Joint Polar Satellite System (JPSS) Ground Project
Code 474
474-00448-02-15-B0200

Joint Polar Satellite System (JPSS)
Algorithm Specification Volume II: Data Dictionary for the Surface Reflectance

Block 2.0.0

Goddard Space Flight Center
Greenbelt, Maryland

National Aeronautics and Space Administration

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Joint Polar Satellite System (JPSS) Algorithm Specification
Volume II: Data Dictionary for the Surface Reflectance
JPSS Review/Approval Page

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Goddard Space Flight Center
Greenbelt, Maryland

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Preface

This document is under JPSS Ground ERB 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
Code 474
Greenbelt, MD  20771
### Change History Log

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1 Introduction

1.1 Scope

The Joint Polar Satellite System (JPSS) Algorithm Specification for the Surface Reflectance - Volume II: Data Dictionary contains the specifications for the format of the Surface Reflectance Intermediate Products (IPs) and Environmental Data Records (EDRs). 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

<table>
<thead>
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<th>Section</th>
<th>Contents</th>
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<tbody>
<tr>
<td>Section 1</td>
<td>Provides information regarding the scope, purpose, and organization of this document, as reference material only.</td>
</tr>
<tr>
<td>Section 2</td>
<td>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.</td>
</tr>
<tr>
<td>Section 3</td>
<td>Provides an overview of the HDF5 UML for the data product types.</td>
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<tr>
<td>Section 4</td>
<td>Provides a description of the contents of each JPSS Intermediate Product associated with this algorithm grouping.</td>
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<tr>
<td>Section 5</td>
<td>Provides a description of the contents of each JPSS EDR associated with this algorithm grouping.</td>
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<tr>
<td>Section 6</td>
<td>Identifies the ancillary and auxiliary data needed for the processing associated with this algorithm grouping if applicable.</td>
</tr>
<tr>
<td>Section 7</td>
<td>Provides a description of relevant Look-Up Tables (LUTs) and Processing Coefficient Tables (PCTs) associated with this algorithm grouping.</td>
</tr>
<tr>
<td>Appendix A</td>
<td>Provides the Data Mnemonic to Interface Mapping for the data products in this volume.</td>
</tr>
<tr>
<td>Appendix B</td>
<td>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.</td>
</tr>
<tr>
<td>Appendix C</td>
<td>References 470-00041, JPSS Program Lexicon.</td>
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<tr>
<td>Attachment A</td>
<td>Provides the list of applicable xml files for this Data Dictionary.</td>
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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 document(s) is (are) the Parent Document(s) 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.

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<td>JPSS Algorithm Specification Volume I: Software Requirements Specification (SRS) for the Surface Reflectance</td>
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2.2 Applicable Documents

The following document(s) is (are) the Applicable Document(s) 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.

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<td>NPR 7150.2A</td>
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2.3 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.

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<td>D0001-M01-S01-026</td>
<td>Joint Polar Satellite System (JPSS) Operational Algorithm Description Document For VIIRS Surface Reflectance Algorithm Theoretical Basis Document (ATBD)</td>
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3 UML for HDF5 Products

The following paragraphs describe the structure and contents of the IP and EDR granules formed by the JPSS ground processing software.

3.1 Intermediate Products and Environmental Data Records HDF5 Details - Statically Sized

Figure 3.1-1, Generalized UML Diagram for statically sized HDF5 IP/EDR Files, depicts the HDF5 IP/EDR organization as a Unified Modeling Language (UML) class diagram. Each HDF5 IP/EDR 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_Agg) and Granule Datasets (Collection Short Name_Gran_n) - where n indicates the nth granule in a temporal aggregation of granules (0 .. n-1). 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 the JPSS -Algorithm Specification Volume II: Data Dictionary for the Common Algorithms. Attributes that are specific to a particular IP/EDR are listed with the specific IP/EDR’s data format definition. For the generalized formats and packaging options for the Geolocation data, see the JPSS CDFCB-X Vol. I - Overview.
The inclusion of the \texttt{N\_GEO\_Ref} and the GEO Group is dependent on the existence of a separate geolocation product. If applicable, then either the \texttt{N\_GEO\_Ref} or the GEO Group will be included based on the Packaging Option selected by the IDP requester. These elements are mutually exclusive.

![Figure: Generalized UML Diagram for statically sized HDF5 IP/EDR Files]

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3.2 Intermediate Products, Application Related Products and Environmental Data Records HDF5 Details - Dynamically Sized

Figure 3.2-1, Generalized UML Diagram for dynamically sized HDF5 IP/EDR Files, depicts the HDF5 IP/EDR organization as a Unified Modeling Language (UML) class diagram for products that contain dynamically sized fields. Dynamically sized means that a field’s length will vary from granule to granule. The organization of the HDF5 file is identical to the statically sized HDF5 file with the exception of the aggregation and corresponding All_Data group. For statically sized products, the object ID stored in the aggregation array points to a Dataset_Array under the All_Data group. This Dataset_Array is a single HDF5 dataset for each field. This single HDF5 dataset contains all the data for all granules in the file for a given field. However, for dynamically sized products, the object ID stored in the aggregation array points to an HDF5 group instead. This HDF5 group contains one or more datasets - a separate dataset for each granule for a given field. The dataset is named “Dataset_Array_Gran_n”.

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4 Intermediate Products (IPs)

IPs are defined as a data subset or retrieval by-product that is required within another primary data product’s generation sequence or is used as an input to secondary processing or analysis. The IPs defined here can be packaged and delivered to the end-user. Other IPs are generated during the creation of EDRs but are not deliverable and are thus not documented here.

4.1 VIIRS Surface Reflectance IP Format

| Data Mnemonic | IMPI_VISR_R0100 (Official)  
|               | IMPI_VISR_R0110 (Substitute) |
| Description/Purpose | The VIIRS Surface Reflectance IP consists of surface reflectance values for VIIRS spectral bands I1, I2, I3, M1, M2, M3, M4, M5, M7, M8, M10, and M11. These values are Lambertian approximation atmospherically adjusted, adjacency adjusted, and Bidirectional Reflectance Distribution Function (BRDF) coupling-corrected. This product also includes associated land quality flags. The unitless IP surface reflectance values are arrayed by spectral band as shown in the data format tables below. The 6 octet per pixel quality flag array is produced at moderate resolution. Effectivity: S-NPP and JPSS |
| File-Naming Construct | See the JPSS CDFCB-X Vol. I, 474-00001-01, section 3.0 for details. |
| File Size | See Table: 4.1.1-1 VIIRS Surface Reflectance IP Product Profile for size |
| File Format Type | HDF5 |
| Production Frequency | As requested |
| Data Content and Data Format | See Section 4.1.1 VIIRS Surface Reflectance Data Content Summary  
| | See Section 4.1.2 VIIRS Surface Reflectance IP Product Profile  
| | See Section 4.1.3 VIIRS Surface Reflectance IP Metadata Details  
| | See Section 4.1.4 VIIRS Surface Reflectance IP Geolocation Details |
### 4.1.1 VIIRS Surface Reflectance IP Data Content Summary

Table: 4.1.1-1 VIIRS Surface Reflectance IP Data Content Summary

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<td>[1536, 6400]</td>
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<td>[768, 3200]</td>
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<td>768</td>
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<tr>
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### VIIRS-Surf-Refl-IP Product Profile - Quality Flags

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<th>Max Array Size</th>
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<th>Data Type</th>
<th>Fill Values</th>
<th>Legend Entries</th>
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<td>Cloud Mask Quality</td>
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<td>0</td>
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<td>Unless</td>
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<td>Geometry and Wind Based</td>
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</tbody>
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**JPSS Alg Spec for Surface Reflect - Vol II, Block 2.0.0**

**Effective Date:** June 07, 2016

**Block/Revision:** 0200E

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

### QF2_VIIRSSRIPSDR Byte(s)

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<th>Name</th>
<th>Granule Boundary</th>
<th>Dynamic</th>
<th>Min Array Size</th>
<th>Max Array Size</th>
</tr>
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<td>No</td>
<td>768</td>
<td>768</td>
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<tr>
<td>M_VIIRS_SDR_COLS</td>
<td>No</td>
<td>No</td>
<td>3200</td>
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**Datum**

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<th>Scale Factor Name</th>
<th>Data Type</th>
<th>Fill Values</th>
<th>Legend Entries</th>
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<td>Name/Value</td>
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### QF3_VIIRSSRIPSDR Byte(s)

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**Datum**

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<tr>
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<td>Thin Cirrus</td>
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<td>No</td>
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<td>Name/Value</td>
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<td>No/Yes</td>
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<td>Name/Value</td>
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<td>No/Yes</td>
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Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.
4.1.3 VIIRS Surface Reflectance IP Metadata Details

The product metadata elements contained in the VIIRS Surface Reflectance IP are listed in the JPSS Algorithm Specification Volume II: Data Dictionary for the Common Algorithms, 474-00448-02-01. These metadata elements include all common metadata at the root, product, aggregation, and granule level.

There are no granule level Quality Flags defined as metadata elements in the VIIRS Surface Reflectance IP. Therefore, there are no entries in the N_Quality_Summary_Name/Value metadata attributes for this product.

4.1.4 VIIRS Surface Reflectance IP Geolocation Details

VIIRS Surface Reflectance IP uses the VIIRS Moderate Resolution Geolocation - Terrain Corrected for its Geolocation data. See the JPSS Algorithm Specification Volume II Data Dictionary for the VIIRS RDR/SDR (474-00448-02-06), Section 6.2 for geolocation details.
5 **Environmental Data Records (EDRs)**

Not Applicable
6 Ancillary and Auxiliary Data Inputs
Not applicable.
7  Look-up Tables and Processing Coefficient Tables

The template used for these formats in this document is described below.

Data Mnemonic: This is a unique identifier. JPSS CDFCB-X Vol. I, 474-00001-01 describes the data mnemonic definition methodology.

Description/Purpose: A brief description of the data format and its purpose.


File Size: The size of the data file.

File Format Type: The format type of the data file.

Production Frequency: Production frequency is the interval of time for data generation. A production frequency equal to dynamic implies that it is only as requested or as needed.

Data Format/Structure: This defines the actual data format. The definitions provide information for every data element in the data unit.

The following rules apply to all tables:

1. All field names mandatory, unless specified otherwise.
2. Fill data is specified, where applicable.
3. Strings are left-aligned and integers are right-aligned, unless specified otherwise.
4. For information regarding Coordinated Universal Time (UTC) and IDPS Epoch Time (IET) conventions, see the JPSS CDFCB-X Vol. I, 474-00001-01.
5. For all references of the ASCII Standard, the corresponding International Standards Organization (ISO) standard is ISO/IEC 10646. The specific Unicode is UTF8, unless stated otherwise.
6. The fields are presented in order (either top - down or most significant first), unless stated otherwise.

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  VIIRS Surface Reflectance LUTs

7.1.1.1  VIIRS Surface Reflectance AOT Values PC

<table>
<thead>
<tr>
<th>Data Mnemonic</th>
<th>NP_NU-LM0233-064</th>
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</thead>
<tbody>
<tr>
<td>Description/ Purpose</td>
<td>The VIIRS Surface Reflectance AOT Values PCT file contains the ratio of AOT at VIIRS wavelengths to AOT at 550 nm calculated</td>
</tr>
</tbody>
</table>
Effect Date: June 07, 2016

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.

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<thead>
<tr>
<th>Data Mnemonic</th>
<th>NPNU-LM0233-064</th>
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</thead>
<tbody>
<tr>
<td>Description/Purpose</td>
<td>The VIIRS Surface Reflectance Atmospheric Reflectance PC contains the atmospheric reflectance calculated using 6S RTM. Contains values for all land and ocean aerosol models. These same tables are used in AOT. This file is used in the VIIRS Surface Reflectance IP algorithm.</td>
</tr>
</tbody>
</table>

| File-Naming Construct | See the File-Naming Convention for Auxiliary Data Formats, JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4. The Collection Short Name used in the filename is based on the table - see the JPSS CDFCB-X Vol. I, 474-00001-01, for the applicable Collection Short Names. |

| File Size | See Table 7.1.1.1-1 VIIRS Surface Reflectance AOT Values PC Data Format for size |
| File Format Type | Little Endian Binary |
| Production Frequency | As needed |
| Data Content and Data Format | For details see Table 7.1.1.1-1, VIIRS Surface Reflectance AOT Values PC Data Format |

### Table: 7.1.1.1-1 VIIRS Surface Reflectance AOT Values PC Data Format

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<th>Length (Bytes)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
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<td>unitless</td>
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### 7.1.1.2 VIIRS Surface Reflectance Atmospheric Reflectance PC

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<thead>
<tr>
<th>Data Mnemonic</th>
<th>NPNU-LM0233-065</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description/Purpose</td>
<td>The VIIRS Surface Reflectance Atmospheric Reflectance PC contains the atmospheric reflectance calculated using 6S RTM. Contains values for all land and ocean aerosol models. These same tables are used in AOT. This file is used in the VIIRS Surface Reflectance IP algorithm.</td>
</tr>
</tbody>
</table>

| File-Naming Construct | See the File-Naming Convention for Auxiliary Data Formats, JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4. The Collection Short Name used in the filename is based on the table - see the JPSS CDFCB-X Vol. I, 474-00001-01, for the applicable Collection Short Names. |

| File Size | See Table: 7.1.1.2-1 VIIRS Surface Reflectance Atmospheric Reflectance PC Data Format for size |
| File Format Type | Little Endian Binary |
| Production Frequency | As needed |
| Data Content and Data Format | For details see Table 7.1.1.2-1, VIIRS Surface Reflectance Atmospheric Reflectance PC Data Format |
Table: 7.1.1.2-1 VIIRS Surface Reflectance Atmospheric Reflectance PC Data Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Length (Bytes)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>16581000</td>
<td>32-bit floating point</td>
<td>1.18E-38 - 3.40E+38</td>
<td>unitless</td>
<td>4 Dimensional Array: AERO_MODEL_DIM x AOT_DIM x BAND_DIM x ANG_DIM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Size of Dimension(s): 5 x 15 x 10 x 5527</td>
</tr>
</tbody>
</table>

File Size: 16,581,000 Bytes

7.1.1.3 VIIRS Surface Reflectance Downward Transmittance PC

Data Mnemonic | NP_NU-LM0233-066
---|---
Description/ Purpose | The VIIRS Surface Reflectance Downward Transmittance PC contains the downward transmittance calculated using 6S RTM. Contains values for all land and ocean aerosol models. These same tables are used in AOT. This file is used in the VIIRS Surface Reflectance IP algorithm.

File-Naming Construct | See the File-Naming Convention for Auxiliary Data Formats, JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4. The Collection Short Name used in the filename is based on the table - see the JPSS CDFCB-X Vol. I, 474-00001-01, for the applicable Collection Short Names.

File Size | See Table: 7.1.1.3-1 VIIRS Surface Reflectance Downward Transmittance PC Data Format for size

File Format Type | Binary
Production Frequency | As needed
Data Content and Data Format | For details see Table 7.1.1.3-1, VIIRS Surface Reflectance Downward Transmittance PC Data Format

Table: 7.1.1.3-1 VIIRS Surface Reflectance Downward Transmittance PC Data Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Length (Bytes)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>63000</td>
<td>32-bit floating point</td>
<td>1.18E-38 - 3.40E+38</td>
<td>unitless</td>
<td>4 Dimensional Array: AERO_MODEL_DIM x AOT_DIM x BAND_DIM x SOL_ZEN_DIM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Size of Dimension(s): 5 x 15 x 10 x 21</td>
</tr>
</tbody>
</table>

File Size: 63,000 Bytes

7.1.1.4 VIIRS Surface Reflectance Incremental Scattering Angles PC

Data Mnemonic | NP_NU-LM0233-067
---|---
Description/ Purpose | The VIIRS Surface Reflectance Incremental Scattering Angles PCT file is used to compute the four scattering angles that come closest to the input scattering angle that will be used to interpolate the atmospheric reflectance.

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Effective Date: June 07, 2016

**Data Mnemonic**

This table contains the incremental scattering angle (step_length).

**File-Naming Construct**

See the File-Naming Convention for Auxiliary Data Formats, JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4. The Collection Short Name used in the filename is based on the table - see the JPSS CDFCB-X Vol. I, 474-00001-01, for the applicable Collection Short Names.

**File Size**

See Table: 7.1.1.4-1 VIIRS Surface Reflectance Inc Scattering Angles PC Data Format for size

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Length Byte(s)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>4</td>
<td>32-bit floating point</td>
<td>Initially set to 4.0</td>
<td>Degrees</td>
<td>Incremental scattering angles Step Length</td>
</tr>
</tbody>
</table>

File Size: 4 Bytes

**7.1.1.5 VIIRS Surface Reflectance Solar Zenith Angle PC**

**Description/ Purpose**

The VIIRS Surface Reflectance Solar Zenith Angle LUT file is used to compute the four solar zenith angles that come closest to the input solar zenith angle that will be used in interpolation. This file is used in the VIIRS Surface Reflectance IP algorithm.

**File-Naming Construct**

See the File-Naming Convention for Auxiliary Data Formats, JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4. The Collection Short Name used in the filename is based on the table - see the JPSS CDFCB-X Vol. I, 474-00001-01, for the applicable Collection Short Names.

**File Size**

See Table: 7.1.1.5-1 VIIRS Surface Reflectance Solar Zenith Angle PC Data Format for size

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Length (Bytes)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>168</td>
<td>64-bit floating point</td>
<td>0.0 - 1.4</td>
<td>Radians</td>
<td>1 Dimensional Array:</td>
</tr>
</tbody>
</table>

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.
Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.
### Data Mnemonic

<table>
<thead>
<tr>
<th>Data Mnemonic</th>
<th>NP_NU-LM0233-070</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This file is used in the VIIRS Surface Reflectance IP algorithm.</td>
</tr>
</tbody>
</table>

### File-Naming Construct

See the File-Naming Convention for Auxiliary Data Formats, JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4.
The Collection Short Name used in the filename is based on the table - see the JPSS CDFCB-X Vol. I, 474-00001-01, for the applicable Collection Short Names.

### File Size

See Table 7.1.1.7-1, VIIRS Surface Reflectance Satellite Zenith Angles PC Data Format for size.

### File Format Type

Binary

### Production Frequency

As needed

### Data Content and Data Format

For details see Table 7.1.1.7-1, VIIRS Surface Reflectance Satellite Zenith Angles PC Data Format

---

**Table: 7.1.1.7-1  VIIRS Surface Reflectance Satellite Zenith Angles PC Data Format**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Length (Bytes)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>160</td>
<td>64-bit floating point</td>
<td>0.0 - 1.21</td>
<td>Radians</td>
<td>1 Dimension Array: SAT_ZEN_DIM Size of Dimension(s): 20</td>
</tr>
</tbody>
</table>

**File Size**  160 Bytes

---

### 7.1.1.8  VIIRS Surface Reflectance Spherical Albedo PC

<table>
<thead>
<tr>
<th>Data Mnemonic</th>
<th>NP_NU-LM0233-071</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The VIIRS Surface Reflectance Spherical Albedo PCT file contains spherical albedo calculated using 6S RTM. Contains values for all land and ocean aerosol models. These same tables are used in AOT. This file is used in the VIIRS Surface Reflectance IP algorithm.</td>
</tr>
</tbody>
</table>

### File-Naming Construct

See the File-Naming Convention for Auxiliary Data Formats, JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4.
The Collection Short Name used in the filename is based on the table - see the JPSS CDFCB-X Vol. I, 474-00001-01, for the applicable Collection Short Names.

### File Size

See Table 7.1.1.8-1, VIIRS Surface Reflectance Spherical Albedo PC Data Format for size
### Data Mnemonic

<table>
<thead>
<tr>
<th>Field Format Type</th>
<th>NP_NU-LM0233-071</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Production Frequency</th>
<th>As needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Content and Data Format</td>
<td>For details see Table 7.1.1.8-1, VIIRS Surface Reflectance Spherical Albedo PC Data Format</td>
</tr>
</tbody>
</table>

### Table 7.1.1.8-1 VIIRS Surface Reflectance Spherical Albedo PC Data Format

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Length (Bytes)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>3000</td>
<td>32-bit floating point</td>
<td>0.0 - 1.0</td>
<td>unitless</td>
<td>3 Dimensional Array: AERO_MODEL_DIM x AOT_DIM x BAND_DIM Size of Dimension(s): 5 x 15 x 10</td>
</tr>
</tbody>
</table>

| File Size | 3,000 Bytes |

### 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 VIIRS Surface Reflectance Automated PCs

VIIRS Surface Reflectance product generation 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 VIIRS Surface Reflectance Initialization PCs

7.2.2.2 VIIRS Surface Reflectance IP Ephemeral PC

<table>
<thead>
<tr>
<th>Data Mnemonic</th>
<th>DP_NU-LM2020-028</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description/ Purpose</td>
<td>The VIIRS Surface Reflectance IP Ephemeral PC provides tunable processing coefficients for use by the algorithm during execution. The coefficients can be modified (tuned) through a configuration control process in response to algorithm, performance, inputs, sensitivity, etc. changes.</td>
</tr>
<tr>
<td>File-Naming Construct</td>
<td>See the File-Naming Convention for Auxiliary Data Formats, JPSS CDFCB-X Vol. I, 474-00001-01, Section 3.4. The Collection Short Name used in the filename is based on the table - see the JPSS CDFCB-X Vol. I, 474-00001-01, Table B-1 for the applicable Collection Short Names.</td>
</tr>
<tr>
<td>File Size</td>
<td>See Table 7.2.2.2-1, VIIRS Surface Reflectance IP Ephemeral PC Data Format for size</td>
</tr>
<tr>
<td>File Format Type</td>
<td>Binary</td>
</tr>
<tr>
<td>Production Frequency</td>
<td>As needed</td>
</tr>
<tr>
<td>Data Content and Data Format</td>
<td>For details see Table 7.2.2.2-1, VIIRS Surface Reflectance IP Ephemeral PC Data Format</td>
</tr>
</tbody>
</table>
### Table: 7.2.2.2-1 VIIRS Surface Reflectance IP Ephemeral PC

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Length (Bytes)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>min_SR</td>
<td>4</td>
<td>32-bit floating point</td>
<td>Initially set to: 0.0</td>
<td>unitless</td>
<td>Minimum value for surface reflectance</td>
</tr>
<tr>
<td>max_SR</td>
<td>4</td>
<td>32-bit floating point</td>
<td>Initially set to: 1.5</td>
<td>unitless</td>
<td>Maximum value for surface reflectance</td>
</tr>
<tr>
<td>min_AOT</td>
<td>4</td>
<td>32-bit floating point</td>
<td>Initially set to: 0.0</td>
<td>unitless (tau)</td>
<td>Min value for AOT</td>
</tr>
<tr>
<td>max_AOT</td>
<td>4</td>
<td>32-bit floating point</td>
<td>Initially set to: 2.0</td>
<td>unitless (tau)</td>
<td>Max value for AOT</td>
</tr>
<tr>
<td>min_ANC</td>
<td>4</td>
<td>32-bit floating point</td>
<td>Initially set to: 0.0</td>
<td>unitless</td>
<td>Min value for ANC</td>
</tr>
<tr>
<td>max_SDR</td>
<td>4</td>
<td>32-bit floating point</td>
<td>Initially set to: 1.0</td>
<td>unitless</td>
<td>Max value for SDR data</td>
</tr>
<tr>
<td>min_AMDL</td>
<td>1</td>
<td>unsigned 8-bit char</td>
<td>Initially set to: 1.0</td>
<td>unitless</td>
<td>Minimum value for AMDL data</td>
</tr>
<tr>
<td>max_AMDL</td>
<td>1</td>
<td>unsigned 8-bit char</td>
<td>Initially set to: 5</td>
<td>unitless</td>
<td>Maximum value for AMDL data</td>
</tr>
<tr>
<td>padding</td>
<td>2</td>
<td>unsigned 8-bit char</td>
<td>Set to 0</td>
<td>unitless</td>
<td>Pad value for word alignment</td>
</tr>
<tr>
<td>heavy_AOT</td>
<td>4</td>
<td>32-bit floating point</td>
<td>Initially set to: 1.0</td>
<td>unitless</td>
<td>Threshold value to determine heavy aerosol</td>
</tr>
<tr>
<td>tauray</td>
<td>48</td>
<td>32-bit floating point</td>
<td>Initially set to: [3.1891e-01, 2.3362e-01, 1.6050e-01, 9.7790e-02, 5.4517e-02, 4.4158e-02, 1.6005e-02, 1.6054e-02, 3.6706e-03, 1.3148e-03, 1.3119e-03, 3.3128e-04]</td>
<td>unitless</td>
<td>Raleigh optical thickness</td>
</tr>
</tbody>
</table>

Check the JPSS MIS Server at [https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm](https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm) to verify that this is the correct version prior to use.
<table>
<thead>
<tr>
<th>Field Name</th>
<th>Length (Bytes)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Dimensional Array</td>
<td></td>
<td>Size of Dimension(s): 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Dimensional Array</td>
<td></td>
<td>Size of Dimension(s): 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Dimensional Array</td>
<td></td>
<td>Size of Dimension(s): 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Dimensional Array</td>
<td></td>
<td>Size of Dimension(s): 12</td>
</tr>
</tbody>
</table>

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.
<table>
<thead>
<tr>
<th>Field Name</th>
<th>Length (Bytes)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>ogtransa1</td>
<td>48</td>
<td>32-bit floating point</td>
<td>Initially set to: [ 1.1649e-03, 1.0375e-04, 3.6623e-04, 3.1128e-04, 5.2716e-03, 8.4638e-03, 1.1231e-03, 1.1246e-03, 7.3716e-03, 3.5759e-03, 3.9373e-03, 3.9820e-02]</td>
<td>unitless</td>
<td>Other gases transmittance coefficients</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Dimensional Array</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Size of Dimension(s): 12</td>
</tr>
<tr>
<td>ogtransb0</td>
<td>48</td>
<td>32-bit floating point</td>
<td>Initially set to: [2.8171e-04, 2.9041e-05, 1.2075e-04, 1.0242e-04, 1.6574e-04, 1.7787e-03, 7.2406e-06, 8.4389e-06, 1.2425e-05, 3.0789e-03, 3.0169e-03, -1.2661e-02]</td>
<td>unitless</td>
<td>Other gases transmittance coefficients</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Dimensional Array</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Size of Dimension(s): 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Dimensional Array</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Size of Dimension(s): 12</td>
</tr>
<tr>
<td>ogtransc0</td>
<td>48</td>
<td>32-bit floating point</td>
<td>Initially set to: [7.4310e-05, 7.5244e-06, 3.1271e-05, 2.6456e-05, 1.9821e-04, 5.1932e-04, 2.3153e-06, 2.6909e-06, 1.4641e-04, 4.3176e-03, 4.2526e-03, 7.7193e-03]</td>
<td>unitless</td>
<td>Other gases transmittance coefficients</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Dimensional Array</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Size of Dimension(s): 12</td>
</tr>
<tr>
<td>ogtransc1</td>
<td>48</td>
<td>32-bit floating point</td>
<td>Initially set to: [-3.0489e-04,</td>
<td>unitless</td>
<td>Other gases transmittance coefficients</td>
</tr>
</tbody>
</table>

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.
<table>
<thead>
<tr>
<th>Field Name</th>
<th>Length (Bytes)</th>
<th>Data Type</th>
<th>Range of Values</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>-2.7054e-05, -9.6747e-05, -8.1778e-05, -1.3178e-03, -2.3157e-03, -8.0386e-06, -9.6868e-06, -1.1865e-03, 4.6775e-03, 4.5467e-03, -1.3653e-02</td>
<td>1 Dimensional Array Size of Dimension(s): 12</td>
<td></td>
</tr>
<tr>
<td>File Size</td>
<td>560 Bytes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.

Check the JPSS MIS Server at https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm to verify that this is the correct version prior to use.
Appendix B. DQTT Quality Flag Mapping
Not applicable.
Appendix C. 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

<table>
<thead>
<tr>
<th>File Number</th>
<th>XML Filename</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>474-00448-02-15_JPSS-SR-DD-Part-15_0200E_VIIRS-Surf-Refl-IP-PP.xml</td>
</tr>
</tbody>
</table>

Check the JPSS MIS Server at [https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm](https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm) to verify that this is the correct version prior to use.