultative Committee for Space Data Systems (CCSDS) structured APs. For Science and Diagnostic RDRs a Spacecraft Diary Group is also included in the Data_Products group. The Product Groups and Spacecraft Diary Group both contain datasets - an Aggregation Dataset (CollectionShortName_Aggr) and Granule Datasets (CollectionShortName_Gran_n - where n indicates the nth granule in a temporal aggregation of granules (1 .. n)). A granule is a general term used to describe the minimum quanta of data collected per processing period, generally on the order of seconds. For the definition and organization of the metadata attributes contained in the HDF5 files, see 474-00448-02-01, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms. Attributes that are specific to a particular RDR are listed with the specific RDR's data format definition. Note: In the UML diagrams, an '*' following the name of an attribute indicates an element with exceptions; see JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms, for the details of the exception.

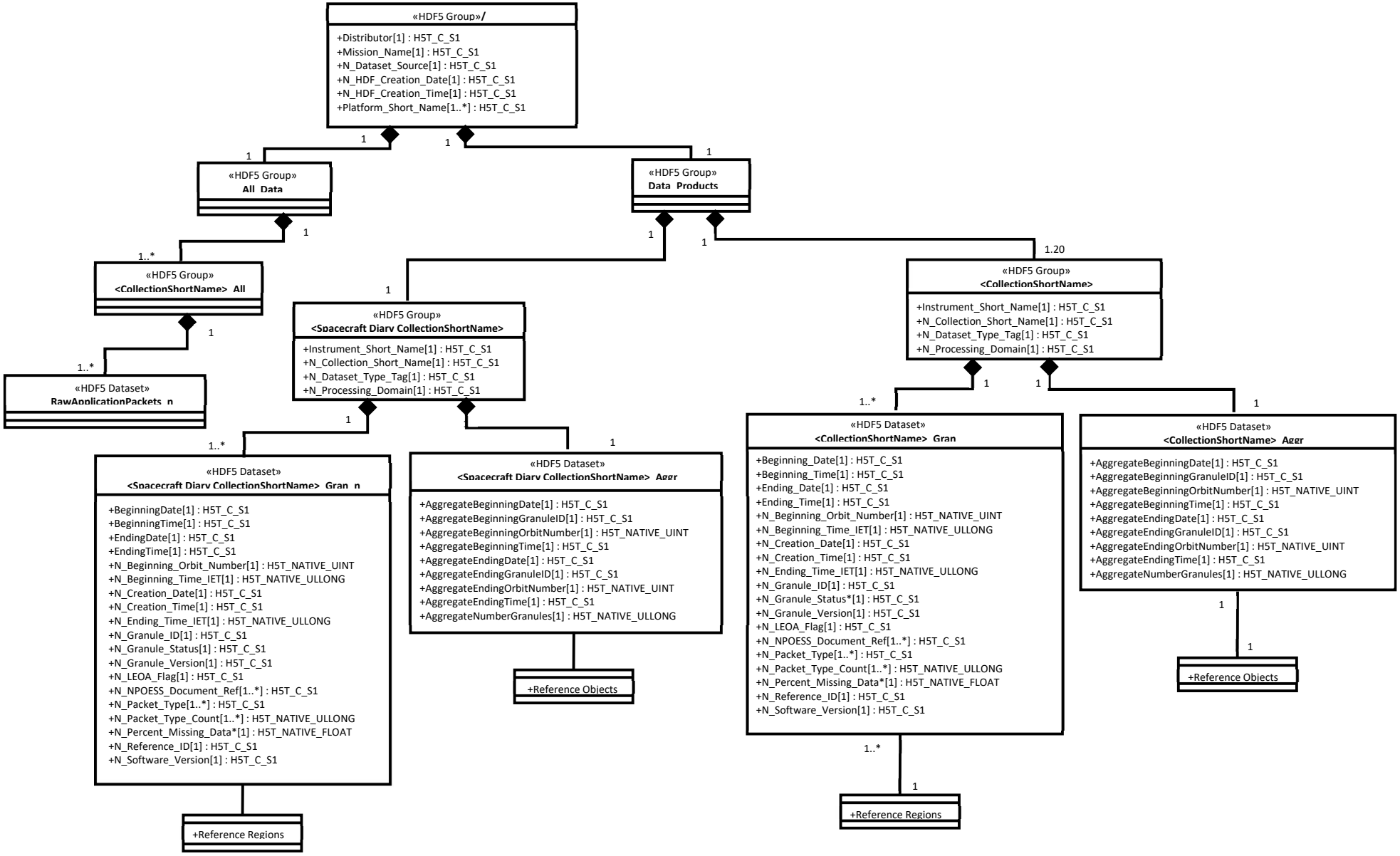

Figure: 3.1-1 Science and Diagnostic RDR Generalized UML Diagram

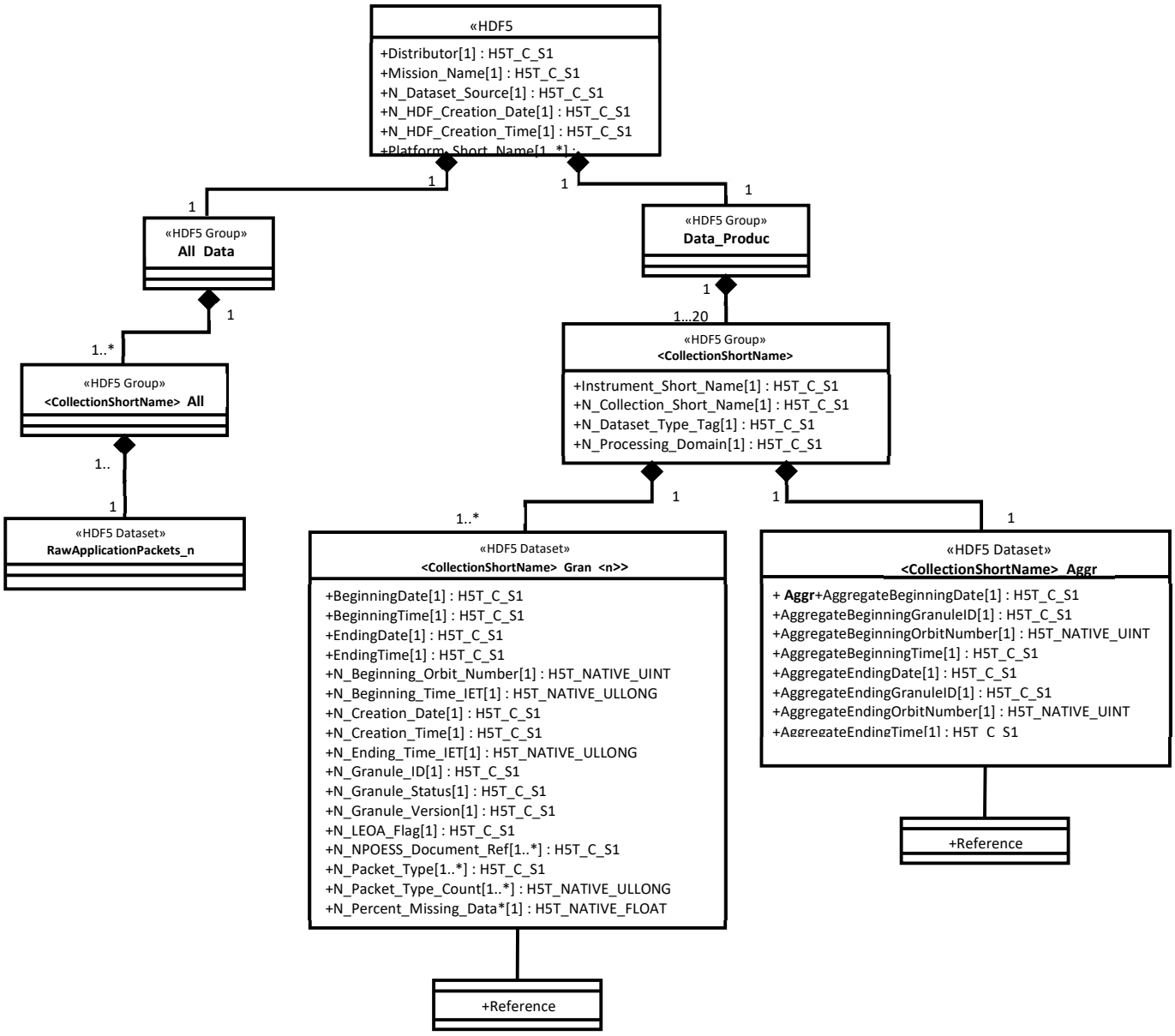

Figure: 3.1-2 Dwell, Dump, Telemetry, and Spacecraft Diary (when requested separately) RDR Generalized UML Diagram

3.2 TDR/SDR HDF5 Details

Figure 3.2-1, Generalized UML Diagram for HDF5 SDR/TDR Files, depicts the HDF5 SDR/TDR organization as a Unified Modeling Language (UML) class diagram. Each HDF5 SDR/TDR file contains an HDF5 Root Group, '/', a Data Products Group, Product Groups (Collection Short Name), an optional Geolocation Group (depending upon packaging option, see the JPSS CDFCB-X Vol. I for a description of the geolocation packaging), and an All Data

Group (dataset arrays). The Product Groups and Geolocation Group both contain datasets - an Aggregation Dataset (Collection Short Name_Aggr) and Granule Datasets (Collection Short Name_Gran_n) - where n indicates the nth granule in a temporal aggregation of granules (1 .. n). A granule is a general term used to describe the minimum quanta of data collected per processing period, generally on the order of seconds. For the definition and organization of the metadata attributes contained in the HDF5 files, see 474-00448-02-01, JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms. Attributes that are specific to a particular SDR/TDR are listed with the specific SDR/TDR's data format definition. For the generalized formats and packaging options for the Geolocation data, see the JPSS CDFCB-X Vol. I.

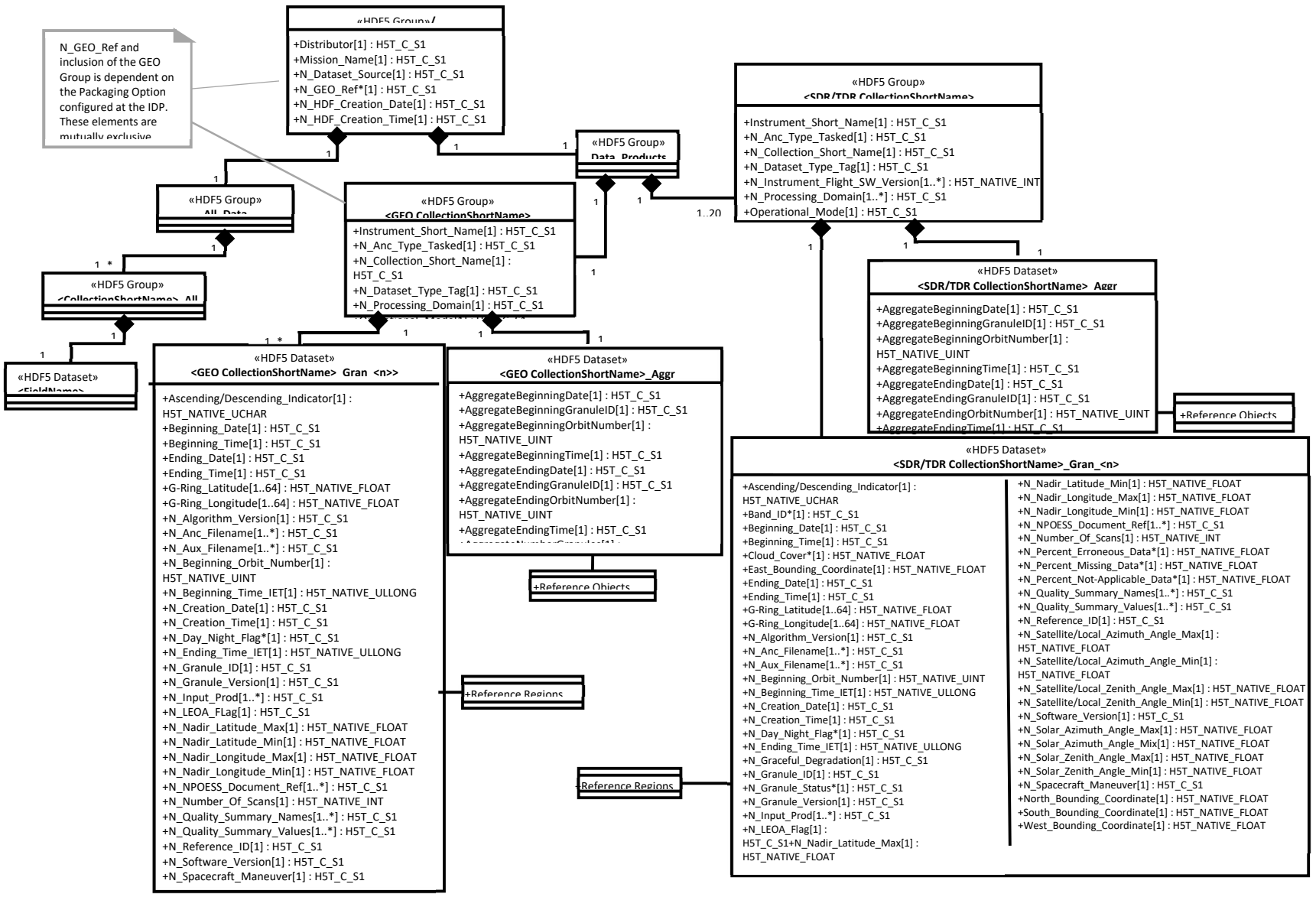

Figure: 3.2-1 Generalized UML Diagram for HDF5 SDR/TDR Files

4 JPSS RAW DATA RECORDS (RDRS)

The following paragraphs describe the structure and contents of the RDR granules formed by the JPSS ground processing software. The ground processing software generates several RDRs for each sensor by accumulating one or more specific Application Packets (APs) into a single collection. The accumulated Aps are not byte-aligned or otherwise altered. They are merely collected and placed into storage in the order that they are received. The following paragraphs describe the binary packaging structure for these accumulated APs. Table 4-1, Common RDR Structure, shows the common JPSS RDR Structure. All JPSS RDRs are based on the same generic granule storage framework and is illustrated conceptually in Figure 4-1 Common RDR Layout.

The detailed structure and contents of the APs are documented in the Mission Data Format Control Book (MDFCB) for each mission, GSFC 429-05-02-42 for S-NPP, and 472-00717 for JPSS-2. For more information on AP formatting, see the Recommendations for Advanced Orbiting Systems, Networks and Data Links, CCSDS 701.0-B-2, Section 3.3.3.

Table: 4-1 Common RDR Structure

Field Name	Description
Static Header	Static header describing the RDR
APID List	Array of structures that contains information about each APID that is collected in the RDR
Packet Tracker	Array of structures that contains information about each AP that is in the RDR
AP Storage area	General buffer where the APs are stored back-to-back in the order that they are received

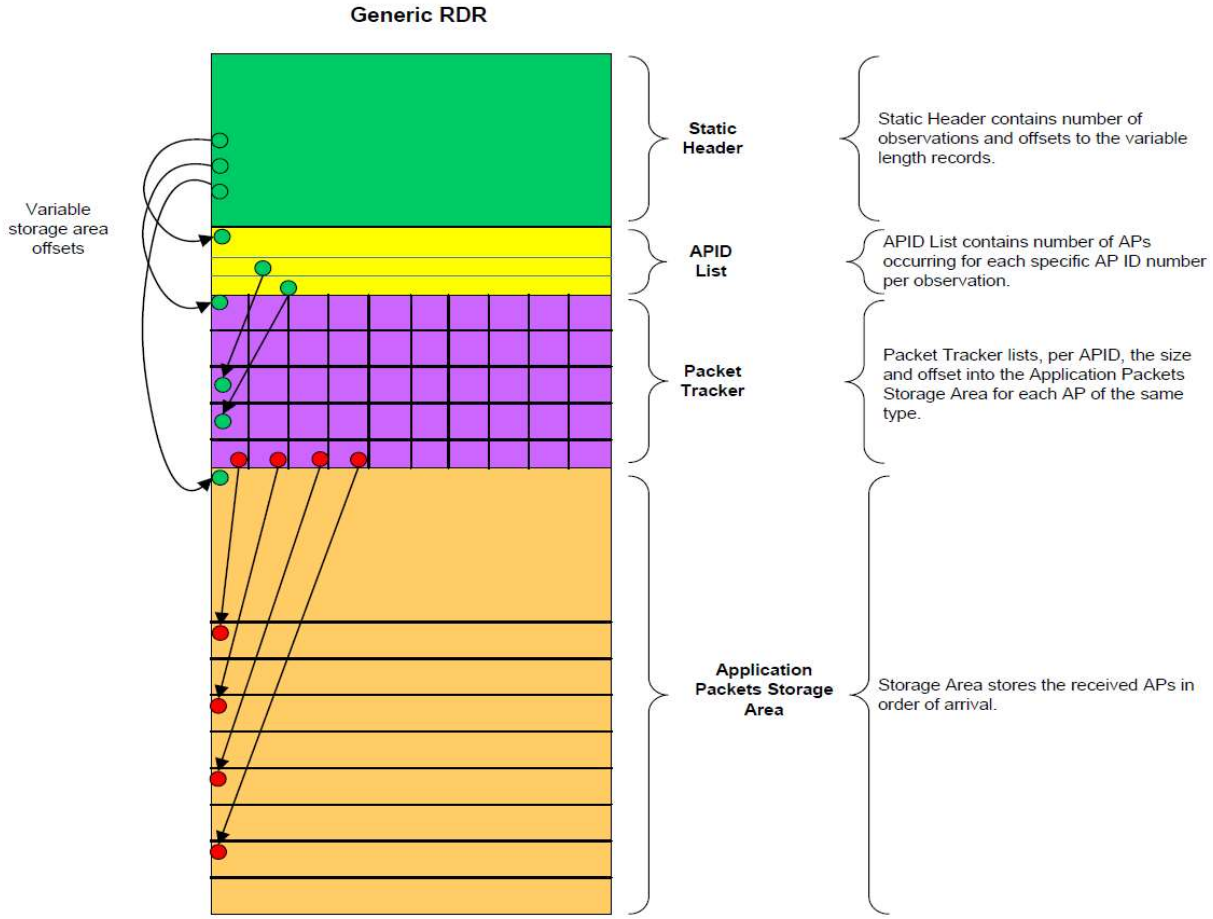

Figure: 4-1 Common RDR Layout

4.1 Common RDR Structures

The following section defines these structures and provides methods for determining the variable length RDR components.

Description/ Purpose	The following tables describe the four structures found in the common RDR Structure. The common RDR Structure granules are referenced by the HDF5 Object and Reference Region pointers in the CollectionShortName_Aggr and CollectionShortName_Gran_# datasets, respectively.
File-Naming Construct	See the JPSS CDFCB-X Vol. I-Overview, Section 3.0 for details.
File Size	Nominally specified per RDR
File Format Type	Big Endian Binary (structure stored within HDF5)
Production Frequency	Common structure created for each RDR granule Granule durations specified per RDR

Data Content and Data Format	Each RDR has a single RDR Static Header and a dynamic Application Packet content area with three major entries: 1) APID List, 2) Packet Tracker List, and 3) Application Packet Storage Area. Table 4.1-1, RDR Static Header, details the spacecraft and sensor that the RDR data originated from, the type of data the RDR contains, and the start and end boundary times of the RDR granule. It also provides byte offset information needed to access individual APs and the number of AP types that are contained in the RDR. Tables 4.1-2, 4.1-3, and 4.1-4 define the Dynamic Application Packet content area. Table 4.1-2, RDR APID List, defines the structure used to identify the AP data type and it provides information necessary for accessing the RDR Packet Tracker. The APID List has details for each APID including number expected and received. Table 4.1-3, RDR Packet Tracker provides information about individual APs. Table 4.1-4, Application Packet Storage Area, describes the storage area containing the APs.

Table 4.1-1, RDR Static Header, details the spacecraft and sensor that the data originated from, the type of the data the RDR contains, and the start and end boundary times of the RDR granule. The RDR contains APs that have observation times which are greater than or equal to the start boundary and less than the end boundary time. The total size of the RDR Static Header is 72 bytes.

Table: 4.1-1 RDR Static Header

Field Name	Data Type	Description
satellite	char[4]	Source satellite name as found in JPSS CDFCB-X Vol. I, Table 3.4.1-1, Spacecraft ID.
Sensor	char[16]	The RDR sensor name in a case-sensitive string (Example: “VIIRS”, “ATMS”, “CrIS”, etc. See Appendix B, Common Static Header Values, for specific values.)
typeID	char[16]	The RDR type in an upper case string (Example: “SCIENCE”, “DIAGNOSTIC”, “TELEMETRY”, “MEMORY DUMP”, “DWELL”. See Appendix B, Common Static Header Values, for specific values.)
numAPIDs	Uint32	The number of different types of expected APIDs that make the RDR. (numAPIDs is specific for each type of RDR, see Appendix B, Common Static Header Values, for specific values.)
apidListOffset	Uint32	Byte offset of the APID List (this is equivalent to the size of the static header: 72). The APID List starts immediately after the Generic RDR Static Header. Note: Always use this value to find the APID address.
pktTrackerOffset	Uint32	Byte offset from the beginning of the Common RDR to the Packet Tracker list Note: Always use this value to find the Packet Tracker list.

Field Name	Data Type	Description
apStorageOffset	Uint32	Byte offset from the beginning of the Common RDR to the AP Storage Note: Always use this value to find the AP Storage.
nextPktPos	Uint32	Byte offset from the beginning of the Application Packet Storage Area (apStorageOffset) to the end of valid data within the Application Packet Storage Area
startBoundary	int64	All APs occur at or after this time in IDPS Epoch Time (IET) format. Note IET begins January 1, 1958 and is measured in microseconds. For more information on IET see JPSS CDFCB-X Vol. I, Section 3.3.1.
endBoundary	int64	The RDR non-inclusive boundary time in IET format. All APs occur before this time.

Table 4.1-2, RDR APID List, details the APIDs that are in the RDR. The number of elements in the list is equal to the numAPIDs field in the RDR Static Header. The size of a single RDR APID list element is 32 bytes.

Table: 4.1-2 RDR APID List

Field Name	Data Type	Description
name	char[16]	Short name describing the data type (Example: M01 for VIIRS. See individual RDR sections for specific values.)
value	Uint32	This field stores an APID that is in the RDR.
pktTrackerStartIndex	Uint32	The first index in the pktTracker array that will contain an AP of this APID. This index is zero based.
pktsReserved	Uint32	This field stores the number of APs reserved for this APID in this RDR. This value accounts for the worst case expected for the temporal granule period. Due to variability in scan rates, the actual number of packets received can be less than the "reserved" and still be 100% complete as shown in the metadata.
pktsReceived	Uint32	The number of APs of this APID that have been received for this RDR

Each RDR contains an array of Packet Trackers. Table 4.1-3, RDR Packet Tracker, details information about the AP and its location in the storage buffer. The number of elements in this array is equal to the total number of packets that are expected for all expected APIDs. The size of a single RDR Packet Tracker is 24 bytes.

Table: 4.1-3 RDR Packet Tracker

Field Name	DataType	Description
obsTime	int64	The IET observation time of the AP as derived from the CCSDS Secondary Header of the AP or associated with the segmented group of the APID.
sequenceNumber	int32	The 14 bit sequence number extracted from the Primary Header's Packet Sequence Control word of the AP. This is used to track segmented packets and their location.
size	int32	The AP size in bytes as received

Field Name	DataType	Description
offset	int32	The AP begins at this offset from the beginning of the AP Storage Area. From the beginning of the RDR, the AP is at "offset" + apStorageOffset. (offset = -1 for packets not received).
fillPercent	int32	Percentage of fill data included in the AP. Based on received and expected bytes per AP with valid values being 0-100% reported to the nearest %. Any AP with fill data (even one byte) will be reported with at least 1% fill data. Under normal conditions the value is 0. In packets received at a Field Terminal, this value is always zero. If the primary AP header indicates a secondary AP header is present, and the time code of the secondary AP header is fill, the AP is not made available. In the event that an AP is repaired, resulting in less fillPercent, a repaired RDR granule may be produced. See JPSS CDFCB-X, Vol. I, Section 3.5.7 for more information on Repair Granules.

Table: 4.1-4 Application Packet Storage Area

Field Name	Data Type	Description
apStorage	Array of unsigned int8	Storage area where application packets are stored as they arrive in consecutive order

Table 4.1-5, Application Packet Tables, provides explanations of the fields given for each RDR described in the following sections.

Table: 4.1-5 Application Packet Tables

APID Short Name	Description
Short name of this Application Packet as an upper-case string	Brief description of this application packet

Note: Grouped or segmented packets contain mission data exceeding the size of a single CCSDS packet.

Accessing APs can be achieved in two fashions; Random Access or Sequential Access.

To access APs in random order by AP type:

- Get the range for a specific type of data from the APID List
  - Find desired AP type using name field
  - Get pktTrackerStartIndex
  - Get pktsReserved
- Loop over the elements in Packet Tracker array starting at pktTrackerStartIndex
  - Get offset (if -1 stop processing no packet received)
  - Get size

- Access the AP by adding the offset to the apStorageOffset value found in the Static Header
- Extract size (the AP size in bytes) from the AP Storage Area
- Repeat above for pktsReserved

To access APs in sequential order:

- Get the apStorageOffset from the Static Header to determine memory location for start of APs in AP Storage Area
- Get the nextPktPos from the Static Header (The nextPktPos value indicates the end of valid RDR data within the AP Storage Area)
- Parse AP's manually by reading the primary header, accessing the size of the packet, and accessing the user data section in the CCSDS packet

Repeat until nextPktPos equals current position.

4.2 OMPS Limb Profile (LP) RDR Overview

Data Mnemonic	Limb Profile (LP) Science: RDRE-OMPS-C0032 Calibration: RDRE-OMPS-C0039 Diagnostic Exposure #1 Earth View: RDRE-OMPS-C0054 Diagnostic Exposure #2 Earth View: RDRE-OMPS-C0056 Diagnostic Calibration: RDRE-OMPS-C0055
Description/ Purpose	OMPS uses two primary sensors within a single instrument suite to perform complementary functions for atmospheric ozone monitoring. Total column ozone is retrieved from backscattered UV radiance measurements, using a 2-D Charge-Coupled Device (CCD) system, which points towards the nadir and simultaneously observes across the orbital track to provide daily global mapping. An additional CCD focal plane collects nadir data at shorter wavelengths to create a non-EDR profile ozone product for continuity with previous instruments. Profile ozone data is obtained from limb-scattered UV and visible measurements, using a CCD array-based system.
File-Naming Construct	See the JPSS CDFCB-X Vol. I, Section 3.0 for details
File Size	LP Science: See Table 4.3.2-3 OMPS LP Science RDR Structure for size LP Calibration: See Table 4.4.2-5 OMPS LP Calibration RDR Structure for size LP Diagnostic Exposure #1 Earth View: See Table 4.5.2-3 OMPS LP Diagnostic Exposure #1 RDR Structure for size LP Diagnostic Exposure #2 Earth View: See Table 4.6.1-3 OMPS LP Diagnostic Exposure #2 RDR Structure for size

	LP Diagnostic Calibration: See Table 4.7.2-3 OMPS LP Diagnostic Calibration RDR Structure
File Format Type	HDF5
Data Content and Data Format	Section 4.3 describes the OMPS LP Science RDR Section 4.4 describes the OMPS LP Calibration RDR Section 4.5 describes the OMPS LP Diagnostic Exposure #1 Earth View RDR Section 4.6 describes the OMPS LP Diagnostic Exposure #2 Earth View RDR Section 4.7 describes the OMPS LP Diagnostic Calibration RDR Section 4.8, 4.9, 4.10 and 4.11 reference the JPSS Algorithm Specification Volume II: Data Dictionary for the OMPS Nadir Profile RDR/SDR (474-00448-02-05) for the following OMPS RDRs: 1. OMPS Dwell RDR 2. OMPS Telemetry RDR 3. OMPS Memory Dump RDR 4. OMPS Flight Software (FSW) Boot-Up Status

4.3 OMPS LP Science RDR

4.3.1 OMPS LP Science RDR HDF5 Files

The OMPS LP Science RDR HDF5 files are described in Section 3.0, Raw Data Records HDF5 Details.

4.3.2 OMPS LP Science RDR Data Content Summary

Table 4.3.2-1, S-NPP OMPS LP Science RDR Application Packets and Table 4.3.2-2, JPSS-2 OMPS LP Science RDR Application Packets, lists the APs accumulated for the OMPS LP Science RDR. In the event of a discrepancy in the APIDs listed here, see the MDFCB, GSFC 429-05-02-42 for S-NPP, or 472-00717 for JPSS-2.

Table: 4.3.2-1 S-NPP OMPS LP Science RDR Application Packets

APID Short Name	Description	Value $APID_{10}$
LP1	Science LP Image #1 (long)	562
LP2	Science LP Image #2 (short)	563

Each observation is max-sized to accept at most a single segment (256 packets).

Table: 4.3.2-2 JPSS-2 OMPS LP Science RDR Application Packets

APID Short Name	Description	Value $APID_{10}$
LP1	Science LP Image #1 (long)	562
LP2	Science LP Image #2 (short)	563
LP1_RF	Uncompressed RF Science LP Image #1 (long)	595
LP2_RF	Uncompressed RF Science LP Image #2 (short)	594
LP1_CMP	Compressed Science LP Image #1 (long)	619
LP2_CMP	Compressed Science LP Image #2 (short)	618
LP1_RF_CMP	Compressed RF LP Image #1 (long)	611

APID Short Name	Description	Value $APID_{10}$
LP2_RF_CMP	Compressed RF LP Image #2 (short)	610

Each observation is max-sized to accept at most a single segment (256 packets).

Table 4.3.2-3, S-NPP OMPS LP Science RDR Structure and Table 4.3.2-4, JPSS-2 OMPS LP Science RDR Structure AP, shows the layout and static contents of the OMPS LP Science RDR.

Table: 4.3.2-3 S-NPP OMPS LP Science RDR Structure

	Byte	Field	Type	Value
Static Header	0	satellite	char[4]	NPP
	4	sensor	char[16]	OMPS-LP
	20	typeID	char[16]	SCIENCE
	36	numAPIDs	Uint32	2
	40	apidListOffset	Uint32	72
	44	pktTrackerOffset	Uint32	136
	48	apStorageOffset	Uint32	24712
	52	nextPktPos	Uint32	varies
	56	startBoundary	int64	varies
	64	endBoundary	int64	varies
Dynamic	72	APID List	IngSmdCommon_ApidDetailType[2]	varies
	136	Pkt Tracker List	IngSmdCommon_PktTrackerType[1024]	varies
	24712	AP storage area	Uint8[1048576]	varies
File Size	1,073,288 Bytes			

Table: 4.3.2-4 JPSS-2 OMPS LP Science RDR Structure

	Byte	Field	Type	Value
Static Header	0	satellite	char[4]	J02
	4	sensor	char[16]	OMPS-LP
	20	typeID	char[16]	SCIENCE
	36	numAPIDs	Uint32	8
	40	apidListOffset	Uint32	72
	44	pktTrackerOffset	Uint32	328
	48	apStorageOffset	Uint32	98,632
	52	nextPktPos	Uint32	varies
	56	startBoundary	int64	varies
	64	endBoundary	int64	varies
Dynamic	72	APID List	IngSmdCommon_ApidDetailType[8]	varies
	328	Pkt Tracker List	IngSmdCommon_PktTrackerType[4096]	varies
	98,632	AP storage area	Uint8[4,194,304]	varies
File Size	4,292,936 Bytes			

4.4 OMPS LP Calibration RDR

4.4.1 OMPS LP Calibration RDR HDF5 Files

The OMPS LP Calibration RDR HDF5 files are described in Section 3.0, Raw Data Records HDF5 Details.

4.4.2 OMPC LP Calibration RDR Data Content Summary

Table 4.4.2-1, S-NPP OMPS LP Calibration RDR Application Packets, lists the APs accumulated for the OMPS LP Calibration RDR. The APID assignment listed in Table 4.4.2-1, S-NPP OMPS LP Calibration RDR Application Packets, applies to S-NPP only. Table 4.4.2-2, JPSS-2 OMPS LP Calibration RDR Application Packets, lists the APs accumulated for the OMPS LP Calibration RDR. In the event of a discrepancy in APIDs listed here, see the MDFCB, GSFC 429-05-02-42 or 472-00717 for JPSS-2.

Table: 4.4.2-1 S-NPP OMPS LP Calibration RDR Application Packets

APID Short Name	Description	Value $APID_{10}$
LP_CAL	Science Limb Profile Calibration	566

Table: 4.4.2-2 JPSS-2 OMPS LP Calibration RDR Application Packets

APID Short Name	Description	Value $APID_{10}$
LP_CAL	Science LP Calibration	566
LP_CAL_CMP	Compressed LP Calibration	626

OMPS LP Calibration RDRs contain all images for a single event. Each event is made up of a number of images. Each image can be made up of anywhere from 1 Standalone packet to a multiple segmented group. The RDR is max sized to handle data based on the values provided in Table 4.4.2-3, S-NPP OMPS LP Calibration RDR Maximum Sizes.

Table: 4.4.2-3 S-NPP OMPS LP Calibration RDR Maximum Sizes

Sizing Parameter	Value
Max Number of images	250
Maximum segments per image	5

OMPS LP Calibration RDRs contain all images for a single event. Each event is made up of a number of images. Each image can be made up of anywhere from 1 Standalone packet to a multiple segmented group. The RDR is max sized to handle data based on the values provided in Table 4.4.2-4, JPSS-2 OMPS LP Calibration RDR Maximum Sizes.

Table: 4.4.2-4 JPSS-2 OMPS LP Calibration RDR Maximum Sizes

Sizing Parameter	Value
Max Number of images	250
Maximum segments per image	5

Table 4.4.2-5, S-NPP OMPS LP Calibration RDR Structure, shows the layout and static contents of the OMPS LP Calibration RDR.

Table: 4.4.2-5 S-NPP OMPS LP Calibration RDR Structure

	Byte	Field	Type	Value
Static Header	0	satellite	char[4]	NPP
	4	sensor	char[16]	OMPS-LP
	20	typeID	char[16]	CALIBRATION
	36	numAPIDs	Uint32	1
	40	apidListOffset	Uint32	72
	44	pktTrackerOffset	Uint32	104
	48	apStorageOffset	Uint32	7680104
	52	nextPktPos	Uint32	varies
	56	startBoundary	int64	varies
	64	endBoundary	int64	varies
Dynamic	72	APID List	IngSmdCommon_ApidDetailType[1]	varies
	104	Pkt Tracker List	IngSmdCommon_PktTrackerType [131840]	varies
	7680104	AP storage area	Uint8[327680000]	varies
File Size	335,360,104 Bytes			

Table 4.4.2-6, JPSS-2 OMPS LP Calibration RDR Structure, shows the layout and static contents of the OMPS LP Calibration RDR.

Table: 4.4.2-6 JPSS-2 OMPS LP Calibration RDR Structure

	Byte	Field	Type	Value
Static Header	0	satellite	char[4]	J02
	4	sensor	char[16]	OMPS-LP
	20	typeID	char[16]	CALIBRATION
	36	numAPIDs	Uint32	2
	40	apidListOffset	Uint32	72
	44	pktTrackerOffset	Uint32	136
	48	apStorageOffset	Uint32	15360136
	52	nextPktPos	Uint32	varies
	56	startBoundary	int64	varies
	64	endBoundary	int64	varies
Dynamic	72	APID List	IngSmdCommon_ApidDetailType[2]	varies
	136	Pkt Tracker List	IngSmdCommon_PktTrackerType [263680]	varies
	15360136	AP storage area	Uint8[655,360,000]	varies
File Size	670,720,136 Bytes			

4.5 OMPS LP Diagnostic Exposure #1 Earth View RDR

4.5.1 OMPS LP Diagnostic Exposure #1 Earth View RDR HDF5 Files

The S-NPP OMPS LP Diagnostic Exposure #1 Earth View RDR HDF5 files are described in Section 3.0, Raw Data Records HDF5 Details.

4.5.2 OMPS LP Diagnostic Exposure #1 Earth View RDR Data Content Summary

Table 4.5.2-1, S-NPP OMPS LP Diagnostic Exposure #1 Earth View RDR Application Packets and Table 4.5.2-2, JPSS-2 OMPS LP Diagnostic Exposure #1 Earth View RDR Application Packets, lists the APs accumulated for the S-NPP OMPS LP Diagnostic Exposure #1 Earth View RDR. In the event of a discrepancy in APIDs listed here, see the MDFCB, GSFC 429-05-02-42 or 472-00717 for JPSS-2.

Table: 4.5.2-1 S-NPP OMPS LP Diagnostic Exposure #1 Earth View RDR Application Packets

APID Short Name	Description	Value $APID_{10}$
DIA_LP1	Limb Profile Diagnostic Exposure #1 Earth View	578

Table: 4.5.2-2 JPSS-2 OMPS LP Diagnostic Exposure #1 Earth View RDR Application Packets

APID Short Name	Description	Value $APID_{10}$
DIA_LP1	Limb Profile Diagnostic Exposure #1 Earth View	578
DIA_LP1_RF	Reduced Frame LP Diagnostic Exposure #1	599
DIA_LP1_RF_CMP	Compressed Reduced Frame LP Diagnostic Exposure #1	615
DIA_LP1_CMP	Compressed LP Diagnostic Exposure #1	623

OMPS LP Diagnostic Exposure #1 RDRs are sized to expect one observation per granule. This observation is max-sized such that it can only be up to 5 segmented groups (5*256 packets) using the OMPS super segmentation approach. The data may be collected at a different rate than the granule size, so gaps between granule IDs can be expected (does not imply there are data gaps). The minimum granule size was chosen to support flexibility for Diagnostic activities.

Table 4.5.2-3, S-NPP OMPS LP Diagnostic Exposure #1 RDR Structure and Table 4.5.2-4, JPSS-2 OMPS LP Diagnostic Exposure #1 RDR Structure, shows the layout and static contents of the OMPS LP Diagnostic Exposure #1 RDR.

Table: 4.5.2-3 S-NPP OMPS LP Diagnostic Exposure #1 RDR Structure

	Byte	Field	Type	Value
Static Header	0	satellite	char[4]	NPP
	4	sensor	char[16]	OMPS-LP
	20	typeID	char[16]	DIAGEXPONE
	36	numAPIDs	Uint32	1
	40	apidListOffset	Uint32	72
	44	pktTrackerOffset	Uint32	104
	48	apStorageOffset	Uint32	30824
	52	nextPktPos	Uint32	varies
	56	startBoundary	int64	varies

	Byte	Field	Type	Value
	64	endBoundary	int64	varies
Dynamic	72	APID List	IngSmdCommon_ApidDetailType[1]	varies
	104	Pkt Tracker List	IngSmdCommon_PktTrackerType[1280]	varies
	30824	AP storage area	Uint8[1310720]	varies
File Size	1,341,544 Bytes			

Table: 4.5.2-4 JPSS-2 OMPS LP Diagnostic Exposure #1 RDR Structure

	Byte	Field	Type	Value
Static Header	0	satellite	char[4]	J02
	4	sensor	char[16]	OMPS-LP
	20	typeID	char[16]	DIAGEXPONE
	36	numAPIDs	Uint32	4
	40	apidListOffset	Uint32	72
	44	pktTrackerOffset	Uint32	200
	48	apStorageOffset	Uint32	123080
	52	nextPktPos	Uint32	varies
	56	startBoundary	int64	varies
	64	endBoundary	int64	varies
Dynamic	72	APID List	IngSmdCommon_ApidDetailType[4]	varies
	200	Pkt Tracker List	IngSmdCommon_PktTrackerType [5120]	varies
	123080	AP storage area	Uint8[5242880]	varies
File Size	5,365,960 Bytes			

4.6 OMPS LP Diagnostic Exposure #2 Earth View RDR

4.6.1 OMPS LP Diagnostic Exposure #2 Earth View RDR HDF5 Files

The OMPS LP Diagnostic Exposure #2 Earth View RDR HDF5 files are described in Section 3.0, Raw Data Records HDF5 Details.

Table 4.6.1-1, S-NPP OMPS LP Diagnostic Exposure #2 Earth View RDR Application Packets and Table 4.6.1-2, JPSS-2 OMPS LP Diagnostic Exposure #2 Earth View RDR Application Packets, lists the APs accumulated for the OMPS LP Diagnostic Exposure #2 Earth View RDR. In the event of a discrepancy in the APIDs listed here, see the MDFCB, GSFC 429-05-02-42 for S-NPP, or 472-00717 for JPSS-2.

Table: 4.6.1-1 S-NPP OMPS LP Diagnostic Exposure #2 Earth View RDR Application Packets

APID Short Name	Description	Value $APID_{10}$
DIA_LP2	Limb Profile Diagnostic Exposure #2 Earth View	579

Table: 4.6.1-2 JPSS-2 OMPS LP Diagnostic Exposure #2 Earth View RDR Application Packets

APID Short Name	Description	Value $APID_{10}$
DIA_LP2	Limb Profile Diagnostic Exposure #2 Earth View	579
DIA_LP2_RF	Reduced Frame Limb Profile Diagnostic Exposure #2	598
DIA_LP2_RF_CMP	Compressed Reduced Frame LP Diagnostic Exposure #2	614
DIA_LP2_CMP	Compressed LP Diagnostic Exposure #2	622

OMPS LP Diagnostic Exposure #2 RDRs are sized to expect one observation per granule. This observation is max-sized such that it can only be up to 5 segmented groups (5*256 packets) using the OMPS super segmentation approach. The data may be collected at a different rate than the granule size, so gaps between granule IDs can be expected (does not imply there are data gaps). The minimum granule size was chosen to support flexibility for Diagnostic activities.

Table 4.6.1-3, S-NPP OMPS LP Diagnostic Exposure #2 RDR Structure and Table 4.6.1-4, JPSS-2 OMPS LP Diagnostic Exposure #2 RDR Structure, shows the layout and static contents of the OMPS LP Diagnostic Exposure #2 RDR.

Table: 4.6.1-3 S-NPP OMPS LP Diagnostic Exposure #2 RDR Structure

	Byte	Field	Type	Value
Static Header	0	satellite	char[4]	NPP
	4	sensor	char[16]	OMPS-LP
	20	typeID	char[16]	DIAGEXPTWO
	36	numAPIDs	Uint32	1
	40	apidListOffset	Uint32	72
	44	pktTrackerOffset	Uint32	104
	48	apStorageOffset	Uint32	30824
	52	nextPktPos	Uint32	varies
	56	startBoundary	int64	varies
	64	endBoundary	int64	varies
Dynamic	72	APID List	IngSmdCommon_ApidDetailType[1]	varies
	104	Pkt Tracker List	IngSmdCommon_PktTrackerType[1280]	varies
	30824	AP storage area	Uint8[310720]	varies
File Size	1,341,544 Bytes			

Table: 4.6.1-4 JPSS-2 OMPS LP Diagnostic Exposure #2 RDR Structure

	Byte	Field	Type	Value
Static Header	0	satellite	char[4]	J02
	4	sensor	char[16]	OMPS-LP
	20	typeID	char[16]	DIAGEXPTWO
	36	numAPIDs	Uint32	4
	40	apidListOffset	Uint32	72

	Byte	Field	Type	Value
	44	pktTrackerOffset	Uint32	200
	48	apStorageOffset	Uint32	123080
	52	nextPktPos	Uint32	varies
	56	startBoundary	int64	varies
	64	endBoundary	int64	varies
Dynamic	72	APID List	IngSmdCommon_ApidDetailType[4]	varies
	200	Pkt Tracker List	IngSmdCommon_PktTrackerType[5120]	varies
	123080	AP storage area	Uint8[5242880]	varies
File Size	5,365,960 Bytes			

4.7 OMPS LP Diagnostic Calibration RDR

4.7.1 OMPS LP Diagnostic Calibration RDR HDF5 Files

The OMPS LP Diagnostic Calibration RDR HDF5 files are described in Section 3.0, Raw Data Records HDF5 Details.

4.7.2 OMPS LP Diagnostic Calibration RDR Data Content Summary

Table 4.7.2-1, S-NPP OMPS LP Diagnostic Calibration RDR Application Packets and Table 4.7.2-2, JPSS-2 OMPS LP Diagnostic Calibration RDR Application Packets, lists the APs accumulated for the OMPS LP Diagnostic Calibration RDR. In the event of a discrepancy in APIDs listed here, see the MDFCB, GSFC 429-05-02-42 or 472-00717 for JPSS-2.

Table: 4.7.2-1 S-NPP OMPS LP Diagnostic Calibration RDR Application Packets

APID Short Name	Description	Value $APID_{10}$
DIA_CAL	Diagnostic Limb Profile Calibration	582

Table: 4.7.2-2 JPSS-2 OMPS LP Diagnostic Calibration RDR Application Packets

APID Short Name	Description	Value $APID_{10}$
DIA_CAL	Diagnostic Limb Profile Calibration	582
DIA_CAL_CMP	Compressed Diagnostic Limb Profile Calibration	629

OMPS LP Diagnostic Calibration RDRs are sized to expect one image per granule. This observation is max-sized such that it can only be up to 5 segmented groups (5*256 packets) using the OMPS super segmentation approach. The data may be collected at a different rate than the granule size, so gaps between granule IDs can be expected (does not imply there are data gaps). The minimum granule size was chosen to support flexibility for Diagnostic activities.

Table 4.7.2-3, S-NPP OMPS LP Diagnostic Calibration RDR Structure and Table 4.7.2-4, JPSS-2 OMPS LP Diagnostic Calibration RDR Structure, shows the layout and static contents of the OMPS LP Diagnostic Calibration RDR.

Table: 4.7.2-3 S-NPP OMPS LP Diagnostic Calibration RDR Structure

	Byte	Field	Type	Value
Static Header	0	satellite	char[4]	NPP
	4	sensor	char[16]	OMPS-LP
	20	typeID	char[16]	DIA-CAL
	36	numAPIDs	Uint32	1
	40	apidListOffset	Uint32	72
	44	pktTrackerOffset	Uint32	104
	48	apStorageOffset	Uint32	30824
	52	nextPktPos	Uint32	varies
	56	startBoundary	int64	varies
	64	endBoundary	int64	varies
Dynamic	72	APID List	IngSmdCommon_ApidDetailType[1]	varies
	104	Pkt Tracker List	IngSmdCommon_PktTrackerType [1280]	varies
	30824	AP storage area	Uint8[1310720]	varies
File Size	1,341,544 Bytes			

Table: 4.7.2-4 JPSS-2 OMPS LP Diagnostic Calibration RDR Structure

	Byte	Field	Type	Value
Static Header	0	satellite	char[4]	J02
	4	sensor	char[16]	OMPS-LP
	20	typeID	char[16]	DIA-CAL
	36	numAPIDs	Uint32	2
	40	apidListOffset	Uint32	72
	44	pktTrackerOffset	Uint32	136
	48	apStorageOffset	Uint32	61576
	52	nextPktPos	Uint32	varies
	56	startBoundary	int64	varies
	64	endBoundary	int64	varies
Dynamic	72	APID List	IngSmdCommon_ApidDetailType[2]	varies
	136	Pkt Tracker List	IngSmdCommon_PktTrackerType [2560]	varies
	61576	AP storage area	Uint8[2621440]	varies
File Size	2,683,016 Bytes			

4.8 OMPS Dwell RDR

See Section 4.7 of the JPSS Algorithm Specification Volume II: Data Dictionary for the OMPS Nadir Profile RDR/SDR (474-00448-02-05) for the OMPS Dwell RDR.

4.9 OMPS Telemetry RDR

See Section 4.8 of the JPSS Algorithm Specification Volume II: Data Dictionary for the OMPS Nadir Profile RDR/SDR (474-00448-02-05) for the OMPS Telemetry RDR.

4.10 OMPS Memory Dump RDR

See Section 4.9 of the JPSS Algorithm Specification Volume II: Data Dictionary for the OMPS Nadir Profile RDR/SDR (474-00448-02-05) for the OMPS Memory Dump RDR.

4.11 OMPS Flight Software (FSW) Boot-up Status RDR

See Section 4.10 of the JPSS Algorithm Specification Volume II: Data Dictionary for the OMPS Nadir Profile RDR/SDR (474-00448-02-05) for the OMPS Flight Software (FSW) Boot-up Status RDR.

5 TEMPERATURE DATA RECORDS (TDRS)

Not Applicable

6 SENSOR DATA RECORDS (SDRS)

Not Applicable

7 LOOK-UP TABLES AND PROCESSING COEFFICIENT TABLES

7.1 Look-up Tables

Algorithm Look-up Table (LUT) files contain tables of pre-computed values used in lieu of real-time algorithm computations to reduce processing resource demands. Table values are typically the result of RTM executions and other environmental model simulations. These data generally cover broad, multi-dimensional parameter spaces which are unique to each algorithm.

7.1.1 OMPS Limb RDR LUTs

The OMPS Limb RDR currently uses no LUTs.

7.2 Processing Coefficient Tables

The S-NPP/JPSS-1 ground system data product generation subsystem uses Processing Coefficient Table (PCT) file parameters. PCT files can be either Automated or Manual coefficient tables. Within the Manual table type are two coefficient classes: Initial and Ephemeral. Sections below describe all three and any tables of that type for the product.

7.2.1 Automated Processing Coefficients

Automated Processing Coefficient (PC) files contain parameters updated and/or created during the processing of the S-NPP/JPSS Data Products by the processing algorithms. The processing environment subsequently uses these files without human review of their contents. Files can be used immediately after creation or in future processing such as the next granule in the production data stream processing.

7.2.1.1 OMPS Limb RDR Automated PCs

The OMPS Limb RDR currently uses no Automated PCs.

7.2.2 Manual Processing Coefficients

Manual Processing Coefficient (PC) files contain parameters used for S-NPP/JPSS Data Product generation which require human review prior to operational processing environment insertion. Manual Processing Coefficients have two classes:

- Initialization PCTs contain infrequently updated initial parameters sets S-NPP/JPSS uses for data product generation.
- Ephemeral PCTs contain frequently updated parameters sets S-NPP/JPSS uses for data product generation

7.2.2.1 OMPS Limb RDR Initialization PCs

The OMPS Limb RDR currently uses no Initialization PCs.

7.2.2.2 OMPS Limb RDR Ephemeral PCs

The OMPS Limb RDR currently uses no Ephemeral PCs.

8 INTERMEDIATE PRODUCTS (IPS)

Not Applicable

Appendix A. Data Mnemonic to Interface Mapping

For a complete list of Data Mnemonic to Interface Mapping, see 474-00001-01, JPSS CDFCB-X Vol I. The CDFCB contains Data Mnemonics, Identifiers, Collection Short Names, Interface Documents, and Collection Long Names for each JPSS Data Product and for Geolocation data.

Appendix B. Common RDR Static Header Values

Common RDR Static Header Values lists pre-defined unique values for the fields from the static header for each of the RDRs defined.

RDR Name	Sensor	TypeID	numAPIDS
OMPS LP Science	OMPS-LP	SCIENCE	2
OMPS LP Calibration	OMPS-LP	CALIBRATION	1
OMPS LP Diagnostic Exposure #1 Earth View	OMPS-LP	DIAGEXPONE	1
OMPS LP Diagnostic Exposure #2 Earth View	OMPS-LP	DIAGEXPTWO	1
OMPS LP Diagnostic Calibration	OMPS-LP	DIA-CAL	1

Appendix C. DQTT Quality Flag Mapping

Not Applicable

Appendix D. Abbreviations and Acronyms

See 470-00041 JPSS Program Lexicon for abbreviations and acronyms.

Attachment A. XML Formats for Related Data Products

Table: ATT-1 XML Formats for Related Products

File Number	XML Filename
NA	NA