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**Joint Polar Satellite System (JPSS)
Algorithm Specification Volume I:
Software Requirement Specification (SRS)
for the VIIRS Imagery**



NOAA / NASA

**Goddard Space Flight
Center Greenbelt, Maryland**

Joint Polar Satellite System (JPSS) Algorithm Specification Volume I: Software Requirement Specification (SRS) for the VIIRS Imagery

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Preface

This document is under JPSS Ground Segment (GS) 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:

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Greenbelt, MD 20771

Change History Log

Revision	Effective Date	Description of Changes (Reference the CCR & CCB/ERB Approve Date)
Rev-	Aug. 29, 2013	This version incorporates 474-CCR-13-1178 which was approved by JPSS Ground ERB on the effective date shown.
A	Jan 23, 2014	This version incorporates 474-CCR-13-1457 which was approved by JPSS Ground ERB on the effective date shown.
A1	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.
B	Nov 20, 2014	This version incorporates 474-CCR-14-1721, 474-CCR-14-1741, 474-CCR-14-1781, 474-CCR-14-1793 and 474-CCR-14-2120 which was approved by JPSS Ground ERB on the effective date shown.
C	Feb 12, 2016	This version incorporates 474-CCR-14-2110, 474-CCR-15-2452, 474-CCR-15-2480, 474-CCR-15-2657 and 474-CCR-16-2776 which was approved by JPSS Ground ERB on the effective date shown.
0200D	Sep 22, 2016	This version incorporates 474-CCR-16-2939 and 474-CCR-16-3049 which was approved by JPSS Ground ERB on the effective date shown.
0200E	Jan 11, 2017	This version incorporates 474-CCR-16-3199 which was approved by JPSS Ground ERB on the effective date shown.
0200F	Feb 09, 2018	This version incorporates 474-CCR-18-3822 which was approved by JPSS Ground ERB on the effective date shown.
G	Dec 14, 2018	This version incorporates 474-CCR-18-4203. This version incorporates 0220A of 474-00448-01-26-B0220, dated 01/11/2017 to create this baseline. This was approved by the JPSS Ground ERB on the effective date shown.
H	Oct 24, 2019	This version incorporates 474-CCR-19-4584 which was approved by the JPSS Ground ERB on Oct 17, 2019 and by the JPSS Ground Segment CCB on the effective date shown.
I	Sep 14, 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-19-4719 which was approved by the JPSS Ground ERB on Mar 11, 2020 and by the JPSS Ground Segment CCB on Mar 26, 2020; 474-CCR-20-5127 which was approved by the JPSS Ground ERB on Jul 24, 2020 and by the JPSS Ground Segment CCB on Jul 30, 2020; 474-CCR-19-4631 which was approved by the JPSS Ground ERB on Jul 21, 2020 and by the JPSS Ground Segment CCB on Jul 30, 2020; 474-CCR-20-4960 which was approved by the JPSS Ground ERB on Apr 11, 2020 and by the JPSS Ground Segment CCB on the effective date shown.

J	Mar 09, 2021	This version incorporates 474-CCR-21-5418 which was approved by the JPSS Ground ERB on Mar 09, 2021 and by the JPSS Ground Segment CCB on the effective date shown.
K	Aug 26, 2021	This version incorporates 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

The Joint Polar Satellite System (JPSS) is the National Oceanic and Atmospheric Administration's (NOAA) next-generation operational Earth observation program that acquires and distributes global environmental data primarily from multiple polar-orbiting satellites. The program plays a critical role in NOAA's mission to understand and predict changes in weather, climate, oceans and coasts, and the space environment, which support the Nation's economy and protect lives and property. For information regarding the JPSS Program, missions, instruments, and partners, see the JPSS website at <https://www.jpss.noaa.gov/>.

1.1 Identification

This SRS provides requirements for the VIIRS Imagery Environmental Data Records (EDRs), generated from all 5 I-bands, a Day Night Band (DNB), and all 16 M-bands.

1.2 Algorithm Overview

The algorithm merely transforms the VIIRS SDRs to a Ground-Track Mercator (GTM) projection. All imagery products report a top-of-atmosphere radiance. In addition, emissive-band imagery reports a top-of-atmosphere brightness temperature, and reflective-band imagery reports a top-of-atmosphere reflectance.

1.3 Document Overview

Section	Description
Section 1	Introduction - Provides a brief overview of the JPSS Ground System and the relevant algorithm, as reference material only.
Section 2	Related Documentation - Lists related documents and identifies them as Parent, Applicable, or Information Documents such as, MOAs, MOUs, technical implementation agreements, as well as Data Format specifications. This section also establishes an order of precedence in the event of conflict between two or more documents.
Section 3	Algorithm Requirements - Provides a summary of the science requirements for the products covered by this volume.
Appendix A	Requirements Attributes - Provides the mapping of requirements to verification methodology and attributes.

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.

Doc. No.	Document Title
474-01541	Joint Polar Satellite System (JPSS) Ground System Requirements Document (GSRD)
474-01543	Joint Polar Satellite System (JPSS) Ground Segment Data Product Specification
474-00448-01-01	Joint Polar Satellite System (JPSS) Algorithm Specification Volume I: Software Requirements Specification (SRS) for the Common Algorithms

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.

Doc. No.	Document Title
474-00448-02-26	Joint Polar Satellite System (JPSS) Algorithm Specification Volume II: Data Dictionary for the VIIRS Imagery
474-00448-04-26	Joint Polar Satellite System (JPSS) Algorithm Specification Volume IV: Software Requirements Specification Parameter File (SRSPF) for the VIIRS Imagery

3 ALGORITHM REQUIREMENTS

3.1 States and Modes

3.1.1 Normal Mode Performance

SRS.01.26_152 The VIIRS NCC Imagery algorithm shall calculate the value with a horizontal spatial resolution of 0.8 km across swath.

Rationale: The horizontal spatial resolution value for the Near Constant Contract (NCC) Imagery uses Day/night band resolution and was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_155 The VIIRS NCC Imagery algorithm shall calculate the position of the pixel with a 3-sigma mapping uncertainty at nadir of 1 km.

Rationale: The mapping uncertainty at nadir for the NCC Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_156 The VIIRS NCC Imagery algorithm shall calculate the position of the pixel with a 3-sigma mapping uncertainty at edge of swath of 3 km.

Rationale: The mapping uncertainty at edge of swath for the NCC Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_170 The VIIRS Reflective I-band Imagery algorithm shall produce the reflectance with a horizontal spatial resolution at nadir of 0.4 km.

Rationale: The horizontal spatial resolution value at nadir for the I-band Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_171 The VIIRS Reflective I-band Imagery algorithm shall produce the reflectance with a horizontal spatial resolution at edge of swath of 0.8 km.

Rationale: The horizontal spatial resolution value at edge of swath for the I-band Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_172 The VIIRS Reflective I-band Imagery algorithm shall produce the reflectance with a 3-sigma mapping uncertainty at nadir of 1 km.

Rationale: The mapping uncertainty at nadir for the I-band Imagery was flowed down from the Level 1 and Level 2 documents, with the application of the associated data in the product.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_173 The VIIRS Reflective I-band Imagery algorithm shall produce the reflectance with a 3-sigma mapping uncertainty at edge of swath of 3 km.

Rationale: The mapping uncertainty at edge of swath for the I-band Imagery was flowed down from the Level 1 and Level 2 documents, with the application of the associated data in the product.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_184 The VIIRS Emissive I-band Imagery algorithm shall produce the brightness temperature with a horizontal spatial resolution at nadir of 0.4 km.

Rationale: The horizontal spatial resolution value at nadir for the I-band Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_185 The VIIRS Emissive I-band Imagery algorithm shall produce the brightness temperature with a horizontal spatial resolution at edge of swath of 0.8 km.

Rationale: The horizontal spatial resolution value at edge of swath for the I-band Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_186 The VIIRS Emissive I-band Imagery algorithm shall produce the brightness temperature with a 3-sigma mapping uncertainty at nadir of 1 km.

Rationale: The mapping uncertainty at nadir for the I-band Imagery was flowed down from the Level 1 and Level 2 documents, with the application of the associated data in the product.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_187 The VIIRS Emissive I-band Imagery algorithm shall produce the brightness temperature with a 3-sigma mapping uncertainty at edge of swath of 3 km.

Rationale: The mapping uncertainty at edge of swath for the I-band Imagery was flowed down from the Level 1 and Level 2 documents, with the application of the associated data in the product.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_200 The VIIRS Reflective M-band Imagery algorithm shall produce the reflectance with a horizontal spatial resolution at nadir of 0.8 km.

Rationale: The horizontal spatial resolution value at nadir for the M-band Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_201 The VIIRS Reflective M-band Imagery algorithm shall produce the reflectance with a horizontal spatial resolution at edge of swath of 1.6 km.

Rationale: The horizontal spatial resolution value at edge of swath for the M-band Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_202 The VIIRS Reflective M-band Imagery algorithm shall produce the reflectance with a 3-sigma mapping uncertainty at nadir of 1 km.

Rationale: The mapping uncertainty at nadir for the M-band Imagery was flowed down from the Level 1 and Level 2 documents, with the application of the associated data in the product.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_203 The VIIRS Reflective M-band Imagery algorithm shall produce the reflectance with a 3-sigma mapping uncertainty at edge of swath of 3 km.

Rationale: The mapping uncertainty at edge of swath for the M-band Imagery was flowed down from the Level 1 and Level 2 documents, with the application of the associated data in the product.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_213 The VIIRS Emissive M-band Imagery algorithm shall produce the brightness temperature with a horizontal spatial resolution at nadir of 0.8 km.

Rationale: The horizontal spatial resolution value at nadir for the M-band Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_214 The VIIRS Emissive M-band Imagery algorithm shall produce the brightness temperature with a horizontal spatial resolution at edge of swath of 1.6 km.

Rationale: The horizontal spatial resolution value at edge of swath for the M-band Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_215 The VIIRS Emissive M-band Imagery algorithm shall produce the brightness temperature with a 3-sigma mapping uncertainty at nadir of 1 km.

Rationale: The mapping uncertainty at nadir for the M-band Imagery was flowed down from the Level 1 and Level 2 documents.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_216 The VIIRS Emissive M-band Imagery algorithm shall produce the brightness temperature with a 3-sigma mapping uncertainty at edge of swath of 3 km.

Rationale: The mapping uncertainty at edge of swath for the M-band Imagery was flowed down from the Level 1 and Level 2 documents, with the application of the associated data in the product.

Mission Effectivity: JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

3.1.2 Graceful Degradation Mode Performance

Not applicable.

3.2 Algorithm Functional Requirements

3.2.1 Product Production Requirements

Not applicable.

3.2.2 Algorithm Science Requirements

SRS.01.26_145 The VIIRS NCC Imagery EDR software shall incorporate a computing algorithm provided for pseudo albedo.

Rationale: The EDR software through its algorithm must use normalized, top-of-atmosphere radiances to produce NCC Imagery in accordance with the JPSS VIIRS Imagery Products Algorithm Theoretical Basis Document (ATBD) (D0001-M01-S01-008).

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_146 The VIIRS NCC Imagery EDR software shall incorporate a computing algorithm provided for mapping DNB SDR geolocation to the Ground Track Mercator grid.

Rationale: The EDR software through its algorithm must map DNB SDR geolocation to a GTM grid to produce geolocation for NCC Imagery.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_178 The VIIRS Emissive I-band Imagery EDR software shall incorporate a computing algorithm provided for calibrated, top-of-atmosphere radiances.

Rationale: The calibrated TOA radiance is one of Emissive I-band SDR products and is used to produce Emissive I-band Imagery EDR in accordance with the JPSS VIIRS Imagery Products Algorithm Theoretical Basis Document (ATBD) (D0001-M01-S01-008).

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_179 The VIIRS Emissive I-band Imagery EDR software shall incorporate a computing algorithm provided for calibrated, top-of-atmosphere brightness temperatures.

Rationale: The calibrated TOA brightness temperature is one of Emissive I-band SDR products and is used to produce Emissive I-band Imagery EDR in accordance with the JPSS VIIRS Imagery Products Algorithm Theoretical Basis Document (ATBD) (D0001-M01-S01-008).

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_162 The VIIRS Reflective I-band Imagery EDR software shall incorporate a computing algorithm provided for calibrated, top-of-atmosphere radiances.

Rationale: The calibrated TOA radiance is one of Reflective I-band SDR products and is used to produce Reflective I-band Imagery EDR in accordance with the JPSS VIIRS Imagery Products Algorithm Theoretical Basis Document (ATBD) (D0001-M01-S01-008).

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_163 The VIIRS Reflective I-band Imagery EDR software shall incorporate a computing algorithm provided for calibrated, top-of-atmosphere reflectances when the sensor mode is "day".

Rationale: The Reflective I-bands SDR products are produced for daytime only and are used to produce Reflective I-band Imagery EDR in accordance with the JPSS VIIRS Imagery Products Algorithm Theoretical Basis Document (ATBD) (D0001-M01-S01-008).

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_164 The VIIRS I-band Imagery EDR software shall incorporate a computing algorithm provided for mapping I-band SDR geolocation to the Ground Track Mercator grid.

Rationale: The EDR software through its algorithm must map I-band SDR geolocation to a GTM grid to produce geolocation for I-band Imagery.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_192 The VIIRS Reflective M-band Imagery EDR software shall incorporate a computing algorithm provided for calibrated, top-of-atmosphere radiances.

Rationale: The calibrated TOA radiance is one of Reflective M-band SDR products and is used to produce Reflective M-band Imagery EDR in accordance with the JPSS VIIRS Imagery Products Algorithm Theoretical Basis Document (ATBD) (D0001-M01-S01-008).

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_193 The VIIRS Reflective M-band Imagery EDR software shall incorporate a computing algorithm provided for calibrated, top-of-atmosphere reflectances when the sensor mode is "day".

Rationale: The Reflective M-bands SDR products are produced for daytime only and are used to produce Reflective M-band Imagery EDR in accordance with the JPSS VIIRS Imagery Products Algorithm Theoretical Basis Document (ATBD) (D0001-M01-S01-008).

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_194 The VIIRS M-band Imagery EDR software shall incorporate a computing algorithm provided for mapping M-band SDR geolocation to the Ground Track Mercator grid.

Rationale: The EDR software through its algorithm must map M-band SDR geolocation to a GTM grid to produce geolocation for M-band Imagery.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_195 The VIIRS Reflective M-band Imagery EDR software shall generate the reflective M-band imagery EDR for the reflective M-bands specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <Refl_M_EDR><whichReflM>.

Rationale: The Reflective M-band Imagery EDRs are produced from specified Reflective M-bands. The selection of M-bands for Imagery EDR is configuration managed.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_207 The VIIRS Emissive M-band Imagery EDR software shall incorporate a computing algorithm provided for calibrated, top-of-atmosphere radiances.

Rationale: The calibrated TOA radiance is one of Emissive M-band SDR products and is used to produce Emissive M-band Imagery EDR in accordance with the JPSS VIIRS Imagery Products Algorithm Theoretical Basis Document (ATBD) (D0001-M01-S01-008).

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_208 The VIIRS Emissive M-band Imagery EDR software shall incorporate a computing algorithm provided for calibrated, top-of-atmosphere brightness temperatures.

Rationale: The calibrated TOA brightness temperature is one of Emissive M-band SDR products and is used to produce Emissive M-band Imagery EDR in accordance with the JPSS VIIRS Imagery Products Algorithm Theoretical Basis Document (ATBD) (D0001-M01-S01-008).

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

SRS.01.26_209 The VIIRS Emissive M-band Imagery EDR software shall generate the emissive M-band imagery EDR for the emissive M-bands specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <Emiss_M_EDR><whichEmissM>.

Rationale: The Emissive M-band Imagery EDRs are produced from specified Emissive M-bands. The selection of M-bands for Imagery EDR is configuration managed.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 2.0.0

3.2.3 Algorithm Exception Handling

SRS.01.26_147 The VIIRS NCC Imagery EDR software shall set each <FillField> to <FillValue> according to <FillCondition> specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <NCC_EDR><fill>.

Rationale: The EDR software through its computing algorithm must fill the NCC Imagery EDR values based on the established fill conditions to satisfy exclusion and fill conditions.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_165 The VIIRS Reflective I-band Imagery EDR software shall set each <FillField> to <FillValue> according to <FillCondition> specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <Refl_I1-3_EDR><fill>.

Rationale: The EDR software through its computing algorithm must fill the Reflective I-band Imagery EDR values based on the established fill conditions to satisfy exclusion and fill conditions.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_180 The VIIRS Emissive I-band Imagery EDR software shall set each <FillField> to <FillValue> according to <FillCondition> specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <Emiss_I4-5_EDR><fill>.

Rationale: The EDR software through its computing algorithm must fill the Emissive I-band Imagery EDR values based on the established fill conditions to satisfy exclusion and fill conditions.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_196 The VIIRS Reflective M-band Imagery EDR software shall set each <FillField> to <FillValue> according to <FillCondition> specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <Refl_M_EDR><fill>.

Rationale: The EDR software through its computing algorithm must fill the Reflective M-band Imagery EDR values based on the established fill conditions to satisfy exclusion and fill conditions.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_210 The VIIRS Emissive M-band Imagery EDR software shall set each <FillField> to <FillValue> according to <FillCondition> specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <Emiss_M_EDR><fill>.

Rationale: The EDR software through its computing algorithm must fill the Emissive M-band Imagery EDR values based on the established fill conditions to satisfy exclusion and fill conditions

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

3.3 External Interfaces

3.3.1 Inputs

SRS.01.26_150 The VIIRS NCC Imagery EDR software shall incorporate inputs per Table 3-1.

Rationale: The EDR generation software must be able to receive and process the resource interaction items shown in Table 3-1 in order to produce the intended NCC Imagery EDR products.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_168 The VIIRS Reflective I-band Imagery EDR software shall incorporate inputs per Table 3-1.

Rationale: The EDR generation software must be able to receive and process the resource interaction items shown in Table 3-1 in order to produce the intended Reflective I-band Imagery EDR products.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_182 The VIIRS Emissive I-band Imagery EDR software shall incorporate inputs per Table 3-1.

Rationale: The EDR generation software must be able to receive and process the resource interaction items shown in Table 3-1 in order to produce the intended Emissive I-band Imagery EDR products.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_199 The VIIRS Reflective M-band Imagery EDR software shall incorporate inputs per Table 3-1.

Rationale: The EDR generation software must be able to receive and process the resource interaction items shown in Table 3-1 in order to produce the intended Reflective M-band Imagery EDR products.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_212 The VIIRS Emissive M-band Imagery EDR software shall incorporate inputs per Table 3-1.

Rationale: The EDR generation software must be able to receive and process the resource interaction items shown in Table 3-1 in order to produce the intended Emissive M-band Imagery EDR products.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_306 The VIIRS NCC Imagery EDR software shall input tables and coefficients specified in Table 3-1 formatted in accordance with JPSS Algorithm Specification Vol II: Data Dictionary for VIIRS Imagery (474-00448-02-26), Section 7.

Rationale: This defines the formats for Lookup Tables, and Processing Coefficients for input into the algorithm module.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

Table 3-1 and Figure 3-1 are best viewed together since they describe the processes governed by this SRS in different ways. The figure diagrams the data flowing into, out of, and within the code governed by this SRS. The table lists these same data interactions as well as all downstream dependencies for outputs from this SRS.

Each row in the table describes a single software interaction - data flowing from one software item to another. The data is listed in the first column. The second and third columns include the short name and mnemonic for the data. Blanks indicate there is no mnemonic. The fourth and fifth columns contain the SRS that generates the data product(s) in the first column, and the SRS that receives those products. The final two columns contain the actual function name in Algorithm Development Library (ADL) that produces those products, and the function that inputs those products. The SRS's titled "Ingest MSD" and "Store/Retrieve" are non-existent SRS's functioning as data handling for the IDPS. The software functions "Store Products" and "Retrieve Products" are similar non-existent functions that operate as IDPS data handling.

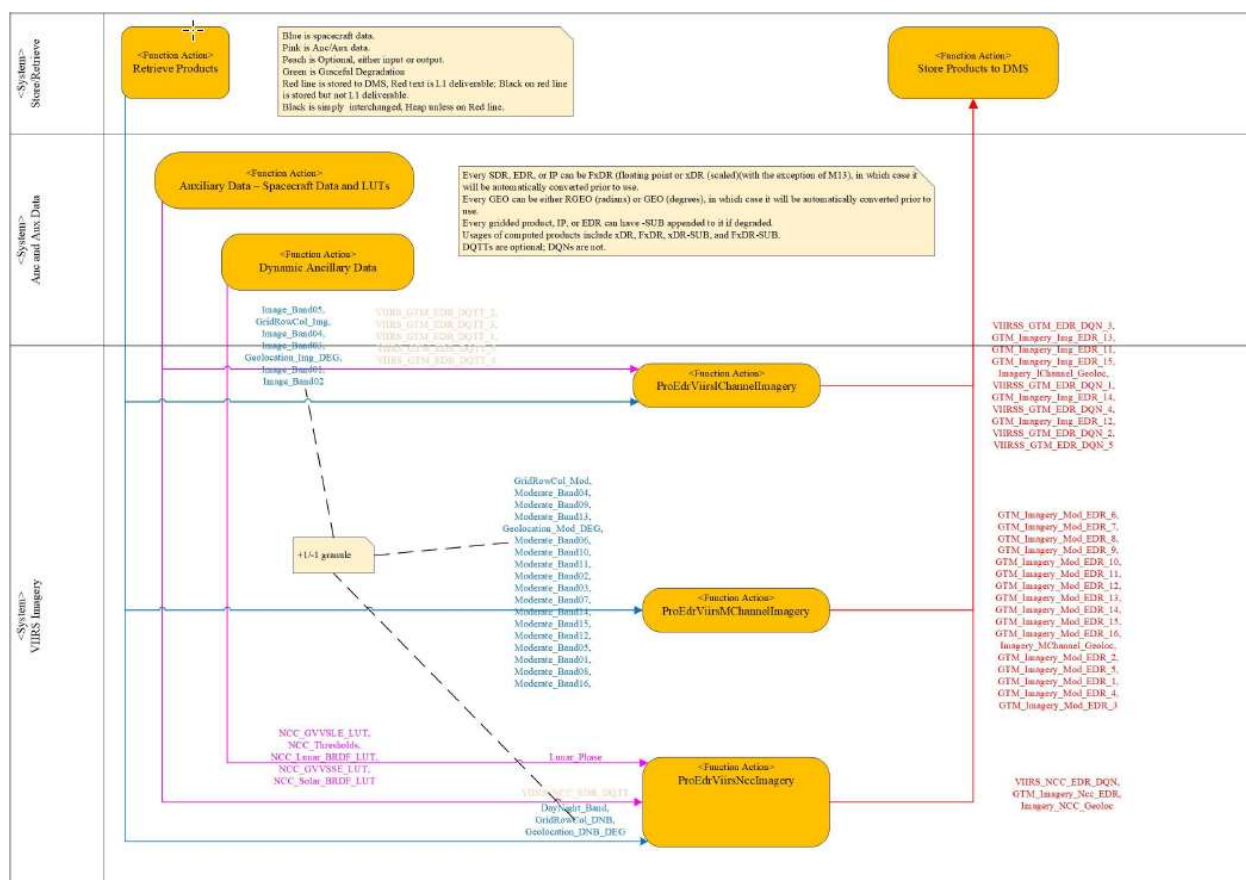


Figure: 3-1 VIIRS Imagery Data Flows

Table: 3-1 Systems Resource Flow Matrix: VIIRS Imagery

	Data Product Name	Collection Short Name	Mnemonic	Sending SRS	Receiving SRS	Sending Function	Receiving Function
1	•Image_Band05 •GridRowCol_Img •Image_Band04 •Image_Band03 •Geolocation_Img_DE G •Image_Band01 •Image_Band02	•VIIRS-I5-SDR •VIIRS-IMG-GRC •VIIRS-I4-SDR •VIIRS-I3-SDR •VIIRS-IMG-GEO •VIIRS-I1-SDR •VIIRS-I2-SDR	•SDRE-VI05-C0030 •None •SDRE-VI04-C0030 •SDRE-VI03-C0030 •None •SDRE-VI01-C0030 •SDRE-VI02-C0030	Store/Retrieve (VIIRS SDR)	VIIRS Imagery	Retrieve Products	ProEdrViirsIChannellImagery
2	•GridRowCol_Mod •Moderate_Band04 •Moderate_Band09 •Moderate_Band13 •Geolocation_Mod_DE G •Moderate_Band06 •Moderate_Band10 •Moderate_Band11 •Moderate_Band02 •Moderate_Band03 •Moderate_Band07 •Moderate_Band14 •Moderate_Band15 •Moderate_Band12 •Moderate_Band05 •Moderate_Band01 •Moderate_Band08 •Moderate_Band16	•VIIRS-MOD-GRC •VIIRS-M4-SDR •VIIRS-M9-SDR •VIIRS-M13-SDR •VIIRS-MOD-GEO •VIIRS-M6-SDR •VIIRS-M10-SDR •VIIRS-M11-SDR •VIIRS-M2-SDR •VIIRS-M3-SDR •VIIRS-M7-SDR •VIIRS-M14-SDR •VIIRS-M15-SDR •VIIRS-M12-SDR •VIIRS-M5-SDR •VIIRS-M1-SDR •VIIRS-M8-SDR •VIIRS-M16-SDR	•None •SDRE-VM04-C0030 •SDRE-VM09-C0030 •SDRE-VM13-C0030 •None •SDRE-VM06-C0030 •SDRE-VM10-C0030 •SDRE-VM11-C0030 •SDRE-VM02-C0030 •SDRE-VM03-C0030 •SDRE-VM07-C0030 •SDRE-VM14-C0030	Store/Retrieve (VIIRS SDR)	VIIRS Imagery	Retrieve Products	ProEdrViirsMChannellImager y

	Data Product Name	Collection Short Name	Mnemonic	Sending SRS	Receiving SRS	Sending Function	Receiving Function
			•SDRE-VM15-C0030 •SDRE-VM12-C0030 •SDRE-VM05-C0030 •SDRE-VM01-C0030 •SDRE-VM08-C0030 •SDRE-VM16-C0030				
3	•DayNight_Band •GridRowCol_DNB •Geolocation_DNB_DEG	•VIIRS-DNB-SDR •VIIRS-DNB-GRC •VIIRS-DNB-GEO	•SDRE-VDNB-C0030 •None •None	Store/Retrieve (VIIRS SDR)	VIIRS Imagery	Retrieve Products	ProEdrViirsNcImagery
4	•VIIRS_GTM_EDR_DQTT_2 •VIIRS_GTM_EDR_DQTT_3 •VIIRS_GTM_EDR_DQTT_1 •VIIRS_GTM_EDR_DQTT_5 •VIIRS_GTM_EDR_DQTT_4	•VIIRS-I2-IMG-EDR-DQTT •VIIRS-I3-IMG-EDR-DQTT •VIIRS-I1-IMG-EDR-DQTT •VIIRS-I5-IMG-EDR-DQTT •VIIRS-I4-IMG-EDR-DQTT	•DP_NU-LM2030-000 •DP_NU-LM2030-000 •DP_NU-LM2030-000 •DP_NU-LM2030-000 •DP_NU-LM2030-000	Anc and Aux Data	VIIRS Imagery	Auxiliary Data - Spacecraft Data and LUTs	ProEdrViirsIChannelImagery
5	•NCC_GVVSLE_LUT •NCC_Thresholds •NCC_Lunar_BRDF_LUT •NCC_GVVSSE_LUT •NCC_Solar_BRDF_LUT	•VIIRS-Ga-Val-Vs-Scene-Lun-Elev-LUT •VIIRS-NCC-EDR-AC •VIIRS-Lun-BRDF-LUT •VIIRS-Ga-Val-Vs-Scene-Sol-Elev-LUT •VIIRS-Sol-BRDF-LUT	•None •DP_NU-LM2020-023 •NP_NU-LM0233-015 •None •NP_NU-LM0233-017	Anc and Aux Data	VIIRS Imagery	Auxiliary Data - Spacecraft Data and LUTs	ProEdrViirsNcImagery

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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.

	Data Product Name	Collection Short Name	Mnemonic	Sending SRS	Receiving SRS	Sending Function	Receiving Function
	•GTM_Imagery_Mod_EDR_13 •GTM_Imagery_Mod_EDR_14 •GTM_Imagery_Mod_EDR_15 •GTM_Imagery_Mod_EDR_16		•EDRE-VMOD-C0030 •EDRE-VMOD-C0030 •EDRE-VMOD-C0030 •EDRE-VMOD-C0030				
10	•VIIRS_GTM_EDR_DQN_3 •GTM_Imagery_Img_EDR_I3 •GTM_Imagery_Img_EDR_I1 •GTM_Imagery_Img_EDR_I5 •Imagery_IChannel_Geoloc •VIIRS_GTM_EDR_DQN_1 •GTM_Imagery_Img_EDR_I4 •VIIRS_GTM_EDR_DQN_4 •GTM_Imagery_Img_EDR_I2 •VIIRS_GTM_EDR_DQN_2 •VIIRS_GTM_EDR_DQN_5	•VIIRS-I3-IMG-EDR-DQN •VIIRS-I3-IMG-EDR •VIIRS-I1-IMG-EDR •VIIRS-I5-IMG-EDR •VIIRS-IMG-GTM-EDR-GEO •VIIRS-I1-IMG-EDR-DQN •VIIRS-I4-IMG-EDR •VIIRS-I4-IMG-EDR-DQN •VIIRS-I2-IMG-EDR •VIIRS-I2-IMG-EDR-DQN •VIIRS-I5-IMG-EDR-DQN	- DP_NU-L00090-001 •EDRE-IMAG-C0030 •EDRE-IMAG-C0030 •EDRE-IMAG-C0030 •None •DP_NU-L00090-001 •EDRE-IMAG-C0030 •DP_NU-L00090-001 •EDRE-IMAG-C0030 •DP_NU-L00090-001 •DP_NU-L00090-001	VIIRS Imagery	Store/Retrieve	ProEdrViirsIChannelImagery	Store Products to DMS

3.3.2 Outputs

SRS.01.26_148 The VIIRS NCC Imagery EDR software shall generate the near-constant contrast imagery EDR for the day/night band in conformance with the XML format file in Attachment A.24 of the JPSS Algorithm Specification Vol II: Data Dictionary for VIIRS Imagery (474-00448-02-26).

Rationale: The product profile must conform to the XML format file.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_166 The VIIRS Reflective I-band Imagery EDR software shall generate the reflective I-band imagery EDR for I1, I2, and I3 in conformance with the XML format file in Attachments A.1 - A.3 of the JPSS Algorithm Specification Vol II: Data Dictionary for VIIRS Imagery (474-00448-02-26).

Rationale: The product profile must conform to the XML format file.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_149 The VIIRS NCC Imagery EDR software shall use the geolocation for the DNB SDR.

Rationale: The geolocation for NCC Imagery EDR is based on the DNB SDR geolocation.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_167 The VIIRS I-band Imagery EDR software shall use the geolocation for the I-band SDR.

Rationale: The geolocation for I-band Imagery EDR is based on the I-band SDR geolocation.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_181 The VIIRS Emissive I-band Imagery EDR software shall generate the emissive I-band imagery EDR for I4 and I5 in conformance with the XML format file in Attachments A.4 and A.5 of the JPSS Algorithm Specification Vol II: Data Dictionary for VIIRS Imagery (474-00448-02-26).

Rationale: The product profile must conform to the XML format file.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_197 The VIIRS Reflective M-band Imagery EDR software shall generate the reflective M-band imagery EDR, in conformance with the XML format file in Attachments A.7 - A.22 of Vol II of the JPSS Algorithm Specification Vol II: Data Dictionary for VIIRS Imagery (474-00448-02-26).

Rationale: The product profile must conform to the XML format file.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_198 The VIIRS M-band Imagery EDR software shall use the geolocation for the M-band SDR.

Rationale: The geolocation for M-band Imagery EDR is based on the M-band SDR geolocation.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_211 The VIIRS Emissive M-band Imagery EDR software shall generate the emissive M-band imagery EDR, in conformance with the XML format file in Attachment A.7-A.22 of the JPSS Algorithm Specification Vol II: Data Dictionary for VIIRS Imagery (474-00448-02-26).

Rationale: The product profile must conform to the XML format file.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

3.4 Science Standards

Not applicable.

3.5 Metadata Output

Not applicable.

3.6 Quality Flag Content Requirements

SRS.01.26_157 The VIIRS NCC Imagery EDR software shall report for each <FlagScope> quality flags using <FlagLogic> as specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <NCC_EDR><QF>.

Rationale: Quality Flags must be generated based on the established flag conditions, logic, and format.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_158 The VIIRS NCC Imagery GEO software shall report for each <FlagScope> quality flags using <FlagLogic> as specified in the JPSS Algorithm

Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26)
<NCC_GEO><QF>.

Rationale: Quality Flags must be generated based on the established flag conditions, logic, and format.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_174 The VIIRS Reflective I-band Imagery EDR software shall report for each <FlagScope> quality flags using <FlagLogic> as specified in the SRSPF <Refl_I1-3_EDR><QF>.

Rationale: Quality Flags must be generated based on the established flag conditions, logic, and format.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_175 The VIIRS I-band Imagery GEO software shall report for each <FlagScope> quality flags using <FlagLogic> as specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <IbandGEO><QF>.

Rationale: Quality Flags must be generated based on the established flag conditions, logic, and format.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_188 The VIIRS Emissive I-band Imagery EDR software shall report for each <FlagScope> quality flags using <FlagLogic> as specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <Emiss_I4-5_EDR><QF>.

Rationale: Quality Flags must be generated based on the established flag conditions, logic, and format.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_204 The VIIRS M-band Imagery GEO software shall report for each <FlagScope> quality flags using <FlagLogic> as specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <MbandGEO><QF>.

Rationale: Quality Flags must be generated based on the established flag conditions, logic, and format.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

3.7 Data Quality Notification Requirements

SRS.01.26_151 The VIIRS NCC Imagery EDR software shall send data quality notifications to the operator according to logic specified in the JPSS Algorithm Specification Vol IV: SRSPF for VIIRS Imagery (474-00448-04-26) <NCC_EDR> <notification>.

Rationale: Notifications must be generated and sent based on the established logic and conditions.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

3.8 Adaptation

Not applicable.

3.9 Provenance Requirements

Not applicable.

3.10 Computer Software Requirements

Not applicable.

3.11 Software Quality Characteristics

Not applicable.

3.12 Design and Implementation Constraints

SRS.01.26_143 The Common Ground System shall execute the top-of-atmosphere pseudo albedo algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_159 The Common Ground System shall execute the top-of-atmosphere radiance algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_160 The Common Ground System shall execute the top-of-atmosphere reflectance algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_161 The Common Ground System shall execute the Ground Track Mercator mapping algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_176 The Common Ground System shall execute the top-of-atmosphere radiance algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_177 The Common Ground System shall execute the top-of-atmosphere brightness temperature algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_189 The Common Ground System shall execute the top-of-atmosphere radiance algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_190 The Common Ground System shall execute the top-of-atmosphere reflectance algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_191 The Common Ground System shall execute the Ground Track Mercator mapping algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_205 The Common Ground System shall execute the top-of-atmosphere radiance algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

SRS.01.26_206 The Common Ground System shall execute the top-of-atmosphere brightness temperature algorithm.

Rationale: The CGS must incorporate algorithm changes that are supplied by the algorithm vendor.

Mission Effectivity: S-NPP, JPSS-1, JPSS-2

Block Start: 2.0.0 *Block End:* 3.0.0

3.13 Personnel Related Requirements

Not applicable.

3.14 Training Requirements

Not applicable.

3.15 Logistics Related requirements

Not applicable.

3.16 Other Requirements

Not applicable.

3.17 Packaging Requirements

Not applicable.

3.18 Precedence and Criticality

Not applicable.

Appendix A. Requirements Attributes

The Requirements Attributes can be found in the VCRMs at Ground > Mission System Engineering > Ground SEIT Unrestricted > VCRM

<https://jpss.gsfc.nasa.gov/sites/ground/MSE/9/Forms/AllItems.aspx?RootFolder=%2Fsites%2Fground%2FMSE%2F9%2FVCRM&FolderCTID=0x012000D0555EA1A211E64A9A7DE7CBCE72DE8B&View=%7B4267AEFE%2D7E8B%2D402D%2D919D%2D41BED55BA4E7%7D>