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Joint Polar Satellite System (JPSS) Ground Segment Data Product Specification (GSegDPS)

NOAA / NASA

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Joint Polar Satellite System (JPSS) Ground Segment Data Product Specification (GSegDPS)

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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:

JPSS Configuration Management Office
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Change History Log

Revision	Effective Date	Description of Changes (Reference the CCR & CCB/ERB Approve Date)
Rev -	Jun 06, 2019	This version incorporates 474-CCR-19-4519. This version incorporates Version 1.3 of JPSS-REQ-1009/470-00220 dated Sep 07, 2018 to create this baseline. This was approved by the JPSS Ground Segment CCB on the effective date shown.
A	Oct 24, 2019	This version incorporates 474-CCR-19-4605, which was approved by the JPSS Ground Segment ERB on Oct 09, 2019 and by the JPSS Ground Segment CCB on the effective date shown.

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1 SCOPE

This specification provides requirements for sensor data products, and for NOAA enterprise environmental data products, generated by ground-segment processing of data from environmental satellite systems.

Only a few data products – mainly the sensor data products (SDRs) – are specific to, and unique to, particular environmental satellites missions. Most data products – mainly the environmental data products (EDRs) – have algorithms that are not necessarily specific to any satellite instrument, and that can be directly extended to any sensor input that has the physical characteristics necessary for the algorithm.

Indeed, many of the data product algorithms for both JPSS sensor and environmental products were developed for other instruments that pre-dated JPSS, such as MODIS, AIRS, AMSU, AVHRR, IASI and AMSU, under missions such as Aqua, POES, MetOp, and DMSP. EDRs are therefore mainly derived from a NOAA algorithm enterprise, and are not specific to a particular mission.

EDR algorithm capabilities are always evolving, and new EDRs are always being added, but these upgrades are not necessarily timed to mission milestones. Exceptions to this general rule are the introduction of qualitatively new remote-sensing capabilities, such as the VIIRS day/night band, or calibration improvements in underlying SDRs. To facilitate mission planning, the data product requirements distinguish products specific to instruments and products generic across instruments.

2 APPLICABLE DOCUMENTS

This section provides references for standards or specifications appearing in the requirement or its attributes. The Multi-Mission Systems Specification is the parent specification to this Data Product Specification.

2.1 Specifications

Document Number	Document Title
470-00101	Joint Polar Satellite System (JPSS) Multi Mission System Specification (MMSS), JPSS-REQ-1005

2.2 Standards

Document Number	Document Title
	BUFR data format standards, provided at http://www.wmo.int/pages/prog/www/WMOCodes.html
	CCSDS space link and ground link data transmission standards, provided at http://public.ccsds.org/publications/BlueBooks.aspx
	HDF5 data format standards, provided at https://www.hdfgroup.org/HDF5/
	NetCDF data format standards, provided at http://www.unidata.ucar.edu/software/netcdf/
WGS84	World Geodetic System 1984 model, described at http://earth-info.nga.mil/GandG/wgs84/
ISO 19115	Metadata Standard for Geographic Information ISO 19115 effective May 1, 2003
ISO 19115-2	Metadata Standard for Geographic Information, Part 2: Extensions for Imagery and Gridded Data effective April 7, 200
	SPSRB Policy on NetCDF, January 14, 2009 (http://projects.osd.noaa.gov/SPSRB/standards_docs/SPSRB_NetCDF_Policy.pdf)
ESPDS-DAP-WA2-DOC-1.4	Standards for Algorithm Delivery and Integration Using Delivered Algorithm Packages (DAPs)
	Memo on Standards/Best Practices for Application Deployment on ESPC Systems, January 28, 2013: http://projects.osd.noaa.gov/SPSRB/doc/Stds_Best_Practices_Signed.pdf
	SPSRB Software and Coding Standards (http://projects.osd.noaa.gov/SPSRB/standards_software_coding.htm): • General Programming Principles and Guidelines, Version 2.0, September 2010. • Standards, Guidelines and Recommendations for Writing Fortran 77 Code, Version 2.0, September 2010. • Standards, Guidelines and Recommendations for Writing Fortran 90/95 Code, Version 2.0, August 2010. • Standards, Guidelines and Recommendations for Writing C Code, Version 1.0, September 2010.

Document Number	Document Title
	• Standards, Guidelines and Recommendations for Writing C++ Code, Version 1.0, December 2011

3 REQUIREMENTS

3.1 Requirements Attributes

Data product requirements have the following attributes, and their possible values. Not all attributes are relevant for every requirement.

"Instrument" identifies the particular JPSS instrument for the data products.

"Product name" identifies the name of the data product. Note that several sets of product requirements share a product name, but are generated with different sensor data. These requirements with the same product name can be distinguished by the instrument attribute.

"Verification Method" identifies which of the canonical verification methods are to be used to verify the requirement: test, demonstration, inspection, or analysis.

"Verification Description" provides a description of the verification approach and conditions. This is typically only provided for requirements whose verification method is set to "analysis".

"Output format" gives the format of the data product: HD5, NetCDF, or BUFR.

The requirement consists of the "shall" statement, output format, the verification method, and the verification description. Product name and instrument attributes are printed in the specification document to help distinguish product requirements, since some different products have the same name.

3.2 Generic Data Product Requirements

This section provides requirements that apply generally to all JPSS data products. These requirements pertain to output data format, metadata, mission data storage, and maintenance of calibration accuracy for long-term trending.

DPS-568 The data products shall be produced in NetCDF format unless otherwise specified.

Product Name: All

Instrument: All

Allocated To: All

Verification Method: Demonstration

DPS-569 The data products shall include attribute metadata that are compatible with the NetCDF Climate and Forecast Metadata Conventions.

Product Name: All

Instrument: All

Allocated To: All

Verification Method: Demonstration

DPS-570 The data products shall provide geolocation data that are compatible with the NetCDF Climate and Forecast Metadata Conventions.

Product Name: All

Instrument: All

Allocated To: All

Verification Method: Demonstration

DPS-659 The calibrated sensor data products shall maintain a long-term relative accuracy not to exceed 2%, for climate monitoring.

Product Name: All

Instrument: All

Allocated To: All

Verification Method: Analysis

3.3 Sensor Data Product Requirements

This section provides production and calibration performance requirements for the sensor data products. These products are derived from instrument data demodulated at the ground station. The instrument data is typically sent as a binary stream of CCSDS data frames distinguished by CCSDS application packet ID (APID) and by CCSDS virtual channel identifier (VCI). The mission data processing will assemble raw data products based on the APIDs applicable for each sensor.

It is important to note that many of the key performance attributes of the sensor data product will be fixed functions of the instrument design – number of channels, noise levels, spatial resolution, etc. By the time the sensor design is fixed, the basic performance of the output sensor data product is fixed. Therefore key sensor data product performance requirements such as noise-equivalent temperature and spatial resolution are specified in the Flight Requirements for the instrument. The performance requirements here are for the performance of the calibration algorithms in mission data processing, which can only optimize the performance capabilities of the instrument, but can never transcend them.

Algorithm performance requirements have not been yet developed for the JPSS sensor data products. The legacy specification, the L1RD-Supplement, contained only instrument specifications for the sensor data algorithm performance requirements. This specification continues that practice; instrument requirements from the parent specification are transcribed as stand-in algorithm performance requirements.

3.3.1 ATMS Data Product Requirements

DPS-18 The ATMS RDR product shall aggregate spacecraft and sensor data necessary for sensor data calibration and geolocation, from downlinked spacecraft and sensor application packets, for archiving and for input to calibration & geolocation algorithms.

Product Name: ATMS RDR

Instrument: ATMS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-652 The ATMS TDR product shall provide antenna temperatures calibrated from ATMS RDRs, for all ATMS earth scene measurements, at the refresh rates of the instrument.

Product Name: ATMS TDR

Instrument: ATMS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-800 The ATMS BUFR TDR product shall provide geolocated antenna temperatures, converted from ATMS TDRs, in the BUFR format.

Product Name: ATMS BUFR TDR

Instrument: ATMS

Allocated To: CGS

Product Format: BUFR

Verification Method: Demonstration

DPS-20 The ATMS SDR product shall provide scene brightness temperatures calibrated from ATMS TDRs, for all ATMS earth scene measurements, at the refresh rates of the instrument.

Product Name: ATMS SDR

Instrument: ATMS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-801 The ATMS BUFR SDR product shall provide geolocated scene brightness temperatures, converted from ATMS SDRs, in the BUFR format.

Product Name: ATMS BUFR SDR

Instrument: ATMS

Allocated To: CGS

Product Format: BUFR

Verification Method: Demonstration

DPS-30 The ATMS TDR and SDR products shall conform with the ATMS instrument requirement MMSS-227 of the Multi-Mission System Specification, reproduced below for reference.

Product Name: ATMS TDR and SDR

Instrument: ATMS

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: Translation of the instrument requirements used to sell off the instrument before launch, using uniform scenes and constrained test scenarios, into a quality determination for the calibrated TDR and SDR provided to NOAA data users, is left to the discretion of the ATMS SDR algorithm provider.

Table: 3-1 MMSS-227 ATMS Flight Requirements

Channel	Center Frequency (GHz) (1)	Maximum Bandwidth (GHz)	Quasi Polarization	Calibration Accuracy (K)	Temperature Sensitivity (No Greater Than) NEdT @ 300K (K)	Static Beamwidth (deg.)	Dynamic Range (K)
1	23.8	0.27	QV	1	0.7	5.2	3-330
2	31.4	0.18	QV	1	0.8	5.2	3-330
3	50.3	0.18	QH	0.75	0.9	2.2	3-330
4	51.76	0.4	QH	0.75	0.7	2.2	3-330
5	52.8	0.4	QH	0.75	0.7	2.2	3-330
6	53.596±0.115	0.17	QH	0.75	0.7	2.2	3-330
7	54.4	0.4	QH	0.75	0.7	2.2	3-330
8	54.94	0.4	QH	0.75	0.7	2.2	3-330
9	55.5	0.33	QH	0.75	0.7	2.2	3-330
10	57.290344	0.33	QH	0.75	0.75	2.2	3-330
11	57.290344±0.217	0.078	QH	0.75	1.2	2.2	3-330
12	57.290344±0.3222±0.048	0.036	QH	0.75	1.2	2.2	3-330
13	57.290344±0.3222±0.022	0.016	QH	0.75	1.5	2.2	3-330
14	57.290344±0.3222±0.010	0.008	QH	0.75	2.4	2.2	3-330
15	57.290344±0.3222±0.0045	0.003	QH	0.75	3.6	2.2	3-330
16	88.2	2	QV	1	0.5	2.2	3-330
17	165.5	3	QH	1	0.6	1.1	3-330
18	183.31±7	2	QH	1	0.8	1.1	3-330
19	183.31±4.5	2	QH	1	0.8	1.1	3-330
20	183.31±3	1	QH	1	0.8	1.1	3-330
21	183.31±1.8	1	QH	1	0.8	1.1	3-330
22	183.31±1	0.5	QH	1	0.9	1.1	3-330

Notes:
QV = Quasi-Vertical QH = Quasi-Horizontal NEdT = Noise Equivalent Differential Temperature

1) The Specified values for the center frequency of each channel do not include plus/minus "tolerances" on the center frequency. As with heritage microwave sounding instruments, the nomenclature used with the requirements values specify the passband characteristics of each channel, i.e., whether it is a single passband, double sideband, or quadruple sideband channel.

DPS-31 The ATMS Geolocation Data product shall have a 3-sigma geolocation uncertainty in the along-scan direction, over all scan angles, not to exceed 1/2 the along-scan footprint size of the 3 dB (FWHM) beam.

Product Name: ATMS Geolocation Data

Instrument: ATMS

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-365 The ATMS Geolocation Data product shall have a 3-sigma geolocation uncertainty in the along-track direction, over all scan angles, not to exceed 1/2 the along-track footprint size of the 3 dB (FWHM) beam.

Product Name: ATMS Geolocation Data

Instrument: ATMS

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-29 The ATMS Geolocation Data product shall provide WGS84 ellipsoid-referenced geolocation data for all beam positions, calibrated from ATMS instrument and spacecraft RDRs, for all ATMS earth scene measurements, at the refresh rates of the instrument.

Product Name: ATMS Geolocation Data

Instrument: ATMS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-182 The ATMS Imagery product shall provide a mapping projection of calibrated ATMS data, in all bands, globally day and night, under all weather conditions, at the native resolution of the instrument, at the refresh rates of the instrument.

Product Name: ATMS Imagery

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

3.3.2 CrIS Data Product Requirements

DPS-355 The CrIS RDR product shall aggregate spacecraft and sensor data necessary for sensor data calibration and geolocation, from downlinked spacecraft and sensor application packets, for archiving and for input to calibration & geolocation algorithms.

Product Name: CrIS RDR

Instrument: CrIS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-357 The CrIS SDR product shall provide complex spectral radiances, calibrated from CrIS interferogram RDRs, for all CrIS earth scene measurements, at the refresh rates of the instrument.

Product Name: CrIS SDR

Instrument: CrIS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-798 The CrIS BUFR product shall provide geolocated complex spectral radiances, converted from CrIS SDRs, in the BUFR format.

Product Name: CrIS BUFR SDR

Instrument: CrIS

Allocated To: CGS

Product Format: BUFR

Verification Method: Demonstration

DPS-359 The CrIS SDR product shall provide complex spectral radiances binned into three bands denoted SW (short wave), MW (mid wave), and LW (long wave).

Product Name: CrIS SDR

Instrument: CrIS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-791 The CrIS SDR product shall conform with the CrIS instrument requirement MMSS-235 of the Multi-Mission Systems Specification, reproduced below for reference.

Product Name: CrIS SDR

Instrument: CrIS

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: Translation of the instrument requirements used to sell off the instrument before launch, using uniform scenes and constrained test scenarios, into a quality determination for the calibrated SDR provided to NOAA data users, is left to the discretion of the CrIS SDR algorithm provider.

Table: 3-2 MMSS-235 CrIS Flight Requirements

Channel	Minimum Wavenumber Range (cm^{-1})	Spectral Resolution (cm^{-1})	Polarization	Radiometric Accuracy @ 287 K (%)	Maximum NEdN ($mW/(m^2\text{-}sr\text{-}cm^{-1})$) (1,2)	Maximum FOV Footprint at Nadir FOV (km)	Maximum Spectral Uncertainty (ppm)
Longwave	650-1095	0.625	NS	0.45	0.45 @ 670 cm^{-1} 0.15 @ 700 cm^{-1} 0.15 @ 850 cm^{-1}- 0.15 @ 1050 cm^{-1}	15	10
Mid-wave	1210-1750	0.625	NS	0.58	0.078 @ 1225 cm^{-1} 0.064 @ 1250 cm^{-1} 0.069 @ 1500 cm^{-1} 0.075 @ 1700 cm^{-1}	15	10
Shortwave	2155-2550	0.625	NS	0.77	0.013 @ 2200 cm^{-1} 0.014 @ 2350 cm^{-1}	15	10

Channel	Minimum Wavenumber Range (cm^{-1})	Spectral Resolution (cm^{-1})	Polarization	Radiometric Accuracy @ 287 K (%)	Maximum NEdN ($mW/(m^2\text{-}sr\text{-}cm^{-1})$) (1,2)	Maximum FOV Footprint at Nadir FOV (km)	Maximum Spectral Uncertainty (ppm)
					0.014 @ 2550 cm^{-1}		

Notes:
1. The Maximum NEdN requirement for any spectral channels existing between the specified table values may be inferred graphically by straight line segments connecting the specified values.
2. The NEdN requirements are applicable to the best 8 of 9 FOVs within each channel FOR.
3. NEDN is calculated prior to the Correction Matrix Operator (CMO) correction.

DPS-364 The CrIS Geolocation Data product shall provide WGS84 ellipsoid-referenced geolocation data for all fields of view, calibrated from CrIS instrument and spacecraft RDRs, for all CrIS earth scene measurements, at the refresh rates of the instrument.

Product Name: CrIS Geolocation Data

Instrument: CrIS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-366 The CrIS Geolocation Data product shall have a 3-sigma geolocation uncertainty in the along-scan direction, over all scan angles, not to exceed 1/4 the along-scan footprint size of the 3 dB (FWHM) beam of each FOV.

Product Name: CrIS Geolocation Data

Instrument: CrIS

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-367 The CrIS Geolocation Data product shall have a 3-sigma geolocation uncertainty in the along-track direction, over all scan angles, not to exceed 1/4 the along-track footprint size of the 3 dB (FWHM) beam of each FOV.

Product Name: CrIS Geolocation Data

Instrument: CrIS

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.3.3 VIIRS Data Product Requirements

The VIIRS instrument has bands in the visible (including the day/night band), near infrared, short-wave infrared, mid-wave infrared, and infrared.

The VIIRS SDR performance requirements are just the VIIRS instrument performance requirements. It is left to the discretion of the VIIRS SDR team to translate specified instrument performance and test conditions to unspecified SDR performance and test conditions.

DPS-561 The VIIRS RDR product shall aggregate spacecraft and sensor data necessary for sensor data calibration and geolocation, from downlinked spacecraft and sensor application packets, for archiving and for input to calibration & geolocation algorithms, for all VIIRS bands.

Product Name: VIIRS RDR

Instrument: VIIRS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-673 The VIIRS emissive band SDR product shall provide radiances and brightness temperatures for emissive M-bands and I-bands, calibrated from RDRs, for all emissive-band earth scene measurements, at the refresh rates of the instrument.

Product Name: VIIRS emissive I-band and M-band SDR

Instrument: VIIRS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-803 The VIIRS emissive band BUFR product shall provide geolocated radiances and brightness temperatures for emissive M-bands and I-bands, converted from emissive-band VIIRS SDRs, in the BUFR format.

Product Name: VIIRS emissive I-band and M-band BUFR

Instrument: VIIRS

Allocated To: CGS

Product Format: BUFR

Verification Method: Demonstration

DPS-676 The VIIRS reflective band SDR product shall provide reflectances and radiances for reflective I-bands and M-bands, calibrated from RDRs, for all daytime reflective-band earth scene measurements, at the refresh rates of the instrument.

Product Name: VIIRS reflective I-band and M-band SDR

Instrument: VIIRS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-804 The VIIRS reflective band BUFR product shall provide geolocated reflectances and radiances for reflective M-bands and I-bands, converted from reflective-band VIIRS SDRs, in the BUFR format.

Product Name: VIIRS reflective I-band and M-band BUFR

Instrument: VIIRS

Allocated To: CGS

Product Format: BUFR

Verification Method: Demonstration

DPS-677 The VIIRS day/night band SDR product shall provide radiances for the day/night band calibrated from RDRs, for all earth scene measurements, at the refresh rates of the instrument.

Product Name: VIIRS day/night band SDR

Instrument: VIIRS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-805 The VIIRS day/night band BUFR product shall provide geolocated radiances for the day/night band, converted from day/night-band VIIRS SDRs, in the BUFR format.

Product Name: VIIRS day/night band BUFR

Instrument: VIIRS

Allocated To: CGS

Product Format: BUFR

Verification Method: Demonstration

DPS-678 The VIIRS SDR products shall conform with the VIIRS instrument requirement MMSS-255 of the Multi-Mission Systems Specification, reproduced below for reference.

Product Name: VIIRS I-band, M-band, and day/night-band SDR

Instrument: VIIRS

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: Translation of the instrument requirements used to sell off the instrument before launch, using uniform scenes and constrained test scenarios, into a quality determination for the calibrated SDR provided to NOAA data users, is left to the discretion of the VIIRS SDR algorithm provider.

Table: 3-3 MMSS-255 VIIRS Flight Requirements

Channel	Center Wavelength (nm)	Bandwidth (nm)	Maximum Polarization Sensitivity (%)	Accuracy @ Ltyp or Scene Temperature (%) (5)	Min. SNR @ Ltyp or Min NEdT @ Ttyp (3)	Maximum FOV @ Nadir (km)	Maximum FOV @ Edge-of-Scan (km)	Ltyp or Ttyp [(K or W/(m^2-sr-µm)] (3)	Minimum Dynamic Range [K or W/(m^2-sr-µm)]
1	412	20	4 (7)	2 (8)	352 316	0.8	1.6	44.9 155	30-615
2	445	18	2.50	2	380 409	0.8	1.6	40 146	26-687
3	488	20	2.50	2	416 414	0.8	1.6	32 123	22-702
4	555	20	2.50	2	362 315	0.8	1.6	21 90	12-667
5	672	20	2.50	2	242 360	0.8	1.6	10 68	8.6-651
6	746	15	2.50	2	199	0.8	1.6	9.6	5.3-41.0
7	865	39	3	2	215 340	0.8	1.6	6.4 33.4	3.4-349
8	1240	20	NS	2	74	0.8	1.6	5.4	3.5-164.9 (10)
9	1378	15	NS	2	83	0.8	1.6	6	0.6-77.1 (11)
10	1610	60	NS	2	342	0.8	1.6	7.3	1.2-71.2
11	2250	50	NS	2	90	0.8	1.6	1.0	0.12-31.8 (12)
12	3700	180	NS	0.70	0.396	0.8	1.6	270K	230-353K
13	4050	155	NS	0.70	0.107 0.423	0.8	1.6	300K 380K	230-634K
14	8550	300	NS	0.60	0.091	0.8	1.6	270K	190-336K
15	10763	1000	NS	0.40	0.07	0.8	1.6	300K	190-343K (13)
16	12013	950	NS	0.40	0.072	0.8	1.6	300K	190-340K (14)
17	700	400	NS	10/30/100 (2)	6 (4)	0.8 (9)	0.8 (9)	NS	$3E^{-5}$ to 200 (1)

Channel	Center Wavelength (nm)	Bandwidth (nm)	Maximum Polarization Sensitivity (%)	Accuracy @ Ltyp or Scene Temperature (%) (5)	Min. SNR @ Ltyp or Min NEdT @ Ttyp (3)	Maximum FOV @ Nadir (km)	Maximum FOV @ Edge-of-Scan (km)	Ltyp or Ttyp [(K or W/(m^2-sr-µm)] (3)	Minimum Dynamic Range [K or W/(m^2-sr-µm)]
18	640	80	2.5	2	119	0.4	0.8	22	5-718
19	865	39	3	2	150	0.4	0.8	25	10.3-349
20	1610	60	NS	2	6	0.4	0.8	7.3	1.2-72.5
21	3740	380	NS	5	2.5	0.4	0.8	270K	210-353K (15)
22	11450	1900	NS	2.5	1.5	0.4	0.8	210K	190-340K

Notes:

1. DNB Units are in W/(sr-m^2).
2. DNB Low Gain / Mid-Gain / High Gain minimum radiance requirements.
3. Dual entries indicate requirements for dual-gain channels.
4. For the DNB, the SNR requirement is referenced to the minimum radiance (Lmin), vice Ltyp, and is applicable to scan angles less than 53 degrees.
5. The stated accuracy requirements for the VIIRS solar reflective bands are on the reflectance, not the radiance. The reflectance accuracy requirement is applicable at the stated typical radiance (Ltyp). The radiance range represents the range over which reflectance values are measured. The accuracy requirements for the thermal emissive moderate resolution bands (Channels 12-16) are applicable to a scene brightness temperature of 270K. The accuracy requirement for the thermal emissive imagery resolution bands (Channels 21 and 22) are applicable to a uniform scene of brightness temperature 267K.
6. Ltyp = Typical Radiance Ttyp = Typical Brightness Temperature SNR = Signal-to-Noise Ratio NS = Not Specified
7. For JPSS-2 only, waived to 5.62% by 470-CCR-18-0236
8. For JPSS-2 only, waived to 2.35% by 470-CCR-18-0236
9. For JPSS-2 only, DNB maximum Horizontal Spatial Resolution is waived to 1.1 km by 470-CCR-18-0236
10. For JPSS-2 only, M8 maximum radiance waived to 135 W m^{-2} sr^{-1} μm^{-1} by NJO-2016-020
11. For JPSS-2 only, M9 maximum radiance waived to 76.3 W m^{-2} sr^{-1} μm^{-1} by 470-CCR-18-0236
12. For JPSS-2 only, M11 maximum radiance waived to 30.2 W m^{-2} sr^{-1} μm^{-1} by 470-CCR-18-0236
13. For JPSS-2 only, M15 maximum brightness temperature waived to 337.74 K by 470-CCR-18-0236
14. For JPSS-2 only, M16 maximum brightness temperature waived to 336.22 K by 470-CCR-18-0236
15. For JPSS-2 only, I4 maximum brightness temperature waived to 351.35 K by 470-CCR-18-0236

DPS-680 The VIIRS Geolocation Data product shall have a 3-sigma geolocation uncertainty for all bands, of 400 meters at nadir, and 1500 meters at edge of scan.

Product Name: VIIRS M-band, I-band, and day/night-band Geolocation Data

Instrument: VIIRS

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-682 The VIIRS Geolocation Data product shall provide terrain-corrected geolocation data for all bands, over all scan angles, calibrated from VIIRS instrument and spacecraft RDRs, for all VIIRS earth scene measurements, at the refresh rates of the instrument.

Product Name: VIIRS M-band, I-band, and day/night-band Geolocation Data

Instrument: VIIRS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-37 The VIIRS Imagery product shall provide a Ground-Track Mercator projection, with terrain corrected geolocation, of all VIIRS I-band SDRs; any set of six among available 16 VIIRS M-band SDRs; and the Day/Night-band SDR; globally, day and night (for emissive and day/night bands), under all weather conditions, at the refresh rates of the instrument.

Product Name: VIIRS Imagery

Instrument: VIIRS

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

3.3.4 OMPS-NM Data Product Requirements

The OMPS instrument uses 2-dimensional CCD arrays. The active region of the OMPS-NM CCD array is 708x196 pixels; 708 cross-track by 196 spectral. The pixels are aggregated cross-track and integrated temporally into FOVs that are reported in the data products. The OMPS instrument software can be used to make measurements with just about any combination of

cross-track pixel aggregation and integration time. Cross-track aggregated pixels are called macro pixels in the RDR, and time-integrated macro pixels are FOVs. The set of FOVs cross-track make a scan.

OMPS-NM on S-NPP aggregates to 35 FOVs of 50 km size; JPSS-1 will aggregate to 100 FOVs of 17 km size. The S-NPP integration time of 7.8 s will be reduced to 2.6 s for JPSS-1. Granule size is fixed across instruments at 39 s, so S-NPP granules will have 5 scans, and JPSS-1 granules will contain 15 scans.

DPS-199 The OMPS-NM RDR product shall provide OMPS nadir mapper total column raw data from downlinked sensor application packets, sorted according to application packet ID, for archiving and for input to calibration & geolocation algorithms.

Product Name: OMPS-NM RDR

Instrument: OMPS-NM

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-605 The OMPS-NM SDR product shall provide earth-view radiances calibrated from OMPS-NM RDRs, for all nominal OMPS-NM earth scene measurements, at the refresh rates of the instrument.

Product Name: OMPS-NM SDR

Instrument: OMPS-NM

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-792 The OMPS-NM SDR product shall conform with the OMPS instrument requirement MMSS-245 of the Multi-Mission Systems Specification, reproduced below for reference.

Product Name: OMPS-NM SDR

Instrument: OMPS-NM

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: Translation of the instrument requirements used to sell off the instrument before launch, using uniform scenes and constrained test scenarios, into a quality

determination for the calibrated SDR provided to NOAA data users, is left to the discretion of the OMPS-NM SDR algorithm provider.

Table: 3-4 MMSS-245 OMPS-NM Flight Requirements

	For J2	For J3, J4
Wavelength Range	300-380 nm	300-380 nm
Maximum Bandwidth	1.2 nm	1.2 nm
Minimum Samples/FWHM	2.3	2.3
Maximum Horizontal Cell Size	17 km @ nadir	17 km @ nadir
Minimum SNR	300 (1)	300 (1)
Maximum Polarization Sensitivity	5%	5%
Maximum Albedo Calibration (RMS)	2%	2%
Wavelength Dependent Albedo Accuracy (RMS)	0.5%	0.5%
Working/Reference Diffuser Ratio Precision (RMS)	0.5% (2)	0.5% (2)
Maximum Stray Light (Out of Band)	10% (3)	10% (3)

Notes:
1. Applicable at the specified minimum radiance.
2. Prelaunch; at all wavelengths.
3. Applies to specified channels for Total Ozone Mapping Spectrometer (TOMS) Radiative Transfer Model sample atmosphere reflectances.
4. Measurement performance requirements may be satisfied by any combination of channel assignments to the Nadir Mapper and Nadir Profiler for J3 to J4.

DPS-202 The OMPS-NM Geolocation Data shall have a 3-sigma geolocation uncertainty in the along-scan direction, over all FOVs in the scan, not to exceed 1/2 the along-scan footprint size of the FOV.

Product Name: OMPS-NM Geolocation Data

Instrument: OMPS-NM

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-654 The OMPS-NM Geolocation Data shall have a 3-sigma geolocation uncertainty in the along-track direction, over all FOVs in the scan, not to exceed 1/2 the along-track footprint size of the FOV.

Product Name: OMPS-NM Geolocation Data

Instrument: OMPS-NM

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-203 The OMPS-NM Geolocation Data product shall provide WGS84 ellipsoid-referenced geolocation data for all fields of view, calibrated from OMPS-NM instrument and spacecraft RDRs, for all OMPS-NM earth scene measurements, at the refresh rates of the instrument.

Product Name: OMPS-NM Geolocation Data

Instrument: OMPS-NM

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

3.3.5 OMPS-NP Data Product Requirements

The OMPS instrument uses 2-dimensional CCD arrays. The active region of the OMPS-NP CCD array is 93x196 pixels; 93 cross-track by 196 spectral. The pixels are aggregated cross-track and integrated temporally into FOVs that are reported in the data products. The OMPS instrument software can be used to make measurements with just about any combination of cross-track pixel aggregation and integration time. Cross-track aggregated pixels are called macro pixels in the RDR, and time-integrated macro pixels are FOVs. The set of FOVs cross-track make a scan.

OMPS-NP on S-NPP aggregates to 1 FOV of 250 km size; JPSS-1 will aggregate to 5 FOVs of 50 km size. The S-NPP integration time of 39 s will be reduced to 7.8 s for JPSS-1.

DPS-618 The OMPS-NP RDR product shall provide OMPS nadir profiler raw data from downlinked sensor application packets, sorted according to application packet ID, for archiving and for input to calibration & geolocation algorithms.

Product Name: OMPS-NP RDR

Instrument: OMPS-NP

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-619 The OMPS-NP SDR product shall provide earth-view radiances calibrated from OMPS nadir profiler RDRs, for all nominal OMPS-NP earth scene measurements, at the refresh rates of the instrument.

Product Name: OMPS-NP SDR

Instrument: OMPS-NP

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

DPS-793 The OMPS-NP SDR product shall conform with the OMPS instrument requirement MMSS-245 of the Multi-Mission Systems Specification, reproduced below for reference.

Product Name: OMPS-NP SDR

Instrument: OMPS-NP

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: Translation of the instrument requirements used to sell off the instrument before launch, using uniform scenes and constrained test scenarios, into a quality determination for the calibrated SDR provided to NOAA data users, is left to the discretion of the OMPS-NP SDR algorithm provider.

Table: 3-5 MMSS-245 OMPS-NP Flight Requirements

	For J2	For J3, J4
Wavelength Range	250-310 nm	250-305 nm
Maximum Bandwidth	1.2 nm	1.2 nm
Minimum Samples/FWHM	2.3	2.3
Maximum Horizontal Cell Size	50 km @ nadir	50 km @ nadir
Maximum Polarization Sensitivity	5%	5%
Maximum Albedo Calibration (RMS)	2%	2%
Wavelength Dependent Albedo Accuracy (RMS)	0.5%	0.5%
Working/Reference Diffuser Ratio Precision (RMS)	0.5% (2)	0.5% (2)
Maximum Stray Light (Out of Band)	5% (3)	3% (3)
Notes: 1. Applicable at the specified minimum radiance. 2. Prelaunch; at all wavelengths. 3. Applies to specified channels for Total Ozone Mapping Spectrometer (TOMS) Radiative Transfer Model sample atmosphere reflectances. 4. Measurement performance requirements may be satisfied by any combination of channel assignments to the Nadir Mapper and Nadir Profiler for J3 to J4.		

DPS-655 The OMPS-NP Geolocation Data shall have a 3-sigma geolocation uncertainty in the along-scan direction, over all FOVs in the scan, not to exceed 1/2 the along-scan footprint size of the FOV.

Product Name: OMPS-NP Geolocation Data

Instrument: OMPS-NP

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-656 The OMPS-NP Geolocation Data shall have a 3-sigma geolocation uncertainty in the along-track direction, over all FOVs in the scan, not to exceed 1/2 the along-track footprint size of the FOV.

Product Name: OMPS-NP Geolocation Data

Instrument: OMPS-NP

Allocated To: CGS

Product Format: HD5

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-657 The OMPS-NP Geolocation Data product shall provide WGS84 ellipsoid-referenced geolocation data for all fields of view, calibrated from OMPS-NM instrument and spacecraft RDRs, for all OMPS-NM earth scene measurements, at the refresh rates of the instrument.

Product Name: OMPS-NP Geolocation Data

Instrument: OMPS-NP

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

3.3.6 OMPS-LP Product Requirements

DPS-790 The OMPS-LP RDR product shall aggregate spacecraft and sensor data necessary for sensor data calibration and geolocation, from downlinked spacecraft and sensor application packets, for archiving and for input to calibration & geolocation algorithms.

Product Name: OMPS-LP RDR

Instrument: OMPS-LP

Allocated To: CGS

Product Format: HD5

Verification Method: Demonstration

3.3.7 AMSR-2 Data Product Requirements

DPS-788 The AMSR-2 ASD product shall aggregate spacecraft and sensor data necessary for sensor data calibration and geolocation, from downlinked spacecraft and sensor application packets, for archiving and for input to calibration & geolocation algorithms.

Product Name: AMSR-2 ASD

Instrument: AMSR-2

Allocated To: CGS

Verification Method: Demonstration

DPS-797 The AMSR-2 calibrated sensor data product shall provide scene counts and scene brightness temperatures calibrated from AMSR-2 ASDs, for all AMSR-2 earth scene measurements, at the refresh rates of the instrument.

Product Name: AMSR-2 Calibrated Sensor Data

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-906 The AMSR-2 calibrated sensor data BUFR product shall provide geolocated scene counts and scene brightness temperatures, converted from AMSR-2 calibrated sensor data products, in the BUFR format.

Product Name: AMSR-2 Calibrated Sensor Data BUFR

Instrument: AMSR-2

Allocated To: ESPC

Product Format: BUFR

Verification Method: Demonstration

DPS-185 The AMSR-2 Imagery product shall provide a mapping projection of AMSR-2 calibrated data, for all bands, globally day and night, under all weather conditions, at the native resolution of the instrument, at the refresh rates of the instrument.

Product Name: AMSR-2 Imagery

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

3.4 Environmental Data Product Requirements

The requirements in this section are for data products that are not specific to particular JPSS sensors, but that may be produced by the Enterprise Data Product system from a range of satellite sensors flying on POES, JPSS, MetOp, DMSP, GCOM, etc.

The spatial resolution is a fixed property of the JPSS instruments, and so there are no spatial resolution requirements in this section, unless the data product performs aggregation of JPSS data. Unless otherwise indicated, it is presumed the enterprise data product spatial resolution is at the native spatial resolution of the underlying instrument SDR used to generate the product. Previous data product requirements did include spatial resolution requirements, but those dated from the time the JPSS instruments were being designed. Now that the design is fixed, spatial requirements are not carried for the JPSS enterprise data products.

The mapping uncertainty requirements are captured in the sensor-specific requirement section. Previous enterprise data product requirements included mapping uncertainty, but like the spatial resolution requirements, they were used to inform the JPSS instrument design. For enterprise data products based on calibrated sensor data (SDRs), the mapping uncertainty follows from the SDR geolocation algorithms. If the enterprise data product algorithm employs pixel aggregation, then mapping uncertainty requirements are carried in this section.

3.4.1 Hyperspectral Infrared Sounder Data Product Requirements

This section contains requirements for data products that are produced from hyperspectral infrared sounders, such as CrIS, AIRS, and IASI. CrIS short-wave bands overlaps VIIRS M12-M14; CrIS long-wave bands overlap VIIRS discrete thermal bands.

3.4.1.1 Infrared Ozone Profile Product Requirements

The 10 micron region of the hyperspectral infrared sounder spectrum is sensitive to ozone, allowing retrieval of ozone in both daytime and nighttime conditions. This retrieval is only possible when cloud clearing is successful (the partly cloudy condition of AVTP and AVMP), otherwise a climatological first guess is reported. The sensitivity of the 10 micron channels is mostly located in the lower stratosphere and, under the right conditions (e.g., stratosphere-troposphere exchange), has some sensitivity in the upper troposphere.

Ozone is derived principally because it can improve other infrared sounder products (e.g., determination of temperature and moisture and trace gases), since ozone affects infrared sounder radiances over broad spectral regions. This product complements ozone products derived from other instruments (e.g., OMPS) due to its unique ability to be derived both day and night and because a thermal sounder has an enhanced sensitivity above the tropopause, due to knowledge of the thermal structure coming from the AVTP product.

The product is made available on 100 layers so that users can compute total column and layer column densities on their vertical gridding; however, in reality this product only has one to two degrees of freedom. Therefore, most of the vertical structure in the profile is derived from the climatological first guess.

DPS-189 The Infrared Ozone Profile product shall provide infrared ozone profiles, globally day and night, at the refresh rates of the instrument.

Product Name: Infrared Ozone Profile

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-190 The Infrared Ozone Profile product shall provide infrared ozone profiles from the top of atmosphere to the surface, on the native vertical reporting interval of the radiative transfer model grid used in the retrieval.

Product Name: Infrared Ozone Profile

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

Verification Description: Each layer reports the column density (molecules per square centimeter) within the layer. The purpose of this requirement is to allow users to vertically remap the product without loss of vertical information content.

DPS-192 The Infrared Ozone Profile product shall provide infrared ozone profiles with a measurement precision of 20% from the surface to 260 millibars (mb) in one statistic layer, and from 260 mb to 4 mb in 6 statistic layers.

Product Name: Infrared Ozone Profile

Instrument: CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Ground truth is to be averaged over 50 kilometers horizontally, and over the vertical layer.

DPS-193 The Infrared Ozone Profile product shall provide infrared ozone profiles with a measurement accuracy of 10% from the surface to 260 millibars (mb) in one statistic layer, and from 260 mb to 4 mb in 6 statistic layers.

Product Name: Infrared Ozone Profile

Instrument: CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Ground truth is to be averaged over 50 kilometers horizontally, and over the vertical layer.

3.4.1.2 Outgoing Longwave Radiation Product Requirements

Outgoing longwave radiation is the instantaneous radiative energy emitted by the earth-plus-atmosphere system, at the top of the atmosphere, out to space.

DPS-205 The Outgoing Longwave Radiation product shall provide outgoing longwave radiation, globally day and night, for all scene conditions, over the measurement range of the instrument, at the refresh rates of the instrument.

Product Name: Outgoing Longwave Radiation

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-208 The Outgoing Longwave Radiation product shall provide outgoing longwave radiation with a measurement precision of 12 watts per square meter (W/m^2).

Product Name: Outgoing Longwave Radiation

Instrument: CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-209 The Outgoing Longwave Radiation product shall provide outgoing longwave radiation with a measurement accuracy of 5 W/m^2.

Product Name: Outgoing Longwave Radiation

Instrument: CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2 Optical Imager Data Product Requirements

This section contains requirements for data products that are produced from broadband optical imagers, such as MODIS or VIIRS.

3.4.2.1 Active Fires Product Requirements

The Active Fires product is based on the detection and analysis of the radiative signature of natural or anthropogenic surface fires as received by the sensor. The product includes the geolocation and fire radiative power of pixels for which fires are detected, and a full mask consisting of a two-dimensional array of values representing the fire and other relevant thematic classes (e.g., cloud) of each pixel in a swath data granule.

DPS-32 The Active Fires product shall provide fire radiative power, with a measurement uncertainty of 50%, over the measurement range of the instrument.

Product Name: Active Fires

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-33 The Active Fires product shall provide a per-pixel fire mask and fire radiative power, calculated from infrared imager calibrated data, globally day and night, under clear sky conditions between clouds, at the refresh rates of the instrument.

Product Name: Active Fires

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

3.4.2.2 Aerosol Detection Product Requirements

Aerosol Detection (including smoke and dust) is a summary map that indicates the extent of smoke/aerosol coverage; a measure of smoke albedo is used to indicate relative intensity. The detection is above a nominal level that can vary depending on conditions. Aerosol detection will include volcanic ash, but the details for that particular aerosol are reported in a separate product.

This product is used for verifying operational smoke forecasts, documenting trends in biomass burning and urban aerosols, and to estimate the impact of biomass burning on human health, ecology, and climate.

DPS-330 The Aerosol Detection product shall provide type identification of aerosols entrained at any altitude, for the total column, globally, under cloud-free conditions, in daytime, for aerosol optical thickness greater than 0.15, at the refresh rates of the instrument.

Product Name: Aerosol Detection

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-331 The Aerosol Detection product shall identify aerosols of type dust, sand, and smoke, at a given location.

Product Name: Aerosol Detection

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-332 The Aerosol Detection product shall identify presence of aerosols of any type with a probability of correct typing of 80%.

Product Name: Aerosol Detection

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification is for a horizontal cell aggregated to 3 kilometers.

DPS-333 The Aerosol Detection product shall identify dust with a probability of correct typing of 80%; and smoke with a probability of correct typing of 70%.

Product Name: Aerosol Detection

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification is for a horizontal cell aggregated to 3 kilometers.

DPS-334 The Aerosol Detection product shall identify smoke plumes with densities from 0 to 2000 micrograms per square meter of column.

Product Name: Aerosol Detection

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.3 Aerosol Optical Depth Product Requirements

Aerosol optical depth is a measure of the fine solids suspended in the air including dust, sand, volcanic ash, smoke, and urban/industrial aerosols. Aerosol optical depth characterization will consist of elements of aerosol optical depth and fine particulate matter.

The fine particulate matter will be derived from the aerosol optical depth translated to mass concentration in the observed vertical path (microgram per cubic meter). Translation to concentration depends on particle type and vertical location of the aerosols, and is determined in regions where aerosols have been detected above a nominal level that may vary, depending on conditions. The term "aerosol optical thickness" is often used synonymously.

DPS-511 The Aerosol Optical Depth product shall provide aerosol optical depth; globally; in daytime; in clear conditions; for the total column; at solar zenith angles less than or equal to 80 degrees; at the refresh rates of the instrument.

Product Name: Aerosol Optical Depth

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-809 The Aerosol Optical Depth BUFR product shall provide geolocated aerosol optical depth, converted from the Aerosol Optical Depth product, in BUFR format.

Product Name: Aerosol Optical Depth BUFR

Instrument: VIIRS

Allocated To: ESPC

Product Format: BUFR

Verification Method: Demonstration

DPS-512 The Aerosol Optical Depth product shall provide aerosol optical depth with a measurement accuracy of: 0.08 over ocean for optical depth less than 0.3, and 0.15 over ocean for optical depth greater than or equal to 0.3; 0.06 over land for optical depth less than 0.1, 0.05 over land for optical depth greater than or equal to 0.1 and less than or equal to 0.8, and 0.2 over land for optical depth greater than 0.8.

Product Name: Aerosol Optical Depth

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions, over the entire dynamic range, over all aerosol types, over all seasons.

The aerosol optical depth retrieved for pixels within 27.5 kilometers from ground-truth measurements are to be averaged and compared to the hourly average of the ground truth measurement; a minimum of five best quality AOD retrievals and two ground-based observations must be available within these spatial and temporal constraints. Ground truth data available at wavelengths other than 550 nm should be interpolated to 550 nm.

Verify only at wavelength of 550 nanometers, and only for optical depth values between 0 and 2.

DPS-513 The Aerosol Optical Depth product shall provide aerosol optical depth with a measurement precision of: 0.15 over ocean for optical depth less than 0.3, and 0.35 over ocean for optical depth greater than or equal to 0.3; 0.15 over land for optical depth less than 0.1, 0.25 over land for optical depth greater than or equal to 0.1 and less than or equal to 0.8, and 0.45 over land for optical depth greater than 0.8.

Product Name: Aerosol Optical Depth

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions, over the entire dynamic range, over all aerosol types, over all seasons.

The aerosol optical depth retrieved for pixels within 27.5 kilometers from ground-truth measurements are to be averaged and compared to the hourly average of the ground truth measurement; a minimum of five best quality AOD retrievals and two ground-based observations must be available within these spatial and temporal constraints. Ground truth data available at wavelengths other than 550 nm should be interpolated to 550 nm.

Verify only at wavelength of 550 nanometers, and only for optical depth values between 0 and 2.

DPS-514 The Aerosol Optical Depth product shall provide aerosol optical depth with a measurement range of – 0.05 to 5.

Product Name: Aerosol Optical Depth

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-515 The Aerosol Optical Depth product shall provide aerosol optical depth for wavelengths at 412, 445, 488, 550, 555, 672, 746, 865, 1240, 1610, and 2250 nanometers.

Product Name: Aerosol Optical Depth

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

3.4.2.4 Aerosol Particle Size Product Requirements

The Aerosol Particle Size product provides a measure of the bimodal size distribution of the aerosol population in terms of the effective radius and effective variance of each mode. The effective radius is the ratio of the third moment of the aerosol size distribution to the second moment. The effective variance characterizes the width of the size distribution. The aerosol particle size is determined in regions where aerosols have been detected above a nominal level that can vary depending on conditions.

Aerosol particle size is parameterized by the Ångström exponent α , defined as

$$\alpha = -\left(\frac{\ln \tau_1 - \ln \tau_2}{\ln \lambda_1 - \ln \lambda_2}\right)$$

where λ_1 and λ_2 are wavelengths, in micrometers, of the band centers of two narrow bands, and τ_1 and τ_2 are the vertical optical thicknesses of the atmospheric aerosols at those wavelengths. The Ångström exponent characterizes the dependency of aerosol optical thickness on wavelength and is related to the average size of the particles in the aerosol (the larger the exponent, the smaller the particles).

DPS-45 The Aerosol Particle Size product shall be provided globally over ocean, daytime only, over the total column, for Ångström exponent values between -1 and +3, at the refresh rates of the instrument.

Product Name: Aerosol Particle Size

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-50 The Aerosol Particle Size product shall provide the Ångström exponent with a measurement precision of 0.6 alpha units over ocean.

Product Name: Aerosol Particle Size

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-51 The Aerosol Particle Size product shall provide the Ångström exponent with a measurement accuracy of 0.3 alpha units over ocean.

Product Name: Aerosol Particle Size

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.5 Cloud Cover/Layers

The Cloud Cover/Layers product reports the fraction of each aggregated cell that has cloud cover, at one of several layers at different heights in the atmosphere.

DPS-458 The Cloud Cover/Layers product shall provide geolocated fractional cloud cover per cell, for three atmospheric layers and for the total of all layers, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.

Product Name: Cloud Cover/Layers

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-591 The Cloud Cover/Layers product shall provide geolocated fractional cloud cover per cell at the three atmospheric layers of 0 to 350 millibars (mb), 350 to 642 mb, and 642 to 1100 mb.

Product Name: Cloud Cover/Layers

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-459 The Cloud Cover/Layers product shall provide fractional cloud cover per cell with a measurement uncertainty of 15%.

Product Name: Cloud Cover/Layers

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Degradation in performance will increase away from zero solar zenith angle due to geometry. Verify against total cloud cover of all layers only; not applicable to individual layers. Fraction is measured from 0 to 1.

DPS-461 The Cloud Cover/Layers product shall provide fractional cloud cover with a horizontal cell size of 10 kilometers.

Product Name: Cloud Cover/Layers

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-462 The Cloud Cover/Layers product shall geolocate the center of the fractional cloud cover cell with a 3-sigma mapping uncertainty of 4 kilometers.

Product Name: Cloud Cover/Layers

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.6 Cloud Height (Top and Base) Product Requirements

Cloud top height and cloud base height are defined for each cloud-covered earth location as the set of heights above mean sea level of the top and base, respectively, of the highest cloud in the column overlying the location.

DPS-481 The Cloud Height product shall provide geolocated cloud top and base heights per cell, for the highest cloud in the column, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.

Product Name: Cloud Height (Top and Base)

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-482 The Cloud Height product shall provide cloud top heights per cell with a measurement precision of 1.0 kilometers for cloud optical thickness greater than or equal to 1; and 2.0 km for cloud optical thickness less than 1.

Product Name: Cloud Height (Top and Base)

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-593 The Cloud Height product shall provide cloud base heights per cell with a measurement precision of 2.0 kilometers for cloud optical thickness greater than or equal to 1; and 3.0 km for cloud optical thickness less than 1.

Product Name: Cloud Height (Top and Base)

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-485 The Cloud Height product shall provide cloud top heights per cell with a measurement accuracy of 1.0 kilometers for cloud optical thickness greater than or equal to 1; and 2.0 km for cloud optical thickness less than 1.

Product Name: Cloud Height (Top and Base)

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-594 The Cloud Height product shall provide cloud base heights per cell with a measurement accuracy of 2.0 kilometers for cloud optical thickness greater than or equal to 1; and 3.0 km for cloud optical thickness less than 1.

Product Name: Cloud Height (Top and Base)

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.7 Cloud Mask Product Requirements

The Cloud Mask product identifies the part of the earth's horizontal surface that is masked by the vertical projection of detectable clouds. The cloud mask has two possible values: cloudy and not cloudy.

DPS-435 The Cloud Mask product shall provide a cloud mask for the total cloud cover, globally whenever detectable clouds are present, at the refresh rates of the instrument.

Product Name: Cloud Mask

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-436 The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing, averaged globally, of 87%.

Product Name: Cloud Mask

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The mask possible values are "cloudy" and "not cloudy".

DPS-596 The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing over ocean of 92% in daytime, and 90% at night.

Product Name: Cloud Mask

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The mask possible values are "cloudy" and "not cloudy".

DPS-597 The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing over snow-free land of 90% in daytime, and 88% at night.

Product Name: Cloud Mask

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The mask possible values are "cloudy" and "not cloudy".

DPS-598 The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing over desert of 85% in daytime and at night.

Product Name: Cloud Mask

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The mask possible values are "cloudy" and "not cloudy".

DPS-599 The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing over snow-covered land of 88% in daytime, and 85% at night.

Product Name: Cloud Mask

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The mask possible values are "cloudy" and "not cloudy".

DPS-600 The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing over sea ice of 82% in daytime, and 72% at night.

Product Name: Cloud Mask

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The mask possible values are "cloudy" and "not cloudy".

DPS-601 The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing over Antarctica and Greenland of 80% in daytime, and 70% at night.

Product Name: Cloud Mask

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The mask possible values are "cloudy" and "not cloudy".

3.4.2.8 Cloud Optical Depth Product Requirements

Cloud optical depth is defined as the optical thickness of the atmosphere due to cloud droplets in a vertical column above a horizontal cell on the Earth's surface, integrated over each cloud layer, and over all distinguishable cloud layers in aggregate. The term "cloud optical thickness" is often used synonymously. Mathematically, both are defined as the path integral of the extinction per unit length, so that optical depth is unitless.

DPS-473 The Cloud Optical Depth product shall provide cloud optical depth, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.

Product Name: Cloud Optical Depth

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

Verification Description: Cloud optical depth is derived at cloud tops, irrespective of cloud layers.

DPS-477 The Cloud Optical Depth product shall provide cloud optical depth with a measurement precision of the greater of 30% or 3 optical depths in daytime; and the greater of 30% or 0.8 optical depths at night.

Product Name: Cloud Optical Depth

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-478 The Cloud Optical Depth product shall provide cloud optical depth with a measurement accuracy of 20% in daytime and 30% at night.

Product Name: Cloud Optical Depth

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The requirement is for liquid-phase clouds and ice-phase clouds.

3.4.2.9 Cloud Particle Size Distribution Product Requirements

Cloud particle size distribution reports the width, or effective variance, of a single-mode particle size distribution parameterized by an effective particle radius. The effective radius is the ratio of the third moment of the size distribution to the second moment, averaged over a layer of air within a cloud. The width or effective variance is known as the cloud effective particle size.

DPS-465 The Cloud Particle Size Distribution product shall provide the cloud effective particle size, at cloud tops, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.

Product Name: Cloud Particle Size Distribution

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-468 The Cloud Particle Size Distribution product shall provide cloud effective particle size over a range from 2 to 50 microns for ice and water in daytime and for ice at night; and 2 to 32 microns for water at night.

Product Name: Cloud Particle Size Distribution

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-469 The Cloud Particle Size Distribution product shall provide cloud effective particle size with a measurement precision of: the greater of 25% or 4 micron for water; greater of 25% or 10 micron for ice.

Product Name: Cloud Particle Size Distribution

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-470 The Cloud Particle Size Distribution product shall provide cloud effective particle size with a measurement accuracy of: greater of 30% or 4 micron for water; and 10 micron for ice.

Product Name: Cloud Particle Size Distribution

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.10 Cloud Phase Product Requirements

Cloud Phase is derived from the cloud type and is the primary phase of the cloud: Clear, Liquid, Supercooled, Mixed, Ice, and Unknown.

DPS-712 The Cloud Phase product shall provide the cloud phase, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.

Product Name: Cloud Phase

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-713 The Cloud Phase product shall provide the cloud phase with an 80% probability of correct typing.

Product Name: Cloud Phase

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The mask possible values are clear, liquid, supercooled, ice, mixed, and unknown.

3.4.2.11 Cloud Top Pressure Product Requirements

Cloud top pressure is defined for each cloud-covered earth location as the set of atmospheric pressures at the tops of the cloud layers, distinguished by the algorithm, overlying the location.

DPS-489 The Cloud Top Pressure product shall provide cloud top pressures for one or more atmospheric layers, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.

Product Name: Cloud Top Pressure

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-490 The Cloud Top Pressure product shall provide cloud top pressures with a measurement precision of 100 millibars for cloud optical depth greater than or equal to 1; and 200 millibars for cloud optical depth less than 1.

Product Name: Cloud Top Pressure

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify for cloud optical depth greater than 0.3.

DPS-491 The Cloud Top Pressure product shall provide cloud top pressures with a measurement accuracy of 100 millibars for cloud optical depth greater than or equal to 1; and 200 millibars for cloud optical depth less than one.

Product Name: Cloud Top Pressure

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify for cloud optical depth greater than 0.3.

3.4.2.12 Cloud Top Temperature Product Requirements

Cloud top temperature is defined for each cloud-covered earth location as the set of atmospheric temperatures at the tops of the cloud layers, distinguished by the algorithm, overlying the location.

DPS-497 The Cloud Top Temperature product shall provide cloud top temperatures of the highest cloud in the column, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.

Product Name: Cloud Top Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-499 The Cloud Top Temperature product shall provide cloud top temperatures with a measurement precision of 6 kelvin for cloud optical depth greater than or equal to 1; and 12 K for cloud optical depth less than 1.

Product Name: Cloud Top Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify for cloud optical depth greater than 0.3.

DPS-500 The Cloud Top Temperature product shall provide cloud top temperatures with a measurement accuracy of 6 K for cloud optical depth greater than or equal to 1; and 12 K for cloud optical depth less than 1.

Product Name: Cloud Top Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify for cloud optical depth greater than 0.3.

3.4.2.13 Global Surface Type Product Requirements

Surface type is defined as the predominant type in a given area from among the International Geosphere Biosphere Program (IGBP) land cover classes. Surface type information is required as input to weather, climate, hydrological, and agricultural models supporting various U.S. Government and academic customers. Global surface type is generated in offline processing, on an annual basis. The by-products of this offline processing include gridding daily granule surface reflectance data to global 8-day and monthly composites that are required to generate the global surface type classification metrics. The global surface type product is input to the granule-based surface type product that is, in turn, input to other product algorithms.

DPS-818 The Global Surface Type product shall provide the IGBP land cover classification, globally.

Product Name: Global Surface Type

Instrument: External

Allocated To: ESPC

Verification Method: Demonstration

DPS-901 The Global Surface Type product shall provide global 8-day and monthly composites of surface reflectance from their daily granule reflectance data.

Product Name: Global Surface Type

Instrument: External

Allocated To: ESPC

Verification Method: Demonstration

DPS-819 The Global Surface Type product shall provide the IGBP land cover classification with a horizontal cell size of 1 kilometer.

Product Name: Global Surface Type

Instrument: External

Allocated To: ESPC

Verification Method: Demonstration

DPS-820 The Global Surface Type product shall provide the IGBP land cover classification with a probability of correct typing of 70%.

Product Name: Global Surface Type

Instrument: External

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-821 The Global Surface Type product shall be updated once per year.

Product Name: Global Surface Type

Instrument: External

Allocated To: ESPC

Verification Method: Demonstration

3.4.2.14 Green Vegetation Fraction Product Requirements

The Green Vegetation Fraction (GVF) product provides the fractional green vegetation cover within a specific grid cell. The GVF product is produced weekly, and updated daily. It consists of a global product at 4 km resolution and a regional composite over North America at 1 km resolution. Unless otherwise noted, requirements below pertain to both. The retrieval algorithm uses red, near infrared, and blue bands centered at 0.64 μm, 0.865 μm, and 0.488 μm, respectively, to calculate the Enhanced Vegetation Index from which the green vegetation fraction is derived. For VIIRS, these bands correspond to I1, I2, and M3.

DPS-62 The Green Vegetation Fraction product shall provide green vegetation fraction globally and regionally, daytime only, weekly with daily updates, 24 hours after the seven-day compositing period.

Product Name: Green Vegetation Fraction

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-75 The Green Vegetation Fraction product shall provide the green vegetation fraction globally with a cell size of 16 km. and associated 3-sigma mapping uncertainty of 4 km.

Product Name: Green Vegetation Fraction

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-66 The Green Vegetation Fraction product shall provide the green vegetation fraction with a measurement precision of 15%.

Product Name: Green Vegetation Fraction

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-69 The Green Vegetation Fraction product shall provide the green vegetation fraction with a measurement accuracy of 12%.

Product Name: Green Vegetation Fraction

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.15 Ice Surface Temperature Product Requirements

Ice surface temperature is the radiating, or "skin", temperature of the ice surface. It includes the aggregate temperature of objects comprising the ice surface, including snow and melt water on the ice. Ice temperatures from inland water bodies and coastal areas are to be obtained from the Land Surface Temperature product.

DPS-370 The Ice Surface Temperature product shall provide ice surface temperature, globally day and night, for clear conditions, for ice-covered ocean, excluding inland water and coastal areas, at the refresh rates of the instrument.

Product Name: Ice Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-371 The Ice Surface Temperature product shall provide ice surface temperatures with a measurement range of 213 to 275 kelvins.

Product Name: Ice Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-372 The Ice Surface Temperature product shall provide ice surface temperatures with a measurement uncertainty of 1 kelvin.

Product Name: Ice Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.16 Land Surface Temperature Product Requirements

Land Surface Temperature (LST) is defined as the sensor-facing skin temperature of the land surface. It includes the aggregate temperature of objects comprising the land surface, including any open water, in the cell. LST is a fundamental indicator in the physics of land-surface processes, at local through global scales. It is one of the most important climate system variables on a variety of time scales, controlling the partitioning of energy into latent and sensible heat fluxes, and indicating heat fluxes into the ground. LST is thus a key boundary condition in General Circulation Models.

DPS-116 The Land Surface Temperature product shall provide land surface temperature, globally day and night, for clear conditions, at the refresh rates of the instrument.

Product Name: Land Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-117 The Land Surface Temperature product shall provide land surface temperatures with a measurement precision of 2.5 kelvin over the measurement range of the instrument.

Product Name: Land Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-118 The Land Surface Temperature product shall provide land surface temperatures with a measurement accuracy of 1.4 kelvin over the measurement range of the instrument.

Product Name: Land Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-1747 The Gridded Land Surface Temperature product shall provide land surface temperature, 1 km globally day and night, for clear conditions, at the refresh rate of the instrument.

Product Name: Gridded Land Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-1748 The Gridded Land Surface Temperature product shall provide land surface temperatures with a measurement precision of 2.5 kelvin over the measurement range of the instrument.

Product Name: Gridded Land Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-1749 The Gridded Land Surface Temperature product shall provide land surface temperatures with a measurement accuracy of 1.4 kelvin over the measurement range of the instrument.

Product Name: Gridded Land Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions

DPS-1750 The Gridded Land Surface Temperature product shall be generated within 3 hours of receiving all the required data.

Product Name: Gridded Land Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

3.4.2.17 Ocean Color/Chlorophyll Product Requirements

Ocean color is the amount of light exiting the water column (excluding specular reflection at the air-water interface), expressed as an outgoing radiant flux per solid angle and per surface area at

multiple wavelengths. This is referred to as normalized water-leaving radiance (nLw), and is estimated from top-of-atmosphere radiances. Geophysical quantities of interest, such as the concentration of the phytoplankton pigment (chlorophyll-a), and inherent optical properties (absorption and backscattering) of near surface waters are derived from the nLw values or equivalent measurements. This product provides continuity with observations from heritage ocean color missions (e.g., MODIS and SeaWiFS).

Open Ocean is defined as waters where phytoplankton and their derivative products play a dominant role in determining the optical properties, and where the water depth is 30 meters or greater. Blue Band indicates that the associated requirements apply to retrievals derived from measurements using the visible band centered at or near 0.445 μm.

DPS-88 The Ocean Color/Chlorophyll product shall provide ocean color (nLw), chlorophyll-a, and optical properties; for ocean, coastal, or inland water; daytime; in clear conditions; at the refresh rate of the instrument.

Product Name: Ocean Color/Chlorophyll

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-90 The Ocean Color/Chlorophyll product shall provide ocean color with a measurement precision of 10%, over the measurement range of the instrument.

Product Name: Ocean Color/Chlorophyll

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified for open ocean and blue band, against validation data selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-89 The Ocean Color/Chlorophyll product shall provide optical properties with a measurement precision of 20%, over the measurement range of the instrument.

Product Name: Ocean Color/Chlorophyll

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified for open ocean and blue band, against validation data selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-91 The Ocean Color/Chlorophyll product shall provide chlorophyll-a density with a measurement precision of 30% below 10 mg/m^3, and 50% at and above 10 mg/m^3, over the measurement range of the instrument.

Product Name: Ocean Color/Chlorophyll

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified for open ocean and blue band, against validation data selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-93 The Ocean Color/Chlorophyll product shall provide ocean color with a measurement accuracy of 10%.

Product Name: Ocean Color/Chlorophyll

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified for open ocean and blue band, against validation data selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-94 The Ocean Color/Chlorophyll product shall provide optical properties with a measurement accuracy of 35%.

Product Name: Ocean Color/Chlorophyll

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified for open ocean and blue band, against validation data selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-95 The Ocean Color/Chlorophyll product shall provide chlorophyll-a density with a measurement accuracy of 35% below 10 mg/m^3, and 40% at and above 10 mg/m^3.

Product Name: Ocean Color/Chlorophyll

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified for open ocean and blue band, against validation data selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.18 Polar Winds Product Requirements

Polar (tropospheric) winds are derived by tracking cloud features in infrared channel imagery. Wind speed, direction, and height are measured throughout the troposphere, poleward of approximately 70 degrees latitude, in cloudy areas only. Vertical and horizontal coverage is not uniform. For quality control, winds are derived using three consecutive orbits. Wind vectors are assigned the time of the middle image of the orbit triplet.

DPS-104 The Polar Winds product shall provide polar wind vectors, at cloud tops, globally day and night, in cloudy areas, between the surface and the tropopause.

Product Name: Polar Winds

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-806 The Polar Winds BUFR product shall provide geolocated polar wind vectors, converted from the Polar Winds product, in BUFR format.

Product Name: Polar Winds BUFR

Instrument: VIIRS

Allocated To: ESPC

Product Format: BUFR

Verification Method: Demonstration

DPS-106 The Polar Winds product shall provide polar wind vectors with magnitudes from 3 to 100 meters/second and directions from 0 to 360 degrees.

Product Name: Polar Winds

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-107 The Polar Winds product shall provide polar wind vectors with a measurement precision of 3.8 meters/sec, expressed as a mean vector difference.

Product Name: Polar Winds

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-108 The Polar Winds product shall provide polar wind vectors with a measurement accuracy of 7.5 meters/sec, expressed as a mean vector difference.

Product Name: Polar Winds

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-109 The Polar Winds product shall provide polar wind vectors with a horizontal resolution of 10 km.

Product Name: Polar Winds

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.19 Sea Ice Age Product Requirements

The Sea Ice Age product provides ice age by assignment to a particular ice age class. Sea ice age is defined as the time that has elapsed since the formation of ice on the surface of sea water. Ice age is therefore related to ice thickness.

DPS-239 The Sea Ice Age product shall provide sea ice age class, globally over ocean, in daytime, under clear conditions, at the refresh rates of the instrument.

Product Name: Sea Ice Age

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-902 The Sea Ice Age product shall provide sea ice age class as either ice free, new/young ice, and all other ice.

Product Name: Sea Ice Age

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-241 The Sea Ice Age product shall provide sea ice age class with a probability of correct typing of 70%.

Product Name: Sea Ice Age

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification excluded under cloudy conditions, in sun glint regions, or when the aerosol optical thickness at 550 nanometers is greater than 1. Degradation is expected under cloud shadows, near the terminator and night regions (solar zenith angle above 85 degrees), in low thermal contrast regions (ice/water tie point contrast below 1.5), and in melt-ponded regions (surface temperature above 271 kelvin).

3.4.2.20 Sea Ice Concentration Product Requirements

Sea ice concentration is the areal extent of ice, calculated as the fraction of each pixel covered in ice. The concentration of sea ice varies within the ice pack due to deformation, new ice development, melting, and motion. Total concentration includes all stages of development that are present.

DPS-246 The Sea Ice Concentration product shall provide sea ice concentration, globally over ocean, in daytime, under clear conditions, at the refresh rates of the instrument.

Product Name: Sea Ice Concentration

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

Verification Description: Ice concentration is reported from 0% to 100%, with the percentage denoting the fraction of each pixel covered in ice.

DPS-248 The Sea Ice Concentration product shall provide sea ice concentration with a measurement uncertainty of 25%.

Product Name: Sea Ice Concentration

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification excluded under cloudy conditions, in sun glint regions, or when the aerosol optical thickness at 550 nanometers is greater than 1. Degradation is expected under cloud shadows, near the terminator and night regions (solar zenith angle above 85 degrees), in low thermal contrast regions (ice/water tie point contrast below 1.5), and in melt-ponded regions (surface temperature above 271 kelvin).

DPS-650 The Sea Ice Concentration product shall provide sea ice concentration with a measurement accuracy of 10%.

Product Name: Sea Ice Concentration

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification excluded under cloudy conditions, in sun glint regions, or when the aerosol optical thickness at 550 nanometers is greater than 1. Degradation is expected under cloud shadows, near the terminator and night regions (solar zenith angle above 85 degrees), in low thermal contrast regions (ice/water tie point contrast below 1.5), and in melt-ponded regions (surface temperature above 271 kelvin).

3.4.2.21 Sea Surface Temperature Product Requirements

Sea surface temperature (SST) is defined as a measurement of the skin temperature of the ocean surface, following the internationally accepted definition used by the Group for High-Resolution SST (GHRSST) and the CEOS Virtual Constellation for SST.

Satellite retrievals of SST provide the majority of ocean data that are assimilated into ocean circulation, climate, and mesoscale atmospheric numerical models, by providing real time constraints on ocean surface boundary conditions. SST is needed for many applications including operational weather and ocean forecasting (including ocean circulation and tropical storm trajectory and intensity forecasts), military and defense operations, validating or forcing ocean and atmospheric models, ecosystem assessment, tourism, coastal zone management, crew safety/ditching at sea, fisheries, climate variability, and seasonal forecasting.

Satellite skin temperatures will enhance the emerging coupled ocean-atmospheric models that require both air and sea temperatures. Many users need temperature profiles, which can be derived by running models of the ocean upper layer, and using skin SST as a constraint. This "skin-to-bulk" inversion will be external to the SST product described here, which only represents atmospheric and surface emissivity correction applied to top-of-atmosphere brightness temperatures to estimate the skin temperature of the ocean surface.

Note that the derived skin SST product will automatically meet similar specifications for bulk SST required by the bulk SST users community. Improvements in SST resolution, accuracy and uncertainty beyond current requirements will enable significantly improved applications.

DPS-133 The Sea Surface Temperature product shall provide sea surface temperature, globally day and night, for clear conditions, for ice-free ocean, excluding lakes and rivers, at the refresh rates of the instrument.

Product Name: Sea Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-813 The Sea Surface Temperature BUFR product shall provide geolocated sea surface temperature, converted from the Sea Surface Temperature product, in BUFR format.

Product Name: Sea Surface Temperature BUFR

Instrument: VIIRS

Allocated To: ESPC

Product Format: BUFR

Verification Method: Demonstration

DPS-134 The Sea Surface Temperature product shall provide sea surface temperatures with a measurement precision of 0.6 kelvin over the measurement range of the instrument.

Product Name: Sea Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification must include 18% of ocean pixels, which is understood to be the average fraction of clear-sky ocean for which a temperature retrieval can be obtained.

DPS-135 The Sea Surface Temperature product shall provide sea surface temperature products with a measurement accuracy of 0.2 kelvin over the measurement range of the instrument.

Product Name: Sea Surface Temperature

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification must include 18% of ocean pixels, which is understood to be the average fraction of clear-sky ocean for which a temperature retrieval can be obtained.

3.4.2.22 Snow Cover Product Requirements

The Snow Cover product contains two products: fractional snow cover (FSC) and a binary snow cover (BSC) mask. The fractional snow cover is defined as the fraction of a given area of the earth's horizontal surface that is masked by snow. The binary snow/no-snow mask provides a mapping of snow covered areas as either having snow or not having snow.

DPS-302 The Snow Cover product shall provide fractional snow cover and binary snow cover mask, globally, in daytime, under clear conditions, at the refresh rates of the instrument.

Product Name: Snow Cover

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-303 The Snow Cover product shall provide fractional snow cover with a measurement uncertainty of 20%.

Product Name: Snow Cover

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Percentage is referenced to the area of the pixel. Verify only over climatologically snow-covered regions. Requirement does not apply where snow can be shaded by vegetation or topography. The fractional snow coverage takes values from 0 to 100%.

DPS-304 The Snow Cover product shall provide the binary snow cover mask with a 90% probability of correct snow/no-snow classification.

Product Name: Snow Cover

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Percentage is referenced to the area of the pixel. Verify only over climatologically snow-covered regions. Requirement does not apply where snow can be shaded by vegetation or topography. The mask takes on one of two values: snow or no-snow.

3.4.2.23 Surface Albedo Product Requirements

Surface albedo is defined as the total amount of solar radiation in the 0.4 to 4.0 micron band reflected by the Earth's surface into an upward hemisphere, including both diffuse and direct components, divided by the total amount incident from this hemisphere, including both direct and diffuse components. Albedo is important in determining the radiative balance at the surface (how much incident energy goes toward surface heating versus how much is reflected back to space). Albedo is also of use in determining surface type and as a background against which to detect and screen out clouds.

DPS-375 The Surface Albedo product shall provide the broad-band earth surface albedo, from 0.4 to 4.0 microns, globally over land and ice, in daytime, in clear conditions, at the refresh rates of the instrument.

Product Name: Surface Albedo

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-376 The Surface Albedo product shall provide earth surface albedo with a measurement precision of 0.05.

Product Name: Surface Albedo

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Albedo values range from 0 to 1.

DPS-377 The Surface Albedo product shall provide earth surface albedo with a measurement accuracy of 0.08.

Product Name: Surface Albedo

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Albedo values range from 0 to 1.

DPS-1751 The Gridded Surface Albedo product shall provide the broad-band earth surface albedo from 0.4 to 4.0 microns, 1 km globally over land, ocean and ice, in daytime, in clear conditions, at the refresh rates of the instrument.

Product Name: Gridded Surface Albedo

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-1752 The Gridded Surface Albedo product shall provide earth surface albedo with a measurement precision of 0.05.

Product Name: Gridded Surface Albedo

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Albedo values range from 0 to 1

DPS-1753 The Surface Albedo product shall provide earth surface albedo with a measurement accuracy of 0.08.

Product Name: Gridded Surface Albedo

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Albedo values range from 0 to 1

DPS-1754 The Gridded Surface Albedo product shall be generated within 3 hours of receiving all the required data.

Product Name: Gridded Surface Albedo

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

3.4.2.24 Surface Reflectance Product Requirements

Surface reflectance is defined as the spectral (narrowband), bi-directional reflectance that would be measured in the absence of the atmosphere. The Surface Reflectance product corrects for the atmosphere by removing effects of scattering and absorption from atmospheric gases and aerosols. The Surface Reflectance product depends on cloud detection and aerosol algorithms. The surface reflectance information is used by the Vegetation Indices and Land Surface Albedo products.

DPS-826 The Surface Reflectance product shall provide the narrowband, bi-directional surface reflectance, globally, in clear conditions, in daytime, at the refresh rates of the instrument.

Product Name: Surface Reflectance

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-828 The Surface Reflectance product shall provide surface reflectance with a measurement accuracy of 0.005 + (0.05 times the retrieved surface reflectance value).

Product Name: Surface Reflectance

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-829 The Surface Reflectance product shall provide surface reflectance with a measurement precision of 0.005 + (0.05 times the retrieved surface reflectance value).

Product Name: Surface Reflectance

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.25 Surface Type Product Requirements

Surface type is defined as the predominant type in a given area from among the International Geosphere Biosphere Program (IGBP) land cover classes. Surface type information is required

as input to weather, climate, hydrological, and agricultural models supporting various U.S. Government and academic customers. The Surface Type product is generated from land classification in the annual Global Surface Type product in combination with real-time satellite data.

DPS-445 The Surface Type product shall provide the IGBP land cover classification, globally, at the refresh rates of the instrument.

Product Name: Surface Type

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-448 The Surface Type product shall provide the IGBP land cover classification with a probability of correct typing of 70%.

Product Name: Surface Type

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.2.26 Vegetation Health Index Suite Product Requirements

The Vegetation Health Index Suite comprises three indices. Vegetation Condition Index (VCI), Temperature Condition Index (TCI), and Vegetation Health Index (VHI) were developed to characterize land surface conditions and health. VCI, produced from NDVI, characterizes such indicators as greenness (dependent on chlorophyll contents) and vigor (dependent on moisture content). TCI, produced from infrared radiance, characterizes thermal conditions of land cover. VHI, a weighted combination of the VCI and TCI, characterizes the integrated effects of greenness, moisture and temperature on vegetation health.

The data processing includes comprehensive calibration of radiances; complete removal of high, medium, and low frequency noise; calculation of special climatology (following three bio-physical lows); and anomalies. The indices are produced in real time at the end of each week for each 4x4 km land surface element.

In the past, these indices were validated in 26 countries based on health conditions of such major crops as wheat, corn, soybeans, sorghum and rice; pasture conditions; precipitation and temperature anomalies; and sea surface temperature.

DPS-416 The Vegetation Health Index Suite shall provide vegetation condition index (VCI), temperature condition index (TCI), and vegetation health index (VHI); globally over land; geolocated; in daytime; in clear conditions.

Product Name: Vegetation Health Index Suite

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-418 The Vegetation Health Index Suite shall provide vegetation indices with a horizontal cell size of 4 kilometers.

Product Name: Vegetation Health Index Suite

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-419 The Vegetation Health Index Suite shall provide vegetation indices with a refresh every 7 days.

Product Name: Vegetation Health Index Suite

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-420 The Vegetation Health Index Suite shall provide vegetation indices with a measurement precision of 4%.

Product Name: Vegetation Health Index Suite

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Index values range from 0 to 100%.

DPS-421 The Vegetation Health Index Suite product shall provide geolocation of horizontal cell centers with a 3-sigma mapping uncertainty of 4 kilometers.

Product Name: Vegetation Health Index Suite

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-422 The Vegetation Health Index Suite shall provide vegetation indices with a measurement accuracy of 1%.

Product Name: Vegetation Health Index Suite

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Index values range from 0 to 100%.

3.4.2.27 Vegetation Indices Product Requirements

The Vegetation Index Suite comprises 3 indices. The Top-of-Atmosphere (TOA)-Normalized Difference Vegetation Index (NDVI), Top-of-Canopy (TOC)-Enhanced Vegetation Index (EVI) and TOC-NDVI are used to monitor and characterize terrestrial landscapes.

Vegetation indices are related to absorption of photosynthetically active radiation by vegetation, and correlate with biomass or primary productivity. The TOA-NDVI is defined as the ratio of the difference of the near-infrared and red band reflectance values as received by the sensor, divided by their sum. The EVI product relies on reflectances that are atmospherically-corrected, and has improved sensitivity in high biomass regions. The TOC-NDVI is defined as the ratio of the difference of the near-infrared and red reflectance values divided by their sum.

DPS-425 The Vegetation Indices shall provide top-of-atmosphere (TOA) normalized difference vegetation index (NDVI), top-of-canopy (TOC) enhanced vegetation index (EVI), and top-of-canopy normalized difference vegetation index; 4 km globally and 1 km regionally over land; in daytime; in clear conditions; at the daily refresh rate.

Product Name: Vegetation Indices

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-426 The Vegetation Indices shall provide TOA NDVI with a measurement accuracy of 0.05.

Product Name: Vegetation Indices

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. NDVI values range from -1 to +1. Verify over aggregated horizontal cell 4 kilometer in size.

DPS-427 The Vegetation Indices shall provide TOA NDVI with a measurement precision of 0.04.

Product Name: Vegetation Indices

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. NDVI values range from -1 to +1. Verify over aggregated horizontal cell 4 kilometer in size.

DPS-428 The Vegetation Indices shall provide TOC EVI with a measurement accuracy of 0.05.

Product Name: Vegetation Indices

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. EVI values range from -1 to +4. Verify over aggregated horizontal cell 4 kilometer in size.

DPS-429 The Vegetation Indices shall provide TOC EVI with a measurement precision of 0.04.

Product Name: Vegetation Indices

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. EVI values range from -1 to +4. Verify over aggregated horizontal cell 4 kilometer in size.

DPS-430 The Vegetation Indices shall provide TOC NDVI with a measurement accuracy of 0.05.

Product Name: Vegetation Indices

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. NDVI values range from -1 to +1. Verify over aggregated horizontal cell 4 kilometer in size.

DPS-431 The Vegetation Indices shall provide TOC NDVI with a measurement precision of 0.04.

Product Name: Vegetation Indices

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. NDVI values range from -1 to +1. Verify over aggregated horizontal cell 4 kilometer in size.

3.4.2.28 Volcanic Ash Detection and Height Product Requirements

Volcanic Ash Detection and Height maps the location and concentration of volcanic ash after an eruption and dispersion by the wind. The top height of the ash is detected at in regions where aerosols have been detected above a nominal level that can vary depending on conditions. The associated Aerosol Detection product includes detection of volcanic ash. Volcanic ash was previously delivered as part of the Suspended Matter product.

DPS-586 The Volcanic Ash Detection and Height product shall provide detection, concentration, and top height of volcanic ash, for the total column, globally, under cloud-free conditions, in daytime, for aerosol optical depth greater than 0.15, at the refresh rates of the instrument.

Product Name: Volcanic Ash Detection and Height

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Demonstration

DPS-587 The Volcanic Ash Detection and Height product shall provide volcanic ash concentration with a measurement accuracy of 2 tons per square kilometer.

Product Name: Volcanic Ash Detection and Height

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification applies only to pixels that contain volcanic ash as the highest cloud layer.

DPS-589 The Volcanic Ash Detection and Height product shall provide volcanic ash concentration with a measurement precision of 2.5 tons per square kilometer.

Product Name: Volcanic Ash Detection and Height

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification applies only to pixels that contain volcanic ash as the highest cloud layer.

DPS-588 The Volcanic Ash Detection and Height product shall provide volcanic ash top height with a measurement accuracy of 3 kilometers.

Product Name: Volcanic Ash Detection and Height

Instrument: VIIRS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification applies only to pixels that contain volcanic ash as the highest cloud layer.

3.4.3 Microwave Sounder and Imager Data Product Requirements

This section contains requirements for data products from microwave sounders, such as AMSU, ATMS or AMSR-2.

3.4.3.1 Cloud Liquid Water Product Requirements

Cloud liquid water is defined as the equivalent depth of water within a cloud in a specified segment of a vertical column of the atmosphere.

DPS-524 The Cloud Liquid Water product shall provide cloud liquid water, globally over ice-free ocean, day and night, for the total column, under all weather conditions, at the refresh rates of the instrument.

Product Name: Cloud Liquid Water

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-525 The Cloud Liquid Water product shall provide cloud liquid water with a measurement range of 0.005 to 1.0 millimeter.

Product Name: Cloud Liquid Water

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-526 The Cloud Liquid Water product shall provide cloud liquid water with a measurement uncertainty of 0.05 millimeter.

Product Name: Cloud Liquid Water

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-527 The Cloud Liquid Water product shall provide cloud liquid water with a measurement accuracy of 0.01 millimeter.

Product Name: Cloud Liquid Water

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.3.2 Cloud Liquid Water Product Requirements

Cloud liquid water is defined as the equivalent depth of water within a cloud in a specified segment of a vertical column of the atmosphere.

DPS-530 The Cloud Liquid Water product shall provide cloud liquid water, globally over ice-free ocean, day and night, for the total column, under all weather conditions, at the refresh rates of the instrument.

Product Name: Cloud Liquid Water

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-532 The Cloud Liquid Water product shall provide cloud liquid water with a measurement precision of 0.08 millimeter.

Product Name: Cloud Liquid Water

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against TRMM Microwave Imager Level 2A Hydrometeor Profile Product Version 7 data, using 3 minutes and 7.5 kilometers as the time and space collocation thresholds, respectively; selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Error includes collocation error and instrument noise error.

DPS-533 The Cloud Liquid Water product shall provide cloud liquid water with a measurement accuracy of 0.03 millimeter.

Product Name: Cloud Liquid Water

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against TRMM Microwave Imager Level 2A Hydrometeor Profile Product Version 7 data, using 3 minutes and 7.5 kilometers as the time and space collocation thresholds, respectively; selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Error includes collocation error and instrument noise error.

3.4.3.3 Land Surface Emissivity Product Requirements

DPS-79 The Land Surface Emissivity product shall provide microwave land surface emissivity, globally, in clear and cloudy conditions, at the refresh rate of the instrument.

Product Name: Land Surface Emissivity

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-80 The Land Surface Emissivity product shall provide land surface emissivity with a measurement precision of 3% at 23.8 GHz and 50.3 GHz, and 4% at 165.5 GHz.

Product Name: Land Surface Emissivity

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against a derived analytical emissivity based on Global Data Assimilation System products, for snow-free land surfaces, over zenith angles from 0 (nadir) to 65 degrees, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The performance requirements include algorithm performance, as well as collocation and instrument error.

DPS-81 The Land Surface Emissivity product shall provide land surface emissivity with a measurement accuracy of 2% at 23.8 GHz, and 1.5% at 50.3 GHz and 165.5 GHz.

Product Name: Land Surface Emissivity

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against a derived analytical emissivity based on Global Data Assimilation System products, for snow-free land surfaces, over zenith angles from 0 (nadir) to 65 degrees, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The performance requirements include algorithm performance, as well as collocation and instrument error.

3.4.3.4 Land Surface Temperature

Land surface temperature is defined as the sensor-facing skin temperature of the land surface. It includes the aggregate temperature of objects comprising the land surface, including any open water, in the cell. Surface temperature information is used for numerical weather prediction, hydrological modeling, automated cloud analysis, wind chill temperatures, heat stress factors, and to support rescue operations.

DPS-407 The Land Surface Temperature product shall provide land surface temperatures, globally over land, day and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Land Surface Temperature

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-408 The Land Surface Temperature product shall provide land surface temperatures with a measurement precision of 7.0 kelvin.

Product Name: Land Surface Temperature

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against European Centre for Medium-Range Weather Forecasts (ECMWF) model data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Error includes collocation error and instrument noise error.

DPS-409 The Land Surface Temperature product shall provide land surface temperatures with a measurement accuracy of 4.0 kelvin.

Product Name: Land Surface Temperature

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against European Centre for Medium-Range Weather Forecasts (ECMWF) model data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Error includes collocation error and instrument noise error.

3.4.3.5 Moisture Profile

DPS-535 The Moisture Profile product shall provide atmospheric moisture profiles, globally, day and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Moisture Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-543 The Moisture Profile product shall provide atmospheric moisture profiles from the surface to 0.01 millibar.

Product Name: Moisture Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-537 The Moisture Profile product shall provide atmospheric moisture profiles with a measurement precision over ocean in clear conditions of: 60% at 400 millibars (mb), 60% at 500 mb, 50% at 700 mb, and 30% at 900 mb.

Product Name: Moisture Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify over ice-free ocean, for non-rainy conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-538 The Moisture Profile product shall provide atmospheric moisture profiles with a measurement precision over ocean in cloudy conditions of: 60% at 400 mb, 65% at 500 mb, 60% at 700 mb, and 30% at 900 mb.

Product Name: Moisture Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify over ice-free ocean, for non-rainy conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-539 The Moisture Profile product shall provide atmospheric moisture profiles with a measurement precision over land of: 60% at 400 mb, 60% at 500 mb, 50% at 700 mb, and 50% at 900 mb.

Product Name: Moisture Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify over snow-free land, for non-rainy conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-540 The Moisture Profile product shall provide atmospheric moisture profiles with a measurement accuracy over ocean in clear conditions of: 30% at 400 mb, 20% at 500 mb, 20% at 700 mb, and 20% at 900 mb.

Product Name: Moisture Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify over ice-free ocean, for non-rainy conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-541 The Moisture Profile product shall provide atmospheric moisture profiles with a measurement accuracy over ocean in cloudy conditions of: 30% at 400 mb, 20% at 500 mb, 10% at 700 mb, and 20% at 900 mb.

Product Name: Moisture Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify over ice-free ocean, for non-rainy conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-542 The Moisture Profile product shall provide atmospheric moisture profiles with a measurement accuracy over land of: 30% at 400 mb, 10% at 500 mb, 10% at 700 mb, and 20% at 900 mb.

Product Name: Moisture Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify over snow-free land, for non-rainy conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

3.4.3.6 Precipitation Rate Product Requirements

Precipitation Rate is defined as the amount of rainfall during a period of time. The required Precipitation Rate products provide the instantaneous rainfall rate during the time of observation

in mm/hour. Satellite-derived precipitation rate data provides information on the severity and evolution of rainfall events, especially in geographic areas without surface-based radar coverage.

DPS-214 The Precipitation Rate product shall provide the rate of stratiform or convective precipitation, globally, in all weather conditions, at the refresh rates of the instrument.

Product Name: Precipitation Rate

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-217 The Precipitation Rate product shall provide precipitation rate with a measurement precision of 0.05 millimeters per hour (mm/hr).

Product Name: Precipitation Rate

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions and over a measurement range of 0 to 50 mm/hr.

DPS-218 The Precipitation Rate product shall provide precipitation rate with a measurement uncertainty of 2 mm/hr over ocean and 5 mm/hr over land.

Product Name: Precipitation Rate

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions and over a measurement range of 0 to 50 mm/hr.

3.4.3.7 Rainfall Rate Product Requirements

Rainfall Rate is defined as the amount of rainfall during a period of time. The required Rainfall Rate products provide the instantaneous rainfall rate during the time of observation in mm/hour. Satellite-derived rainfall rate data provides information on the severity and evolution of rainfall events, especially in geographic areas without surface-based radar coverage.

DPS-223 The Rainfall Rate product shall provide rainfall rate, globally, in all weather conditions, at the refresh rate of the instrument.

Product Name: Rainfall Rate

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-225 The Rainfall Rate product shall provide rainfall rate with a measurement precision of 1.0 millimeter per hour (mm/hr) over ocean and 1.5 mm/hr over land.

Product Name: Rainfall Rate

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: The performance requirements include algorithm error, truth data collocation error, and instrument noise. Over-ocean performance truth data are the Tropical Rainfall Measuring Mission Microwave Imager Level 2A Hydrometeor Profile Product version 7, for latitudes equator-ward of 38 degrees. Over-land performance truth data are the National Center for Environmental Prediction (NCEP) Stage IV analysis over CONUS, assuming the Stage IV rate is constant over the hour.

DPS-226 The Rainfall Rate product shall provide rainfall rate with a measurement accuracy of 0.1 millimeter per hour (mm/hr) over ocean and 0.05 mm/hr over land.

Product Name: Rainfall Rate

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: The performance requirements include algorithm error, truth data collocation error, and instrument noise. Over-ocean performance truth data are the Tropical Rainfall Measuring Mission Microwave Imager Level 2A Hydrometeor Profile Product version 7, for latitudes equator-ward of 38 degrees. Over-land performance truth data are the National Center for Environmental Prediction (NCEP) Stage IV analysis over CONUS, assuming the Stage IV rate is constant over the hour.

DPS-227 The Rainfall Rate product shall provide rainfall rate with a probability of rainfall detection of 50% over land and ocean.

Product Name: Rainfall Rate

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: The performance requirements include algorithm error, truth data collocation error, and instrument noise. Over-ocean performance truth data are the Tropical Rainfall Measuring Mission Microwave Imager Level 2A Hydrometeor Profile Product version 7, for latitudes equator-ward of 38 degrees. Over-land performance truth data are the National Center for Environmental Prediction (NCEP) Stage IV analysis over CONUS, assuming the Stage IV rate is constant over the hour. Rainfall detection is defined to be a rate greater than 0.6 mm/hr.

DPS-228 The Rainfall Rate product shall provide rainfall rate with a false alarm rate of 5% over ocean and 6% over land.

Product Name: Rainfall Rate

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: The performance requirements include algorithm error, truth data collocation error, and instrument noise. Over-ocean performance truth data are the Tropical Rainfall Measuring Mission Microwave Imager Level 2A Hydrometeor Profile Product version 7, for latitudes equator-ward of 38 degrees. Over-land performance truth data are the National Center for Environmental Prediction (NCEP) Stage IV analysis over CONUS, assuming the Stage IV rate is constant over the hour. Rainfall detection is defined to be a rate greater than 0.6 mm/hr.

DPS-229 The Rainfall Rate product shall provide rainfall rate with a Heidke Skill Score of 0.3 over land and ocean.

Product Name: Rainfall Rate

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: The performance requirements include algorithm error, truth data collocation error, and instrument noise. Over-ocean performance truth data are the Tropical Rainfall Measuring Mission Microwave Imager Level 2A Hydrometeor Profile Product version 7, for latitudes equator-ward of 38 degrees. Over-land performance truth data are the National Center for Environmental Prediction (NCEP) Stage IV analysis over CONUS, assuming the Stage IV rate is constant over the hour. Rainfall detection is defined to be a rate greater than 0.6 mm/hr. The HSS range is -1 to +1.

3.4.3.8 Sea Ice Characterization Product Requirements

Sea ice age is defined as the time that has passed since the formation of the surface layer of an ice covered region of the ocean. The content of the sea ice age product is the typing of areas of

sea ice by age. The National Ice Center monitors sea ice globally to estimate sea ice growth and decay. This information is used to protect mariners, support military and civilian operations, and assess potential global climate changes since polar regions are more likely to exhibit early signs of global warming.

Sea ice concentration is the areal extent of ice, calculated as the fraction of each pixel covered in ice.

DPS-264 The Sea Ice Characterization product shall provide sea ice age class, globally over ocean, in daytime and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Sea Ice Characterization

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-903 The Sea Ice Characterization product shall provide sea ice age class as either ice-free, first-year, or multi-year.

Product Name: Sea Ice Characterization

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-265 The Sea Ice Characterization product shall provide sea ice age class with a probability of correct typing of 70%.

Product Name: Sea Ice Characterization

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-273 The Sea Ice Characterization product shall provide sea ice concentration, globally over ocean, in daytime and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Sea Ice Characterization

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

Verification Description: Ice concentration is reported from 0% to 100% in increments of 10%, with the percentage denoting the fraction of each pixel covered in ice.

DPS-274 The Sea Ice Characterization product shall provide sea ice concentration with a measurement uncertainty of 10%.

Product Name: Sea Ice Characterization

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.3.9 Sea Ice Concentration Product Requirements

Sea Ice Concentration is defined as the areal extent of sea ice relative to the total area of a pixel at a given location in the ocean. It is evaluated using the natural variation in the emissivity of ice and water at microwave frequencies between 23 and 50 GHz.

DPS-255 The Sea Ice Concentration product shall provide sea ice concentration, globally over ocean, day and night, at the refresh rates of the instrument.

Product Name: Sea Ice Concentration

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-256 The Sea Ice Concentration product shall provide sea ice concentration with a measurement precision of 25%.

Product Name: Sea Ice Concentration

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: The performance requirements include algorithm error, truth data collocation error, and instrument noise. To be verified against Over-ocean F17 Special Sensor Microwave Imager Sounder (SSMIS) near-real-time product, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-257 The Sea Ice Concentration product shall provide sea ice concentration with a measurement accuracy of 10%.

Product Name: Sea Ice Concentration

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: The performance requirements include algorithm error, truth data collocation error, and instrument noise. To be verified against Over-ocean F17 Special Sensor Microwave Imager Sounder (SSMIS) near-real-time product, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.3.10 Sea Surface Temperature Product Requirements

DPS-143 The Sea Surface Temperature product shall provide sea surface temperature globally, in all weather conditions, at the refresh rates of the instrument.

Product Name: Sea Surface Temperature

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

Verification Description:

To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification is restricted to beyond 100 km of the coast, since coastal waters are contaminated by side lobes from the land.

DPS-904 The Sea Surface Temperature BUFR product shall provide geolocated sea surface temperature, converted from the Sea Surface Temperature product, in the BUFR format.

Product Name: Sea Surface Temperature

Instrument: AMSR-2

Allocated To: ESPC

Product Format: BUFR

Verification Method: Demonstration

DPS-144 The Sea Surface Temperature product shall provide sea surface temperatures with a measurement accuracy of 0.5 kelvin over the measurement range of the instrument.

Product Name: Sea Surface Temperature

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

Verification is restricted to beyond 100 km of the coast, since coastal waters are contaminated by side lobes from the land.

DPS-145 The Sea Surface Temperature product shall provide sea surface temperatures with a measurement uncertainty of 1.0 kelvin over the measurement range of the instrument.

Product Name: Sea Surface Temperature

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification is restricted to beyond 100 km of the coast, since coastal waters are contaminated by side lobes from the land.

3.4.3.11 Sea Surface Wind Speed Product Requirements

Sea Surface Wind Speed is the measure of atmospheric wind speed at the sea/atmosphere interface in clear sky and cloudy conditions. Such winds have many effects; they can indicate global and local circulation patterns, force ocean surface circulation (surface currents), determine sea state, influence water levels along the coast, help to determine surface height, produce storm surge, and drive the motion of the lower layers of the atmosphere.

DPS-286 The Sea Surface Wind Speed product shall provide sea surface wind speed globally over ice-free ocean, in daytime and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Sea Surface Wind Speed

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-287 The Sea Surface Wind Speed product shall provide sea surface wind speed with a measurement range of 2 to 30 meters per second (m/s).

Product Name: Sea Surface Wind Speed

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-288 The Sea Surface Wind Speed product shall provide sea surface wind speed with a measurement uncertainty of the greater of 2 m/s or 10%.

Product Name: Sea Surface Wind Speed

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-289 The Sea Surface Wind Speed product shall provide sea surface wind speed with a measurement accuracy of 0.5 m/s.

Product Name: Sea Surface Wind Speed

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. This requirement applies in the presence of cloud liquid water up to 2 millimeters.

3.4.3.12 Snow Cover Product Requirements

DPS-295 The Snow Cover product shall provide snow cover globally, in daytime and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Snow Cover

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-294 The Snow Cover product shall provide snow cover with a probability of detection of 0.80.

Product Name: Snow Cover

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The probability of detection ranges from 0 to 1. Detection threshold corresponds to snow water

equivalent of 0.01 centimeters. Performance includes algorithm performance, collocation error, instrument noise, and errors in the truth data.

DPS-296 The Snow Cover product shall provide snow cover with a false alarm ratio of 0.10.

Product Name: Snow Cover

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The false alarm ratio ranges from 0 to 1. Detection threshold corresponds to snow water equivalent of 0.01 centimeters. Performance includes algorithm performance, collocation error, instrument noise, and errors in the truth data.

DPS-297 The Snow Cover product shall provide snow cover with a Heidke Skill Score of 0.55.

Product Name: Snow Cover

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. The Heidke Skill Score ranges from -1 to 1. Detection threshold corresponds to snow water equivalent of 0.01 centimeters. Performance includes algorithm performance, collocation error, instrument noise, and errors in the truth data.

3.4.3.13 Snow Cover/Depth Product Requirements

Snow cover is defined to be the horizontal extent of snow cover. It does not include snow hidden by vegetation or other obstructions when viewed from above. Snow cover data at specified values are required to determine background conditions for electro-optical sensors. Forecasts of weather, traffic ability, river stage, flood, air rescue conditions, and other phenomena also utilize snow cover information.

DPS-308 The Snow Cover/Depth product shall provide snow cover and snow depth, globally, in daytime and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Snow Cover/Depth

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-309 The Snow Cover/Depth product shall provide snow cover with a probability of detection of 80%.

Product Name: Snow Cover/Depth

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification does not apply to mountainous areas where the snow can be shaded from view, or conditions of melting snow.

DPS-312 The Snow Cover/Depth product shall provide snow depth with a measurement range from 5 to 60 cm.

Product Name: Snow Cover/Depth

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

Verification Description: Verification does not apply to mountainous areas where the snow can be shaded from view, or conditions of melting snow.

DPS-310 The Snow Cover/Depth product shall provide snow depth in clear conditions with a measurement uncertainty of 30 centimeters (cm) if forest cover exceeds 30%, and 20 cm otherwise.

Product Name: Snow Cover/Depth

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification does not apply to mountainous areas where the snow can be shaded from view, or conditions of melting snow.

DPS-579 The Snow Cover/Depth product shall provide snow depth in cloudy conditions with a measurement uncertainty of 20 cm.

Product Name: Snow Cover/Depth

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification does not apply to mountainous areas where the snow can be shaded from view, or conditions of melting snow.

3.4.3.14 Snow Water-Equivalent Product Requirements

Snow Water-Equivalent is the product of snow depth and snow relative density (with respect to the density of liquid water), a measure of the amount of water stored in a snowpack per unit area. It is expressed in units of length (e.g., cm or inches). It is the depth of water in the snowpack, if the snowpack were melted. SWE is extremely useful to the hydrological community to estimate runoff and stored water. There are two SWE products, provided by ATMS and AMSR-2.

DPS-315 The Snow Water-Equivalent product shall provide the snow water-equivalent depth, globally, in daytime and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Snow Water-Equivalent

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-316 The Snow Water-Equivalent product shall provide the snow water-equivalent depth over a measurement range of 10 to 200 millimeters (mm).

Product Name: Snow Water-Equivalent

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

Verification Description: Verification does not apply to mountainous or forested areas where the snow can be shaded from view, or conditions of melting snow.

DPS-317 The Snow Water-Equivalent product shall provide the snow water-equivalent depth with a measurement uncertainty of the greater of 20 mm or 50%, for snow water equivalents less than 100 mm; and 70% for snow water-equivalents greater than 100 mm.

Product Name: Snow Water-Equivalent

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verification does not apply to mountainous or forested areas where the snow can be shaded from view, or conditions of melting snow.

DPS-319 The Snow Water-Equivalent product shall provide snow water-equivalent depth, globally, in daytime and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Snow Water-Equivalent

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-320 The Snow Water-Equivalent product shall provide the snow water-equivalent depth with a measurement precision of 6 centimeters (cm).

Product Name: Snow Water-Equivalent

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against NASA AMSR-E truth data produced during northern hemisphere cold season (Nov-Mar), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Performance includes algorithm performance, collocation error, instrument noise, and errors in the truth data.

DPS-321 The Snow Water-Equivalent product shall provide the snow water-equivalent depth with a measurement accuracy of 3 cm.

Product Name: Snow Water-Equivalent

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against NASA AMSR-E truth data produced during northern hemisphere cold season (Nov-Mar), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Performance includes algorithm performance, collocation error, instrument noise, and errors in the truth data.

3.4.3.15 Soil Moisture Product Requirements

The Soil Moisture product returns moisture within the surface soil layer to the depth where microwave emission or reflection can be sensed by satellite sensors. It is expressed in terms of a moisture pass per unit area. Soil moisture is used in numerical weather prediction, in climate

forecasting, and in hydrological forecasting. Soil moisture information is also used in agricultural management, urban water management, and other societal applications such as disease vector forecasts.

DPS-325 The Soil Moisture product shall provide soil moisture in the skin layer, globally, in daytime and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Soil Moisture

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-326 The Soil Moisture product shall provide soil moisture with a measurement uncertainty of 6% volumetric root mean square error.

Product Name: Soil Moisture

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verified for volumetric water content < 1.5 kilograms per square meter; or for green vegetation fraction < 0.5 and precipitation rate < 2 millimeters per hour. The measurement range is expected be approximately 0 to 50%, since most soils saturate at moisture levels of 40-50%. Values above the saturation level imply additional standing water on the ground.

3.4.3.16 Temperature Profile

DPS-545 The Temperature Profile product shall provide atmospheric temperature profiles, globally, day and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-547 The Temperature Profile product shall provide atmospheric temperature profiles from the surface to 0.01 millibar.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-548 The Temperature Profile product shall provide atmospheric temperature profiles with a measurement precision over ocean in clear conditions of: 2.0 kelvin (K) at 100 millibar (mb), 2.0 K at 300 mb, 2.0 K at 500 mb, and 3.0 K at 900 mb.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-549 The Temperature Profile product shall provide atmospheric temperature profiles with a measurement precision over ocean in cloudy conditions of: 2.0 K at 100 mb, 2.5 K at 300 mb, 2.0 K at 500 mb, and 3.0 K at 900 mb.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-550 The Temperature Profile product shall provide atmospheric temperature profiles with a measurement precision over ocean in rainy conditions of: 2.5 K at 100 mb, 2.5 K at 300 mb, 2.5 K at 500 mb, and 3.5 K at 900 mb.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-552 The Temperature Profile product shall provide atmospheric temperature profiles with a measurement precision over land in non-rainy conditions of: 2.0 K at 100 mb, 2.0 K at 300 mb, 2.5 K at 500 mb, and 5.5 K at 900 mb.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-553 The Temperature Profile product shall provide atmospheric temperature profiles with a measurement precision over land in rainy conditions of: 2.5 K at 100 mb, 2.5 K at 300 mb, 3.0 K at 500 mb, and 5.5 K at 900 mb.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-554 The Temperature Profile product shall provide atmospheric temperature profiles with a measurement accuracy over ocean in clear conditions of: 0.2 kelvin (K) at 100 millibar (mb), 0.5 K at 300 mb, 0.2 K at 500 mb, and 1.5 K at 900 mb.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-555 The Temperature Profile product shall provide atmospheric temperature profiles with a measurement accuracy over ocean in cloudy conditions of: 0.8 K at 100 mb, 0.8 K at 300 mb, 0.6 K at 500 mb, and 2.0 K at 900 mb.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-556 The Temperature Profile product shall provide atmospheric temperature profiles with a measurement accuracy over ocean in rainy conditions of: 1.0 K at 100 mb, 1.5 K at 300 mb, 2.0 K at 500 mb, and 2.0 K at 900 mb.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-557 The Temperature Profile product shall provide atmospheric temperature profiles with a measurement accuracy over land in non-rainy conditions of: 0.5 K at 100 mb, 0.8 K at 300 mb, 0.2 K at 500 mb, and 2.5 K at 900 mb.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

DPS-558 The Temperature Profile product shall provide atmospheric temperature profiles with a measurement accuracy over land in rainy conditions of: 1.5 K at 100 mb, 1.0 K at 300 mb, 0.5 K at 500 mb, and 2.5 K at 900 mb.

Product Name: Temperature Profile

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data from the Global Data Assimilation System (GDAS), selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Pressure values are averages for the particular layer. Error includes instrument noise error and collocation error.

3.4.3.17 Total Precipitable Water Product Requirements

Total precipitable water is defined as the total equivalent depth of water stored in a column of unit cross-sectional area. It is derived from an integration of the vertical water vapor profile, between any two specified levels in the atmosphere, to include the total atmospheric column. Total Precipitable Water data provides information on moisture advection in the atmosphere and precipitation intensity potential for quantitative precipitation forecasts.

DPS-338 The Total Precipitable Water product shall provide total precipitable water, globally, over ice-free ocean, in daytime and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Total Precipitable Water

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-339 The Total Precipitable Water product shall provide ocean total precipitable water over a measurement range of 1 to 75 millimeters (mm).

Product Name: Total Precipitable Water

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Demonstration

DPS-340 The Total Precipitable Water product shall provide ocean total precipitable water with a measurement uncertainty of the greater of 2 mm or 10%.

Product Name: Total Precipitable Water

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-341 The Total Precipitable Water product shall provide ocean total precipitable water with a measurement accuracy of 1 mm.

Product Name: Total Precipitable Water

Instrument: AMSR-2

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-348 The Total Precipitable Water product shall provide total precipitable water, globally, in daytime and night, under all weather conditions, at the refresh rates of the instrument.

Product Name: Total Precipitable Water

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

DPS-349 The Total Precipitable Water product shall provide total precipitable water with a measurement precision of 2.5 millimeters (mm) over ocean; 2.0 mm over ocean ice; 5.5 mm over land; 2.0 mm over snow-covered land.

Product Name: Total Precipitable Water

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against Global Data Assimilation System (GDAS) truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Error includes collocation error and instrument noise error.

DPS-350 The Total Precipitable Water product shall provide total precipitable water with a measurement accuracy of 1.5 mm over clear ocean; 0.5 mm over cloudy ocean; 2.0 mm over ocean ice; 2.5 mm over land; 0.5 mm over snow-covered land.

Product Name: Total Precipitable Water

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against Global Data Assimilation System (GDAS) truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Error includes collocation error and instrument noise error.

DPS-351 The Total Precipitable Water product shall provide total precipitable water with a measurement uncertainty of 2.5 mm over ocean; 2.5 mm over ocean ice; 5.5 mm over land; 2.0 mm over snow-covered land.

Product Name: Total Precipitable Water

Instrument: ATMS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against Global Data Assimilation System (GDAS) truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Error includes collocation error and instrument noise error.

3.4.3.18 Snowfall Rate Product Requirements

DPS-1755 The Snowfall Rate (SFR) product shall provide water equivalent snowfall amount in unit time globally.

DPS-1756 The algorithm shall produce a SFR product that has a measurement precision of: 1.0 mm/hr.

DPS-1757 The algorithm shall produce a SFR product that has a measurement accuracy of: ±0.3 mm/hr.

Product Name: Snowfall Rate

Instrument: ATMS

Allocated To: ESPC

Verification Method: Demonstration

Verification Description: Over land, SFR will be validated against ground snowfall observations or snowfall estimates from ground-based radar. Over ocean, SFR will be validated against shipboard snowfall measurements or snowfall estimates from space borne radar.

3.4.4 Ultraviolet Sounder Data Product Requirements

This section contains requirements for data products from ultraviolet sounders such as SBUV/2 or OMPS.

3.4.4.1 Ozone Nadir Profile Product Requirements

The Ozone Nadir Profile is created from measurements made by the OMPS Nadir Profiler and the OMPS Nadir Mapper sensors. This product will continue the heritage ozone profile products

made by the POES SBUV/2. These products have vertical resolution between 7 and 10 km in the middle and upper stratosphere.

When an OMPS Limb Profiler instrument is present, the OMPS measurements can be used to make (limb) ozone profile EDRs with high vertical resolution (< 3 km) throughout the stratosphere. The detailed vertical structure of lower stratospheric ozone (12 to 25 km altitude region) has been shown to be a useful contributor to extended range (beyond 1 week) forecast skill in global models. It is also a key region for monitoring interactions between the expected ozone recovery and climate change.

DPS-635 The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles, in daytime, in clear conditions, at the refresh rates of the instrument.

Product Name: Ozone Nadir Profile

Instrument: OMPS-NP

Allocated To: ESPC

Verification Method: Demonstration

DPS-811 The Ozone Nadir Profile BUFR product shall provide geolocated atmospheric vertical ozone profiles, converted from the Ozone Nadir Profile product, in BUFR format.

Product Name: Ozone Nadir Profile BUFR

Instrument: OMPS-NP

Allocated To: ESPC

Verification Method: Demonstration

DPS-637 The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles with a measurement range of 0.1 to 15 parts per million by volume (ppmv) for 0-60 km.

Product Name: Ozone Nadir Profile

Instrument: OMPS-NP

Allocated To: ESPC

Verification Method: Demonstration

DPS-638 The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles with a vertical cell size of 5 kilometers.

Product Name: Ozone Nadir Profile

Instrument: OMPS-NP

Allocated To: ESPC

Verification Method: Demonstration

DPS-984 The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles with a vertical retrieval resolution of 7-10 kilometer at altitudes between 30 and 1 millibar; and 10-20 km at altitudes below 30 mb and above 1 mb.

Product Name: Ozone Nadir Profile

Instrument: OMPS-NP

Allocated To: ESPC

Verification Method: Demonstration

DPS-639 The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles with a measurement precision of the greater of 20% or 0.1 ppmv at altitudes below 30 millibar (mb); 10% from 30 to 1 mb; and the greater of 10% or 0.1 ppmv at altitudes above 1 mb.

Product Name: Ozone Nadir Profile

Instrument: OMPS-NP

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Requirement excluded in South Atlantic Anomaly.

DPS-640 The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles with a measurement accuracy of the greater of 10% or 0.1 ppmv below 30 mb and above 1 mb; and 10% from 30 to 1 mb.

Product Name: Ozone Nadir Profile

Instrument: OMPS-NP

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Requirement excluded in South Atlantic Anomaly.

3.4.4.2 Ozone Total Column Product Requirements

Ozone Total Column (also called Atmospheric Ozone) is defined as the amount of ozone in a vertical column of the atmosphere. It is measured in Dobson units. A Dobson unit is equal to 10 microns at standard temperature and pressure, sometimes referred to as a milli-atmo-centimeter. One Dobson unit corresponds to about 2.7E16 ozone molecules per square centimeter.

DPS-643 The Ozone Total Column product shall provide the total column of atmospheric ozone, in daytime, for all scenes, at the refresh rates of the instrument.

Product Name: Ozone Total Column

Instrument: OMPS-NM

Allocated To: ESPC

Verification Method: Demonstration

DPS-812 The Ozone Total Column BUFR product shall provide the geolocated total column of atmospheric ozone, converted from the Ozone Total Column product, in BUFR format.

Product Name: Ozone Total Column BUFR

Instrument: OMPS-NM

Allocated To: ESPC

Verification Method: Demonstration

DPS-645 The Ozone Total Column product shall provide the total column of atmospheric ozone with a measurement range of 50 to 650 Dobson units.

Product Name: Ozone Total Column

Instrument: OMPS-NM

Allocated To: ESPC

Verification Method: Demonstration

DPS-647 The Ozone Total Column product shall provide the total column of atmospheric ozone with a measurement precision of 6.0 Dobson units for columns below 250 Dobson units; 7.7 Dobson units for columns between 250 and 450 Dobson units; and 2.83 Dobson units for columns above 450 Dobson units.

Product Name: Ozone Total Column

Instrument: OMPS-NM

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify for solar zenith angle below 86 degrees. Verify for horizontal cell aggregated to 50x50 km.

DPS-648 The Ozone Total Column product shall provide the total column of atmospheric ozone with a measurement accuracy of 9.5 Dobson units for columns below 250 Dobson units; 13 Dobson units for columns between 250 and 450 Dobson units; and 16 Dobson units for columns above 450 Dobson units.

Product Name: Ozone Total Column

Instrument: OMPS-NM

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions. Verify for solar zenith angle below 86 degrees. Verify for horizontal cell aggregated to 50x50 km.

3.4.5 CrIS-ATMS Data Product Requirements

3.4.5.1 Atmospheric Vertical Moisture Profile Requirements

An Atmospheric Vertical Moisture Profile (AVMP) is a calculation of the mixing ratio at specified points along a local vertical, from the combined data sets of a microwave sounder and a continuous-band infrared sounder. The mixing ratio of a sample of air is the ratio of the mass of water vapor in the sample to the mass of dry air in the sample.

Atmospheric profiles of moisture provide very important information for weather forecasting. Moisture profiles are used to determine the vertical and horizontal extent of clouds, to confirm numerical weather prediction output, and to determine atmospheric stability conditions.

On JPSS, CrIS and ATMS are synchronized for colocation, but the ATMS footprint must be remapped to the CrIS footprint.

DPS-166 The Atmospheric Vertical Moisture Profile product shall provide atmospheric vertical moisture profiles, globally day and night, for all scenes, for each field of regard (FOR) comprised by multiple fields of view (FOVs), at the refresh rates of the instrument.

Product Name: Atmospheric Vertical Moisture Profile

Instrument: ATMS, CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-167 The Atmospheric Vertical Moisture Profile product shall provide atmospheric vertical moisture profiles with a horizontal cell size of 50 kilometers at nadir.

Product Name: Atmospheric Vertical Moisture Profile

Instrument: ATMS, CrIS

Allocated To: ESPC

Verification Method: Demonstration

Verification Description: The horizontal cell corresponds to the infrared sounder field of regard (FOR), comprised of multiple fields of view (FOVs).

DPS-168 The Atmospheric Vertical Moisture Profile product shall provide atmospheric vertical moisture profiles with vertical reporting intervals of 20 millibar (mb) from the surface to 850 mb; 50 mb from 850 to 100 mb.

Product Name: Atmospheric Vertical Moisture Profile

Instrument: ATMS, CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-169 The Atmospheric Vertical Moisture Profile product shall provide atmospheric vertical moisture profiles with a cloud-free and partly-cloudy measurement uncertainty of the greater of 20% or 0.2 gram per kilogram (g/kg) from the surface to 600 mb; greater of 35% or 0.1 g/kg from 600 mb to 100 mb.

Product Name: Atmospheric Vertical Moisture Profile

Instrument: ATMS, CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: Applies for cloud-free to partly cloudy. Such scenes should have both microwave and infrared retrieval data available for temperature determination. Layering is determined by the vertical reporting interval requirements. Ground truth is averaged over the cell sizes for verification.

DPS-170 The Atmospheric Vertical Moisture Profile product shall provide atmospheric vertical moisture profiles with a cloudy-condition measurement uncertainty of the greater of 20% or 0.2 g/kg from the surface to 600 mb; greater of 40% or 0.1 g/kg from 600 mb to 100 mb.

Product Name: Atmospheric Vertical Moisture Profile

Instrument: ATMS, CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: Applies for cloudy conditions. Such cloudy scenes will typically have only microwave retrievals available for temperature determination. Layering is determined by the vertical reporting interval requirements. The measurement uncertainty is expressed as an error in layer average temperature. Ground truth is averaged over the cell sizes for verification.

3.4.5.2 Atmospheric Vertical Temperature Profile Requirements

The Atmospheric Vertical Temperature Profile is a calculation of temperatures at stated intervals throughout the atmosphere from the combined data sets of a microwave sounder and a continuous-band infrared sounder. Sampling of temperature at stated intervals throughout the atmosphere is used to predict a variety of weather elements such as thunderstorms, cloud cover, and winds. NOAA weather forecast offices use this information to help predict severe weather events.

On JPSS, CrIS and ATMS are synchronized for colocation, but the ATMS footprint must be remapped to the CrIS footprint.

DPS-160 The Atmospheric Vertical Temperature Profile product shall provide atmospheric vertical temperature profiles, globally day and night, for all scenes, for each field of regard (FOR) comprised by multiple fields of view (FOVs), at the refresh rates of the instrument.

Product Name: Atmospheric Vertical Temperature Profile

Instrument: ATMS, CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-161 The Atmospheric Vertical Temperature Profile product shall provide atmospheric vertical temperature profiles with a horizontal cell size of 50 kilometers at nadir.

Product Name: Atmospheric Vertical Temperature Profile

Instrument: ATMS, CrIS

Allocated To: ESPC

Verification Method: Demonstration

Verification Description: The horizontal cell corresponds to the infrared sounder field of regard (FOR), comprised of multiple fields of view (FOVs).

DPS-162 The Atmospheric Vertical Temperature Profile product shall provide atmospheric vertical temperature profiles with vertical reporting intervals of 20 millibar (mb) from the surface to 850 mb; 50 mb from 850 to 300 mb; 25 mb from 300 to 100 mb; 20 mb from 100 mb to 10 mb; 2 mb from 10 mb to 1.0 mb; 0.2 mb from 1.0 mb to 0.5 mb.

Product Name: Atmospheric Vertical Temperature Profile

Instrument: ATMS, CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-163 The Atmospheric Vertical Temperature Profile product shall provide atmospheric vertical temperature profiles with a cloud-free or partly cloudy measurement uncertainty of 1.6 kelvin (K) per layer from the surface to 300 mb; 1.5 K per layer from 300 mb to 1 mb; 3.5 K per layer from 1 mb to 0.5 mb.

Product Name: Atmospheric Vertical Temperature Profile

Instrument: ATMS, CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: Applies over ocean only; cloud-free to partly cloudy. Such scenes should have both microwave and infrared retrieval data available for temperature determination. Layering is determined by the vertical reporting interval requirements. The measurement uncertainty is expressed as an error in layer average temperature. Temperature is averaged over 1 kilometer (km) layers from the surface to 300 mb; 3 km layers from 300 mb to 30 mb; 5 km layers from 30 mb to 0.5 mb.

DPS-164 The Atmospheric Vertical Temperature Profile product shall provide atmospheric vertical temperature profiles with a cloudy-condition measurement uncertainty of 2.5 kelvin (K) per layer from the surface to 700 mb; 1.5 K per layer from 700 mb to 1 mb; 3.5 K per layer from 1 mb to 0.5 mb.

Product Name: Atmospheric Vertical Temperature Profile

Instrument: ATMS, CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: Applies over ocean only; cloudy conditions. Such cloudy scenes will typically have only microwave retrievals available for temperature determination. Layering is determined by the vertical reporting interval requirements. The measurement uncertainty is expressed as an error in layer average temperature. Temperature is averaged over 1 kilometer (km) layers from the surface to 300 mb; 3 km layers from 300 mb to 30 mb; 5 km layers from 30 mb to 0.5 mb.

3.4.5.3 Carbon Dioxide Product Requirements

The Carbon Dioxide product provides a measure of the amount of carbon dioxide contained in a specified volume of air.

Carbon dioxide column data are useful to meet the long-term stability requirements for temperature and moisture from an infrared sounder. The satellite retrievals allow for important assessments of the global geographical distribution of patterns or gradients in the trace gas concentrations that are not feasible otherwise.

Measurement quantities are given in parts-per-million by volume (ppmv). This measure implies that the volume of air sampled by the observation is known (usually through knowledge of surface pressure and quantity of atmospheric moisture).

DPS-389 The Carbon Dioxide product shall provide carbon dioxide volume density, geolocated, globally, for the total vertical column, in all weather conditions, day and night, at the refresh rates of the instrument.

Product Name: Carbon Dioxide

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-390 The Carbon Dioxide product shall provide carbon dioxide volume density with a measurement range of 300 to 500 parts per million by volume (ppmv).

Product Name: Carbon Dioxide

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-391 The Carbon Dioxide product shall provide carbon dioxide volume density with a horizontal resolution of 100 km.

Product Name: Carbon Dioxide

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-393 The Carbon Dioxide product shall provide carbon dioxide volume density with a measurement precision of 0.5% or 2 ppmv.

Product Name: Carbon Dioxide

Instrument: CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-394 The Carbon Dioxide product shall provide carbon dioxide volume density with a measurement accuracy of 1% or 4 ppmv.

Product Name: Carbon Dioxide

Instrument: CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.5.4 Carbon Monoxide Product Requirements

The Carbon Monoxide product provides a measure of the amount of carbon monoxide contained in a specified volume of air.

Carbon monoxide is a short-lived gas (≈ 1 month) in the troposphere and has applications in air quality, atmospheric chemistry, climate, monitoring of combustion products (e.g., forest fires, biomass burning, and industrial pollution), ozone production, pollution transport, and fossil fuel emissions.

DPS-398 The Carbon Monoxide product shall provide carbon Monoxide volume density, geolocated, globally, for the total vertical column, in all weather conditions, day and night, at the refresh rates of the instrument.

Product Name: Carbon Monoxide

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-399 The Carbon Monoxide product shall provide carbon Monoxide volume density with a measurement range of 0 to 200 parts per billion by volume (ppbv).

Product Name: Carbon Monoxide

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-400 The Carbon Monoxide product shall provide carbon Monoxide volume density with a horizontal resolution of 100 km.

Product Name: Carbon Monoxide

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-402 The Carbon Monoxide product shall provide carbon monoxide column value with a measurement precision of 15%.

Product Name: Carbon Monoxide

Instrument: CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-403 The Carbon Monoxide product shall provide carbon Monoxide column value with a measurement accuracy of 5%.

Product Name: Carbon Monoxide

Instrument: CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

3.4.5.5 Methane Product Requirements

The Methane product provides a measure of the amount of methane contained in a specified volume of air. Methane column data are useful to meet the long-term stability requirements for temperature and moisture from an infrared sounder. The satellite retrievals allow for important assessments of the global geographical distribution of patterns or gradients in the trace gas concentrations that are not feasible otherwise.

Measurement quantities are given in parts-per-billion by volume (ppbv). This measure implies that the volume of air sampled by the observation is known (usually through knowledge of surface pressure and quantity of atmospheric moisture).

DPS-382 The Methane product shall provide methane volume density, geolocated, globally, for the total vertical column, in all weather conditions, day and night, at the refresh rates of the instrument.

Product Name: Methane

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-381 The Methane product shall provide methane volume density with a measurement range of 1100 to 2250 parts per billion by volume (ppbv).

Product Name: Methane

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-383 The Methane product shall provide methane volume density with a horizontal resolution of 100 km.

Product Name: Methane

Instrument: CrIS

Allocated To: ESPC

Verification Method: Demonstration

DPS-385 The Methane product shall provide methane volume density with a measurement precision of 1% or 20 ppbv.

Product Name: Methane

Instrument: CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

DPS-386 The Methane product shall provide methane volume density with a measurement accuracy of 4% or 80 ppbv.

Product Name: Methane

Instrument: CrIS

Allocated To: ESPC

Verification Method: Analysis

Verification Description: To be verified against truth data, selected at the discretion of the algorithm provider, demonstrating compliance over the range of production conditions.

4 REQUIREMENT DEFINITIONS

4.1 RDR

The RDR is a collection of data provided by the flight segment to the ground segment. It is provided for each sensor and for the spacecraft bus. The RDR is assembled by the mission data processing system from the data downlinked to the ground segment, sorted according to the CCSDS packet ID. The acronym "RDR" nominally means "raw data record", where the term "raw" is understood to mean unprocessed data provided by the flight segment.

4.2 SDR and TDR

The SDR is the calibrated sensor data, generated by the mission data processing system from the raw sensor data and spacecraft data downlinked by the flight segment. The calibrated data in the SDR is used to generate environmental products. The acronym "SDR" nominally means "sensor data record", although the raw data is also sensor data.

The term "TDR" refers to the calibrated data from the microwave sounder only; it is essentially a flavor of SDR. The microwave sounder data in the TDR are uncorrected "antenna temperatures", that may contain instrument biases. The microwave sounder data in the SDR are bias-corrected scene brightness temperatures. The acronym "TDR" nominally means "temperature data record", where the particular calibrated sensor data in this case are the microwave brightness temperatures, although the SDR also contains brightness temperatures.

4.3 True Value

True value X_T is defined as the actual value of a geophysical parameter, X, that is to be compared to a JPSS measurement.

4.4 Measurement Error

Measurement error ε is the difference between the JPSS measurement value, X_M, of a parameter X, and its true value, X_T:

$$\varepsilon = X_M - X_T$$

This measurement may be the result of a direct measurement, an indirect measurement, or an algorithmic derivation.

4.5 Measurement Accuracy

Measurement accuracy is defined as the magnitude of the mean measurement error.

For a sample set of N measurement errors, the measurement accuracy β_N is given by:

$$\beta_N = |\mu_N|$$

where μ_N is the mean measurement error and |…| denotes absolute value. The mean measurement error μ_N is given by:

$$\mu_N = \frac{1}{N}\sum_{i=1}^{N} \varepsilon_i$$

where ε_i is the measurement error of the ith measurement.

4.6 Measurement Precision

Measurement precision is defined as the corrected sample standard deviation of the measurement errors.

For a sample set of N measurement errors, the measurement precision σ_N is given by:

$$\sigma_N = \left[\frac{1}{N-1}\sum_{i=1}^{N}(\varepsilon_i - \mu_N)^2\right]^{1/2}$$

4.7 Measurement Uncertainty

Measurement uncertainty is defined as the root-mean-square of the measurement errors. It results from the combined effects of all systematic and random errors.

For a sample set of N measurement errors, the measurement uncertainty η_N is given by:

$$\eta_N = \left[\frac{1}{N}\sum_{i=1}^{N}{\varepsilon_i}^2\right]^{1/2}$$

Note that the measurement uncertainty is mathematically redundant with the measurement precision. In the limit $N \gg 1$, $\sigma_N^2 + \mu_N^2 = \eta_N^2$.

4.8 Geolocation Uncertainty

The beam is a frequency interval at an earth field of view. The angular beam width is approximately the ratio of the wavelength to the aperture size.

For geolocation uncertainty, the truth data are the true earth coordinates of the intersection of the beam angular center with the earth surface.

The measurement data are the earth coordinates of the beam angular center returned by the geolocation algorithm.

Geolocation uncertainty is the root-mean-square of all geolocation errors, random and systematic.

For a suitable ensemble of geolocation measurement and truth data pairs, the 3-sigma geolocation uncertainty is the maximum error value of 99.7% of all error measurements. In verification, 99.7% of all ensemble error values must be at or less than the requirement value.

3-dB beam width is the angular size of a beam whose width contains energy down to 3 dB below peak value, or 1/2 the peak value; also called full-width-half-maximum (FWHM).

Define:

$\theta \equiv$ the scan angle of the beam center measured from nadir;

$w_\theta \equiv$ the footprint along-scan width at a given scan angle;

$2\phi \equiv$ the angular beamwidth;

$w_0 \equiv$ the footprint along-scan width at nadir;

$R_\oplus \equiv$ the earth radius;

$H \equiv$ the height of the satellite above the earth (assuming circular orbit);

$\psi \equiv$ the earth angle between the earth radius at the nadir point and the earth radius at the inner edge of the beam footprint.

Then, for a circular orbit, the along-scan footprint width can be expressed as a function of scan angle, beam size, and footprint width at nadir:

$$w_\theta = w_0 \left[\frac{1 + 2\left(\frac{R_\oplus}{H}\right)\sin^2 \psi/2}{\cos(\theta - \phi)} \right] \frac{\cos\phi}{\cos(\theta + \phi + \psi)}$$

The ratio of satellite height to earth radius fixes the maximum scan angle to be 63 degrees for S-NPP, for all instruments. The corresponding maximum earth angle is 27 degrees.

In the limit of flat earth, the earth angle goes to zero, and

$$w_\theta \longrightarrow w_0 \frac{\cos\phi}{\cos(\theta + \phi)\cos(\theta - \phi)}$$

The geolocation specifications presume geometric growth in footprint size on the earth as a function of scan angle similar, but not necessarily identical, to this expression. Without specifying the functional dependence of footprint size on scan angle, the geolocation specifications are in terms of the footprint size at all scan angles.

In the case of the VIIRS instrument, where aggregation is used to reduce off-nadir footprint size, and the growth of footprint size does not follow a simple geometric dependence, a specification in terms of footprint size is still valid.

In the case of beams at different frequencies -- ATMS, for example -- the footprint size depends on frequency. Again, a specification in terms of footprint size is still valid for this case.

4.9 Probability of Correct Typing

Probability of correct typing is the probability that a cell reported as being of type X is in fact confirmed by truth data to be of type X.

4.10 Optical Depth, Optical Thickness

Optical depth, also called optical thickness, is defined as the integral of the extinction per unit length (scattering plus absorption) over the line of sight to the instrument; the optical depth is unitless.

4.11 Tangent Height

Tangent height is the height at which the sensor line of sight intersects an earth radius at right angles.

Appendix A. Acronyms

AIRS	Atmospheric Infrared Sounder
AMSU	Advanced Microwave Sounding Unit
APID	Application Identifier
ATMS	Advanced Technology Microwave Sounder
AVHRR	Advanced Very High Resolution Radiometer
AVMP	atmospheric vertical moisture profile
AVTP	atmospheric vertical temperature profile
CCSDS	Consultative Committee for Space Data Systems
COOP	Continuity of Operations
CrIS	Cross-Track Infrared Sounder
DMSP	Defense Meteorological Satellite Program
GCOM	Global Change Observation Mission
IASI	Infrared Atmospheric Sounding Interferometer
IDPS	Interface Data Processing Segment
JPSS	Joint Polar Satellite System
L1RD	Level 1 Requirements Document
MetOp	Meteorological Operational (satellite)
MODIS	Moderate Resolution Imaging Spectro-radiometer
NASA	National Aeronautics and Space Administration
NDE	NPOESS/NPP Data Exploitation
NOAA	National Oceanic and Atmospheric Administration
NUCAPS	NOAA-Unique CrIS-ATMS Processing System
OLS	Operational Linescan System
OMPS	Ozone Mapping Profiler Suite
POES	Polar-orbiting Operational Environmental Satellite
VIIRS	Visible-Infrared Imaging Radiometer Suite

Appendix B. Requirements Attributes

The Requirements Attributes Table lists each requirement with CM-controlled attributes including requirement type, mission effectivity, requirement allocation(s), block start, block end, and method(s) for verifying each requirement.

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-568	The data products shall be produced in NetCDF format unless otherwise specified.	JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Active Fires Aerosol Detection Aerosol Optical Depth Aerosol Optical Depth BUFR Aerosol Particle Size AMSR-2 ASD AMSR-2 Calibrated Sensor Data AMSR-2 Calibrated Sensor Data BUFR AMSR-2 Imagery Atmospheric Vertical Moisture Profile Atmospheric Vertical Temperature Profile ATMS BUFR SDR ATMS BUFR TDR	AMSR-2 ATMS CrIS VIIRS OMPS-NM OMPS-NP OMPS-LP External	CGS ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					ATMS Geolocation Data ATMS Imagery ATMS RDR ATMS SDR ATMS TDR Carbon Dioxide Carbon Monoxide Cloud Cover/Layers Cloud Height (Top and Base) Cloud Liquid Water Cloud Mask Cloud Optical Depth Cloud Particle Size Distribution Cloud Phase Cloud Top Pressure Cloud Top Temperature CrIS BUFR SDR CrIS Geolocation Data CrIS RDR CrIS SDR Global Surface Type Green Vegetation Fraction			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Ice Surface Temperature Infrared Ozone Profile Land Surface Emissivity Land Surface Temperature Methane Moisture Profile Ocean Color/Chlorophyll OMPS-LP RDR OMPS-NM Geolocation Data OMPS-NM RDR OMPS-NM SDR OMPS-NP Geolocation Data OMPS-NP RDR OMPS-NP SDR Outgoing Longwave Radiation Ozone Nadir Profile Ozone Nadir Profile BUFR Ozone Total Column Ozone Total Column BUFR Polar Winds			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Polar Winds BUFR Precipitation Rate Rainfall Rate Sea Ice Age Sea Ice Characterization Sea Ice Concentration Sea Surface Temperature Sea Surface Temperature BUFR Sea Surface Wind Speed Snow Cover Snow Cover/Depth Snow Water-Equivalent Soil Moisture Surface Albedo Surface Reflectance Surface Type Temperature Profile Total Precipitable Water Vegetation Health Index Suite			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Vegetation Indices Volcanic Ash Detection and Height VIIRS day/night-band BUFR VIIRS day/night-band Geolocation Data VIIRS day/night-band SDR VIIRS emissive I-band BUFR VIIRS emissive I-band SDR VIIRS emissive M-band BUFR VIIRS emissive M-band SDR VIIRS Imagery VIIRS I-band Geolocation Data VIIRS I-band SDR VIIRS M-band Geolocation Data VIIRS M-band SDR VIIRS RDR VIIRS reflective I-band BUFR			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					VIIRS reflective I-band SDR VIIRS reflective M-band BUFR VIIRS reflective M-band SDR			
DPS-569	The data products shall include attribute metadata that are compatible with the NetCDF Climate and Forecast Metadata Conventions.	JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Active Fires Aerosol Detection Aerosol Optical Depth Aerosol Optical Depth BUFR Aerosol Particle Size AMSR-2 ASD AMSR-2 Calibrated Sensor Data AMSR-2 Calibrated Sensor Data BUFR AMSR-2 Imagery Atmospheric Vertical Moisture Profile Atmospheric Vertical Temperature Profile ATMS BUFR SDR	AMSR-2 ATMS CrIS VIIRS OMPS-NM OMPS-NP OMPS-LP External	CGS ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					ATMS BUFR TDR ATMS Geolocation Data ATMS Imagery ATMS RDR ATMS SDR ATMS TDR Carbon Dioxide Carbon Monoxide Cloud Cover/Layers Cloud Height (Top and Base) Cloud Liquid Water Cloud Mask Cloud Optical Depth Cloud Particle Size Distribution Cloud Phase Cloud Top Pressure Cloud Top Temperature CrIS BUFR SDR CrIS Geolocation Data CrIS RDR CrIS SDR Global Surface Type			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Green Vegetation Fraction Ice Surface Temperature Infrared Ozone Profile Land Surface Emissivity Land Surface Temperature Methane Moisture Profile Ocean Color/Chlorophyll OMPS-LP RDR OMPS-NM Geolocation Data OMPS-NM RDR OMPS-NM SDR OMPS-NP Geolocation Data OMPS-NP RDR OMPS-NP SDR Outgoing Longwave Radiation Ozone Nadir Profile Ozone Nadir Profile BUFR Ozone Total Column			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Ozone Total Column BUFR Polar Winds Polar Winds BUFR Precipitation Rate Rainfall Rate Sea Ice Age Sea Ice Characterization Sea Ice Concentration Sea Surface Temperature Sea Surface Temperature BUFR Sea Surface Wind Speed Snow Cover Snow Cover/Depth Snow Water-Equivalent Soil Moisture Surface Albedo Surface Reflectance Surface Type Temperature Profile Total Precipitable Water			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Vegetation Health Index Suite Vegetation Indices Volcanic Ash Detection and Height VIIRS day/night-band BUFR VIIRS day/night-band Geolocation Data VIIRS day/night-band SDR VIIRS emissive I-band BUFR VIIRS emissive I-band SDR VIIRS emissive M-band BUFR VIIRS emissive M-band SDR VIIRS Imagery VIIRS I-band Geolocation Data VIIRS I-band SDR VIIRS M-band Geolocation Data VIIRS M-band SDR VIIRS RDR			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					VIIRS reflective I-band BUFR VIIRS reflective I-band SDR VIIRS reflective M-band BUFR VIIRS reflective M-band SDR			
DPS-570	The data products shall provide geolocation data that are compatible with the NetCDF Climate and Forecast Metadata Conventions.	JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Active Fires Aerosol Detection Aerosol Optical Depth Aerosol Optical Depth BUFR Aerosol Particle Size AMSR-2 ASD AMSR-2 Calibrated Sensor Data AMSR-2 Calibrated Sensor Data BUFR AMSR-2 Imagery Atmospheric Vertical Moisture Profile Atmospheric Vertical Temperature Profile	AMSR-2 ATMS CrIS VIIRS OMPS-NM OMPS-NP OMPS-LP External	CGS ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					ATMS BUFR SDR ATMS BUFR TDR ATMS Geolocation Data ATMS Imagery ATMS RDR ATMS SDR ATMS TDR Carbon Dioxide Carbon Monoxide Cloud Cover/Layers Cloud Height (Top and Base) Cloud Liquid Water Cloud Mask Cloud Optical Depth Cloud Particle Size Distribution Cloud Phase Cloud Top Pressure Cloud Top Temperature CrIS BUFR SDR CrIS Geolocation Data CrIS RDR CrIS SDR			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Global Surface Type Green Vegetation Fraction Ice Surface Temperature Infrared Ozone Profile Land Surface Emissivity Land Surface Temperature Methane Moisture Profile Ocean Color/Chlorophyll OMPS-LP RDR OMPS-NM Geolocation Data OMPS-NM RDR OMPS-NM SDR OMPS-NP Geolocation Data OMPS-NP RDR OMPS-NP SDR Outgoing Longwave Radiation Ozone Nadir Profile Ozone Nadir Profile BUFR			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Ozone Total Column Ozone Total Column BUFR Polar Winds Polar Winds BUFR Precipitation Rate Rainfall Rate Sea Ice Age Sea Ice Characterization Sea Ice Concentration Sea Surface Temperature Sea Surface Temperature BUFR Sea Surface Wind Speed Snow Cover Snow Cover/Depth Snow Water-Equivalent Soil Moisture Surface Albedo Surface Reflectance Surface Type Temperature Profile			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Total Precipitable Water Vegetation Health Index Suite Vegetation Indices Volcanic Ash Detection and Height VIIRS day/night-band BUFR VIIRS day/night-band Geolocation Data VIIRS day/night-band SDR VIIRS emissive I-band BUFR VIIRS emissive I-band SDR VIIRS emissive M-band BUFR VIIRS emissive M-band SDR VIIRS Imagery VIIRS I-band Geolocation Data VIIRS I-band SDR VIIRS M-band Geolocation Data VIIRS M-band SDR			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					VIIRS RDR VIIRS reflective I-band BUFR VIIRS reflective I-band SDR VIIRS reflective M-band BUFR VIIRS reflective M-band SDR			
DPS-659	The calibrated sensor data products shall maintain a long-term relative accuracy not to exceed 2%, for climate monitoring.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Active Fires Aerosol Detection Aerosol Optical Depth Aerosol Optical Depth BUFR Aerosol Particle Size AMSR-2 ASD AMSR-2 Calibrated Sensor Data AMSR-2 Calibrated Sensor Data BUFR AMSR-2 Imagery Atmospheric Vertical Moisture Profile Atmospheric Vertical Temperature Profile	AMSR-2 ATMS CrIS VIIRS OMPS-NM OMPS-NP OMPS-LP External	CGS ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					ATMS BUFR SDR ATMS BUFR TDR ATMS Geolocation Data ATMS Imagery ATMS RDR ATMS SDR ATMS TDR Carbon Dioxide Carbon Monoxide Cloud Cover/Layers Cloud Height (Top and Base) Cloud Liquid Water Cloud Mask Cloud Optical Depth Cloud Particle Size Distribution Cloud Phase Cloud Top Pressure Cloud Top Temperature CrIS BUFR SDR CrIS Geolocation Data CrIS RDR CrIS SDR			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Global Surface Type Green Vegetation Fraction Ice Surface Temperature Infrared Ozone Profile Land Surface Emissivity Land Surface Temperature Methane Moisture Profile Ocean Color/Chlorophyll OMPS-LP RDR OMPS-NM Geolocation Data OMPS-NM RDR OMPS-NM SDR OMPS-NP Geolocation Data OMPS-NP RDR OMPS-NP SDR Outgoing Longwave Radiation Ozone Nadir Profile Ozone Nadir Profile BUFR			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Ozone Total Column Ozone Total Column BUFR Polar Winds Polar Winds BUFR Precipitation Rate Rainfall Rate Sea Ice Age Sea Ice Characterization Sea Ice Concentration Sea Surface Temperature Sea Surface Temperature BUFR Sea Surface Wind Speed Snow Cover Snow Cover/Depth Snow Water-Equivalent Soil Moisture Surface Albedo Surface Reflectance Surface Type Temperature Profile			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					Total Precipitable Water Vegetation Health Index Suite Vegetation Indices Volcanic Ash Detection and Height VIIRS day/night-band BUFR VIIRS day/night-band Geolocation Data VIIRS day/night-band SDR VIIRS emissive I-band BUFR VIIRS emissive I-band SDR VIIRS emissive M-band BUFR VIIRS emissive M-band SDR VIIRS Imagery VIIRS I-band Geolocation Data VIIRS I-band SDR VIIRS M-band Geolocation Data VIIRS M-band SDR			

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
					VIIRS RDR VIIRS reflective I-band BUFR VIIRS reflective I-band SDR VIIRS reflective M-band BUFR VIIRS reflective M-band SDR			
DPS-18	The ATMS RDR product shall aggregate spacecraft and sensor data necessary for sensor data calibration and geolocation, from downlinked spacecraft and sensor application packets, for archiving and for input to calibration & geolocation algorithms.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	ATMS RDR	ATMS	CGS	Inspection
DPS-652	The ATMS TDR product shall provide antenna temperatures calibrated from ATMS RDRs, for all ATMS earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	ATMS TDR	ATMS	CGS	Inspection
DPS-800	The ATMS BUFR TDR product shall provide geolocated antenna temperatures, converted	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	ATMS BUFR TDR	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	from ATMS TDRs, in the BUFR format.							
DPS-20	The ATMS SDR product shall provide scene brightness temperatures calibrated from ATMS TDRs, for all ATMS earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	ATMS SDR	ATMS	CGS	Inspection
DPS-801	The ATMS BUFR SDR product shall provide geolocated scene brightness temperatures, converted from ATMS SDRs, in the BUFR format.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	ATMS BUFR SDR	ATMS	ESPC	Inspection
DPS-30	The ATMS TDR and SDR products shall conform with the ATMS instrument requirement MMSS-227 of the Multi-Mission System Specification, reproduced below for reference.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	ATMS SDR ATMS TDR	ATMS	CGS	Inspection
DPS-31	The ATMS Geolocation Data product shall have a 3-sigma geolocation uncertainty in the along-scan direction, over all scan angles, not to exceed 1/2 the along-scan footprint size of the 3 dB (FWHM) beam.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	ATMS Geolocation Data	ATMS	CGS	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-365	The ATMS Geolocation Data product shall have a 3-sigma geolocation uncertainty in the along-track direction, over all scan angles, not to exceed 1/2 the along-track footprint size of the 3 dB (FWHM) beam.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	ATMS Geolocation Data	ATMS	CGS	Inspection
DPS-29	The ATMS Geolocation Data product shall provide WGS84 ellipsoid-referenced geolocation data for all beam positions, calibrated from ATMS instrument and spacecraft RDRs, for all ATMS earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	ATMS Geolocation Data	ATMS	CGS	Inspection
DPS-182	The ATMS Imagery product shall provide a mapping projection of calibrated ATMS data, in all bands, globally day and night, under all weather conditions, at the native resolution of the instrument, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	ATMS Imagery	ATMS	ESPC	Inspection
DPS-355	The CrIS RDR product shall aggregate spacecraft	S-NPP JPSS-1	2.1.0	5.0.0	CrIS RDR	CrIS	CGS	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	and sensor data necessary for sensor data calibration and geolocation, from downlinked spacecraft and sensor application packets, for archiving and for input to calibration & geolocation algorithms.	JPSS-2 JPSS-3 JPSS-4						
DPS-357	The CrIS SDR product shall provide complex spectral radiances, calibrated from CrIS interferogram RDRs, for all CrIS earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	CrIS SDR	CrIS	CGS	Inspection
DPS-798	The CrIS BUFR product shall provide geolocated complex spectral radiances, converted from CrIS SDRs, in the BUFR format.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	CrIS BUFR SDR	CrIS	ESPC	Inspection
DPS-359	The CrIS SDR product shall provide complex spectral radiances binned into three bands denoted SW (short wave), MW (mid wave), and LW (long wave).	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	CrIS SDR	CrIS	CGS	Inspection
DPS-791	The CrIS SDR product shall conform with the CrIS instrument requirement	S-NPP JPSS-1 JPSS-2	2.1.0	5.0.0	CrIS SDR	CrIS	CGS	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	MMSS-235 of the Multi-Mission Systems Specification, reproduced below for reference.	JPSS-3 JPSS-4						
DPS-364	The CrIS Geolocation Data product shall provide WGS84 ellipsoid-referenced geolocation data for all fields of view, calibrated from CrIS instrument and spacecraft RDRs, for all CrIS earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	CrIS Geolocation Data	CrIS	CGS	Inspection
DPS-366	The CrIS Geolocation Data product shall have a 3-sigma geolocation uncertainty in the along-scan direction, over all scan angles, not to exceed 1/4 the along-scan footprint size of the 3 dB (FWHM) beam of each FOV.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	CrIS Geolocation Data	CrIS	CGS	Inspection
DPS-367	The CrIS Geolocation Data product shall have a 3-sigma geolocation uncertainty in the along-track direction, over all scan angles, not to exceed 1/4 the along-track footprint size of the 3 dB	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	CrIS Geolocation Data	CrIS	CGS	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	(FWHM) beam of each FOV.							
DPS-561	The VIIRS RDR product shall aggregate spacecraft and sensor data necessary for sensor data calibration and geolocation, from downlinked spacecraft and sensor application packets, for archiving and for input to calibration & geolocation algorithms, for all VIIRS bands.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS RDR	VIIRS	CGS	Inspection
DPS-673	The VIIRS emissive band SDR product shall provide radiances and brightness temperatures for emissive M-bands and I-bands, calibrated from RDRs, for all emissive-band earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS emissive I-band SDR VIIRS emissive M-band SDR	VIIRS	CGS	Inspection
DPS-803	The VIIRS emissive band BUFR product shall provide geolocated radiances and brightness temperatures for emissive M-bands and I-bands, converted from emissive-band VIIRS SDRs, in the BUFR format.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS emissive I-band BUFR VIIRS emissive M-band BUFR	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-676	The VIIRS reflective band SDR product shall provide reflectances and radiances for reflective I-bands and M-bands, calibrated from RDRs, for all daytime reflective-band earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS reflective I-band SDR VIIRS reflective M-band SDR	VIIRS	CGS	Inspection
DPS-804	The VIIRS reflective band BUFR product shall provide geolocated reflectances and radiances for reflective M-bands and I-bands, converted from reflective-band VIIRS SDRs, in the BUFR format.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS reflective I-band BUFR VIIRS reflective M-band BUFR	VIIRS	ESPC	Inspection
DPS-677	The VIIRS day/night band SDR product shall provide radiances for the day/night band calibrated from RDRs, for all earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS day/night-band SDR	VIIRS	CGS	Inspection
DPS-805	The VIIRS day/night band BUFR product shall provide geolocated radiances for the day/night band, converted from	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS day/night-band BUFR	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	day/night-band VIIRS SDRs, in the BUFR format.							
DPS-678	The VIIRS SDR products shall conform with the VIIRS instrument requirement MMSS-255 of the Multi-Mission Systems Specification, reproduced below for reference.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS day/night-band SDR VIIRS I-band SDR VIIRS M-band SDR	VIIRS	CGS	Inspection
DPS-680	The VIIRS Geolocation Data product shall have a 3-sigma geolocation uncertainty for all bands, of 400 meters at nadir, and 1500 meters at edge of scan.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS day/night-band Geolocation Data VIIRS I-band Geolocation Data VIIRS M-band Geolocation Data	VIIRS	CGS	Inspection
DPS-682	The VIIRS Geolocation Data product shall provide terrain-corrected geolocation data for all bands, over all scan angles, calibrated from VIIRS instrument and spacecraft RDRs, for all VIIRS earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS day/night-band Geolocation Data VIIRS I-band Geolocation Data VIIRS M-band Geolocation Data	VIIRS	CGS	Inspection
DPS-37	The VIIRS Imagery product shall provide a Ground-Track Mercator projection, with terrain corrected geolocation, of all	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	VIIRS Imagery	VIIRS	CGS	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	VIIRS I-band SDRs; any set of six among available 16 VIIRS M-band SDRs; and the Day/Night-band SDR; globally, day and night (for emissive and day/night bands), under all weather conditions, at the refresh rates of the instrument.							
DPS-199	The OMPS-NM RDR product shall provide OMPS nadir mapper total column raw data from downlinked sensor application packets, sorted according to application packet ID, for archiving and for input to calibration & geolocation algorithms.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NM RDR	OMPS-NM	CGS	Inspection
DPS-605	The OMPS-NM SDR product shall provide earth-view radiances calibrated from OMPS-NM RDRs, for all nominal OMPS-NM earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NM SDR	OMPS-NM	CGS	Inspection
DPS-792	The OMPS-NM SDR product shall conform with the OMPS instrument requirement MMSS-245 of	S-NPP JPSS-1 JPSS-2 JPSS-3	2.1.0	5.0.0	OMPS-NM SDR	OMPS-NM	CGS	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	the Multi-Mission Systems Specification, reproduced below for reference.	JPSS-4						
DPS-202	The OMPS-NM Geolocation Data shall have a 3-sigma geolocation uncertainty in the along-scan direction, over all FOVs in the scan, not to exceed 1/2 the along-scan footprint size of the FOV.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NM Geolocation Data	OMPS-NM	CGS	Inspection
DPS-654	The OMPS-NM Geolocation Data shall have a 3-sigma geolocation uncertainty in the along-track direction, over all FOVs in the scan, not to exceed 1/2 the along-track footprint size of the FOV.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NM Geolocation Data	OMPS-NM	CGS	Inspection
DPS-203	The OMPS-NM Geolocation Data product shall provide WGS84 ellipsoid-referenced geolocation data for all fields of view, calibrated from OMPS-NM instrument and spacecraft RDRs, for all OMPS-NM earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NM Geolocation Data	OMPS-NM	CGS	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-618	The OMPS-NP RDR product shall provide OMPS nadir profiler raw data from downlinked sensor application packets, sorted according to application packet ID, for archiving and for input to calibration & geolocation algorithms.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NP RDR	OMPS-NP	CGS	Inspection
DPS-619	The OMPS-NP SDR product shall provide earth-view radiances calibrated from OMPS nadir profiler RDRs, for all nominal OMPS-NP earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NP SDR	OMPS-NP	CGS	Inspection
DPS-793	The OMPS-NP SDR product shall conform with the OMPS instrument requirement MMSS-245 of the Multi-Mission Systems Specification, reproduced below for reference.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NP SDR	OMPS-NP	CGS	Inspection
DPS-655	The OMPS-NP Geolocation Data shall have a 3-sigma geolocation uncertainty in the along-scan direction, over all FOVs in the scan, not to exceed 1/2 the along-	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NP Geolocation Data	OMPS-NP	CGS	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	scan footprint size of the FOV.							
DPS-656	The OMPS-NP Geolocation Data shall have a 3-sigma geolocation uncertainty in the along-track direction, over all FOVs in the scan, not to exceed 1/2 the along-track footprint size of the FOV.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NP Geolocation Data	OMPS-NP	CGS	Inspection
DPS-657	The OMPS-NP Geolocation Data product shall provide WGS84 ellipsoid-referenced geolocation data for all fields of view, calibrated from OMPS-NM instrument and spacecraft RDRs, for all OMPS-NM earth scene measurements, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-NP Geolocation Data	OMPS-NP	CGS	Inspection
DPS-790	The OMPS-LP RDR product shall aggregate spacecraft and sensor data necessary for sensor data calibration and geolocation, from downlinked spacecraft and sensor application packets, for archiving and for input to calibration & geolocation algorithms.	S-NPP JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	OMPS-LP RDR	OMPS-LP	CGS	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-788	The AMSR-2 ASD product shall aggregate spacecraft and sensor data necessary for sensor data calibration and geolocation, from downlinked spacecraft and sensor application packets, for archiving and for input to calibration & geolocation algorithms.	GCOM-W1	2.1.0	5.0.0	AMSR-2 ASD	AMSR-2	CGS	Inspection
DPS-797	The AMSR-2 calibrated sensor data product shall provide scene counts and scene brightness temperatures calibrated from AMSR-2 ASDs, for all AMSR-2 earth scene measurements, at the refresh rates of the instrument.	GCOM-W1	2.1.0	5.0.0	AMSR-2 Calibrated Sensor Data	AMSR-2	ESPC	Inspection
DPS-906	The AMSR-2 calibrated sensor data BUFR product shall provide geolocated scene counts and scene brightness temperatures, converted from AMSR-2 calibrated sensor data products, in the BUFR format.	GCOM-W1	2.1.0	5.0.0	AMSR-2 Calibrated Sensor Data BUFR	AMSR-2	ESPC	Inspection
DPS-185	The AMSR-2 Imagery product shall provide a mapping projection of	GCOM-W1	2.1.0	5.0.0	AMSR-2 Imagery	AMSR-2	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	AMSR-2 calibrated data, for all bands, globally day and night, under all weather conditions, at the native resolution of the instrument, at the refresh rates of the instrument.							
DPS-189	The Infrared Ozone Profile product shall provide infrared ozone profiles, globally day and night, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Infrared Ozone Profile	CrIS	ESPC	Inspection
DPS-190	The Infrared Ozone Profile product shall provide infrared ozone profiles from the top of atmosphere to the surface, on the native vertical reporting interval of the radiative transfer model grid used in the retrieval.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Infrared Ozone Profile	CrIS	ESPC	Inspection
DPS-192	The Infrared Ozone Profile product shall provide infrared ozone profiles with a measurement precision of 20% from the surface to 260 millibars (mb) in one statistic layer, and from 260 mb to 4 mb in 6 statistic layers.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Infrared Ozone Profile	CrIS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-193	The Infrared Ozone Profile product shall provide infrared ozone profiles with a measurement accuracy of 10% from the surface to 260 millibars (mb) in one statistic layer, and from 260 mb to 4 mb in 6 statistic layers.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Infrared Ozone Profile	CrIS	ESPC	Inspection
DPS-205	The Outgoing Longwave Radiation product shall provide outgoing longwave radiation, globally day and night, for all scene conditions, over the measurement range of the instrument, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Outgoing Longwave Radiation	CrIS	ESPC	Inspection
DPS-208	The Outgoing Longwave Radiation product shall provide outgoing longwave radiation with a measurement precision of 12 watts per square meter (W/m^2).	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Outgoing Longwave Radiation	CrIS	ESPC	Inspection
DPS-209	The Outgoing Longwave Radiation product shall provide outgoing longwave radiation with a measurement accuracy of 5 W/m^2.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Outgoing Longwave Radiation	CrIS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-32	The Active Fires product shall provide fire radiative power, with a measurement uncertainty of 50%, over the measurement range of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Active Fires	VIIRS	ESPC	Inspection
DPS-33	The Active Fires product shall provide a per-pixel fire mask and fire radiative power, calculated from infrared imager calibrated data, globally day and night, under clear sky conditions between clouds, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Active Fires	VIIRS	ESPC	Inspection
DPS-330	The Aerosol Detection product shall provide type identification of aerosols entrained at any altitude, for the total column, globally, under cloud-free conditions, in daytime, for aerosol optical thickness greater than 0.15, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Detection	VIIRS	ESPC	Inspection
DPS-331	The Aerosol Detection product shall identify aerosols of type dust, sand, and smoke, at a given location.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Detection	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-332	The Aerosol Detection product shall identify presence of aerosols of any type with a probability of correct typing of 80%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Detection	VIIRS	ESPC	Inspection
DPS-333	The Aerosol Detection product shall identify dust with a probability of correct typing of 80%; and smoke with a probability of correct typing of 70%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Detection	VIIRS	ESPC	Inspection
DPS-334	The Aerosol Detection product shall identify smoke plumes with densities from 0 to 2000 micrograms per square meter of column.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Detection	VIIRS	ESPC	Inspection
DPS-511	The Aerosol Optical Depth product shall provide aerosol optical depth; globally; in daytime; in clear conditions; for the total column; at solar zenith angles less than or equal to 80 degrees; at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Optical Depth	VIIRS	ESPC	Inspection
DPS-809	The Aerosol Optical Depth BUFR product shall provide geolocated aerosol optical depth, converted from the Aerosol Optical	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Optical Depth BUFR	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	Depth product, in BUFR format.							
DPS-512	The Aerosol Optical Depth product shall provide aerosol optical depth with a measurement accuracy of: 0.08 over ocean for optical depth less than 0.3, and 0.15 over ocean for optical depth greater than or equal to 0.3; 0.06 over land for optical depth less than 0.1, 0.05 over land for optical depth greater than or equal to 0.1 and less than or equal to 0.8, and 0.2 over land for optical depth greater than 0.8.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Optical Depth	VIIRS	ESPC	Inspection
DPS-513	The Aerosol Optical Depth product shall provide aerosol optical depth with a measurement precision of: 0.15 over ocean for optical depth less than 0.3, and 0.35 over ocean for optical depth greater than or equal to 0.3; 0.15 over land for optical depth less than 0.1, 0.25 over land for optical depth greater than or equal to 0.1 and less than or equal to 0.8, and 0.45 over land	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Optical Depth	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	for optical depth greater than 0.8.							
DPS-514	The Aerosol Optical Depth product shall provide aerosol optical depth with a measurement range of –0.05 to 5.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Optical Depth	VIIRS	ESPC	Inspection
DPS-515	The Aerosol Optical Depth product shall provide aerosol optical depth for wavelengths at 412, 445, 488, 550, 555, 672, 746, 865, 1240, 1610, and 2250 nanometers.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Optical Depth	VIIRS	ESPC	Inspection
DPS-45	The Aerosol Particle Size product shall be provided globally over ocean, daytime only, over the total column, for Ångström exponent values between -1 and +3, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Particle Size	VIIRS	ESPC	Inspection
DPS-50	The Aerosol Particle Size product shall provide the Ångström exponent with a measurement precision of 0.6 alpha units over ocean.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Particle Size	VIIRS	ESPC	Inspection
DPS-51	The Aerosol Particle Size product shall provide the Ångström exponent with a measurement accuracy of 0.3 alpha units over ocean.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Aerosol Particle Size	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-458	The Cloud Cover/Layers product shall provide geolocated fractional cloud cover per cell, for three atmospheric layers and for the total of all layers, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Cover/Layers	VIIRS	ESPC	Inspection
DPS-591	The Cloud Cover/Layers product shall provide geolocated fractional cloud cover per cell at the three atmospheric layers of 0 to 350 millibars (mb), 350 to 642 mb, and 642 to 1100 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Cover/Layers	VIIRS	ESPC	Inspection
DPS-459	The Cloud Cover/Layers product shall provide fractional cloud cover per cell with a measurement uncertainty of 15%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Cover/Layers	VIIRS	ESPC	Inspection
DPS-461	The Cloud Cover/Layers product shall provide fractional cloud cover with a horizontal cell size of 10 kilometers.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Cover/Layers	VIIRS	ESPC	Inspection
DPS-462	The Cloud Cover/Layers product shall geolocate the center of the fractional cloud cover cell with a 3-	S-NPP JPSS-1 JPSS-2 JPSS-3	2.1.0	5.0.0	Cloud Cover/Layers	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	sigma mapping uncertainty of 4 kilometers.	JPSS-4						
DPS-481	The Cloud Height product shall provide geolocated cloud top and base heights per cell, for the highest cloud in the column, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Height (Top and Base)	VIIRS	ESPC	Inspection
DPS-482	The Cloud Height product shall provide cloud top heights per cell with a measurement precision of 1.0 kilometers for cloud optical thickness greater than or equal to 1; and 2.0 km for cloud optical thickness less than 1.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Height (Top and Base)	VIIRS	ESPC	Inspection
DPS-593	The Cloud Height product shall provide cloud base heights per cell with a measurement precision of 2.0 kilometers for cloud optical thickness greater than or equal to 1; and 3.0 km for cloud optical thickness less than 1.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Height (Top and Base)	VIIRS	ESPC	Inspection
DPS-485	The Cloud Height product shall provide cloud top heights per cell with a	S-NPP JPSS-1 JPSS-2	2.1.0	5.0.0	Cloud Height (Top and Base)	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	measurement accuracy of 1.0 kilometers for cloud optical thickness greater than or equal to 1; and 2.0 km for cloud optical thickness less than 1.	JPSS-3 JPSS-4						
DPS-594	The Cloud Height product shall provide cloud base heights per cell with a measurement accuracy of 2.0 kilometers for cloud optical thickness greater than or equal to 1; and 3.0 km for cloud optical thickness less than 1.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Height (Top and Base)	VIIRS	ESPC	Inspection
DPS-435	The Cloud Mask product shall provide a cloud mask for the total cloud cover, globally whenever detectable clouds are present, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Mask	VIIRS	ESPC	Inspection
DPS-436	The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing, averaged globally, of 87%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Mask	VIIRS	ESPC	Inspection
DPS-596	The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct	S-NPP JPSS-1 JPSS-2 JPSS-3	2.1.0	5.0.0	Cloud Mask	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	typing over ocean of 92% in daytime, and 90% at night.	JPSS-4						
DPS-597	The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing over snow-free land of 90% in daytime, and 88% at night.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Mask	VIIRS	ESPC	Inspection
DPS-598	The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing over desert of 85% in daytime and at night.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Mask	VIIRS	ESPC	Inspection
DPS-599	The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing over snow-covered land of 88% in daytime, and 85% at night.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Mask	VIIRS	ESPC	Inspection
DPS-600	The Cloud Mask product shall provide a cloud mask for the total cloud cover with a probability of correct typing over sea ice of 82% in daytime, and 72% at night.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Mask	VIIRS	ESPC	Inspection
DPS-601	The Cloud Mask product shall provide a cloud mask	S-NPP JPSS-1	2.1.0	5.0.0	Cloud Mask	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	for the total cloud cover with a probability of correct typing over Antarctica and Greenland of 80% in daytime, and 70% at night.	JPSS-2 JPSS-3 JPSS-4						
DPS-473	The Cloud Optical Depth product shall provide cloud optical depth, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Optical Depth	VIIRS	ESPC	Inspection
DPS-477	The Cloud Optical Depth product shall provide cloud optical depth with a measurement precision of the greater of 30% or 3 optical depths in daytime; and the greater of 30% or 0.8 optical depths at night.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Optical Depth	VIIRS	ESPC	Inspection
DPS-478	The Cloud Optical Depth product shall provide cloud optical depth with a measurement accuracy of 20% in daytime and 30% at night.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Optical Depth	VIIRS	ESPC	Inspection
DPS-465	The Cloud Particle Size Distribution product shall provide the cloud effective particle size, at cloud tops, globally, day and night, whenever detectable clouds	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Particle Size Distribution	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	are present, at the refresh rates of the instrument.							
DPS-468	The Cloud Particle Size Distribution product shall provide cloud effective particle size over a range from 2 to 50 microns for ice and water in daytime and for ice at night; and 2 to 32 microns for water at night.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Particle Size Distribution	VIIRS	ESPC	Inspection
DPS-469	The Cloud Particle Size Distribution product shall provide cloud effective particle size with a measurement precision of: the greater of 25% or 4 micron for water; greater of 25% or 10 micron for ice.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Particle Size Distribution	VIIRS	ESPC	Inspection
DPS-470	The Cloud Particle Size Distribution product shall provide cloud effective particle size with a measurement accuracy of: greater of 30% or 4 micron for water; and 10 micron for ice.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Particle Size Distribution	VIIRS	ESPC	Inspection
DPS-712	The Cloud Phase product shall provide the cloud phase, globally, day and night, whenever detectable clouds are present, at the	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Phase	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	refresh rates of the instrument.							
DPS-713	The Cloud Phase product shall provide the cloud phase with an 80% probability of correct typing.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Phase	VIIRS	ESPC	Inspection
DPS-489	The Cloud Top Pressure product shall provide cloud top pressures for one or more atmospheric layers, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Top Pressure	VIIRS	ESPC	Inspection
DPS-490	The Cloud Top Pressure product shall provide cloud top pressures with a measurement precision of 100 millibars for cloud optical depth greater than or equal to 1; and 200 millibars for cloud optical depth less than 1.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Top Pressure	VIIRS	ESPC	Inspection
DPS-491	The Cloud Top Pressure product shall provide cloud top pressures with a measurement accuracy of 100 millibars for cloud optical depth greater than or equal to 1; and 200	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Top Pressure	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	millibars for cloud optical depth less than one.							
DPS-497	The Cloud Top Temperature product shall provide cloud top temperatures of the highest cloud in the column, globally, day and night, whenever detectable clouds are present, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Top Temperature	VIIRS	ESPC	Inspection
DPS-499	The Cloud Top Temperature product shall provide cloud top temperatures with a measurement precision of 6 kelvin for cloud optical depth greater than or equal to 1; and 12 K for cloud optical depth less than 1.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Top Temperature	VIIRS	ESPC	Inspection
DPS-500	The Cloud Top Temperature product shall provide cloud top temperatures with a measurement accuracy of 6 K for cloud optical depth greater than or equal to 1; and 12 K for cloud optical depth less than 1.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Top Temperature	VIIRS	ESPC	Inspection
DPS-818	The Global Surface Type product shall provide the	JPSS-1 JPSS-2 JPSS-3	2.1.0	5.0.0	Global Surface Type	External	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	IGBP land cover classification, globally.	JPSS-4						
DPS-901	The Global Surface Type product shall provide global 8-day and monthly composites of surface reflectance from their daily granule reflectance data.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Global Surface Type	External	ESPC	Inspection
DPS-819	The Global Surface Type product shall provide the IGBP land cover classification with a horizontal cell size of 1 kilometer.	JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Global Surface Type	External	ESPC	Inspection
DPS-820	The Global Surface Type product shall provide the IGBP land cover classification with a probability of correct typing of 70%.	JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Global Surface Type	External	ESPC	Inspection
DPS-821	The Global Surface Type product shall be updated once per year.	JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Global Surface Type	External	ESPC	Inspection
DPS-62	The Green Vegetation Fraction product shall provide green vegetation fraction globally and regionally, daytime only, weekly with daily updates, 24 hours after the seven-day compositing period.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Green Vegetation Fraction	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-75	The Green Vegetation Fraction product shall provide the green vegetation fraction globally with a cell size of 16 km. and associated 3-sigma mapping uncertainty of 4 km.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Green Vegetation Fraction	VIIRS	ESPC	Inspection
DPS-66	The Green Vegetation Fraction product shall provide the green vegetation fraction with a measurement precision of 15%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Green Vegetation Fraction	VIIRS	ESPC	Inspection
DPS-69	The Green Vegetation Fraction product shall provide the green vegetation fraction with a measurement accuracy of 12%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Green Vegetation Fraction	VIIRS	ESPC	Inspection
DPS-370	The Ice Surface Temperature product shall provide ice surface temperature, globally day and night, for clear conditions, for ice-covered ocean, excluding inland water and coastal areas, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ice Surface Temperature	VIIRS	ESPC	Inspection
DPS-371	The Ice Surface Temperature product shall	S-NPP JPSS-1	2.1.0	5.0.0	Ice Surface Temperature	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	provide ice surface temperatures with a measurement range of 213 to 275 kelvins.	JPSS-2 JPSS-3 JPSS-4						
DPS-372	The Ice Surface Temperature product shall provide ice surface temperatures with a measurement uncertainty of 1 kelvin.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ice Surface Temperature	VIIRS	ESPC	Inspection
DPS-116	The Land Surface Temperature product shall provide land surface temperature, globally day and night, for clear conditions, at the refresh rates of the instrument.	JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Land Surface Temperature	VIIRS	ESPC	Inspection
DPS-117	The Land Surface Temperature product shall provide land surface temperatures with a measurement precision of 2.5 kelvin over the measurement range of the instrument.	JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Land Surface Temperature	VIIRS	ESPC	Inspection
DPS-118	The Land Surface Temperature product shall provide land surface temperatures with a measurement accuracy of 1.4 kelvin over the	JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Land Surface Temperature	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	measurement range of the instrument.							
DPS-1747	The Gridded Land Surface Temperature product shall provide land surface temperature, 1 km globally day and night, for clear conditions, at the refresh rate of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Gridded Land Surface Temperature	VIIRS	ESPC	Inspection
DPS-1748	The Gridded Land Surface Temperature product shall provide land surface temperatures with a measurement precision of 2.5 kelvin over the measurement range of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Gridded Land Surface Temperature	VIIRS	ESPC	Inspection
DPS-1749	The Gridded Land Surface Temperature product shall provide land surface temperatures with a measurement accuracy of 1.4 kelvin over the measurement range of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Gridded Land Surface Temperature	VIIRS	ESPC	Inspection
DPS-1750	The Gridded Land Surface Temperature product shall be generated within 3 hours of receiving all the required data.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Gridded Land Surface Temperature	VIIRS	ESPC	Inspection
DPS-88	The Ocean Color/Chlorophyll product	S-NPP JPSS-1	2.1.0	5.0.0	Ocean Color/Chlorophyll	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	shall provide ocean color (nLw), chlorophyll-a, and optical properties; for ocean, coastal, or inland water; daytime; in clear conditions; at the refresh rate of the instrument.	JPSS-2 JPSS-3 JPSS-4						
DPS-90	The Ocean Color/Chlorophyll product shall provide ocean color with a measurement precision of 10%, over the measurement range of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ocean Color/Chlorophyll	VIIRS	ESPC	Inspection
DPS-89	The Ocean Color/Chlorophyll product shall provide optical properties with a measurement precision of 20%, over the measurement range of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ocean Color/Chlorophyll	VIIRS	ESPC	Inspection
DPS-91	The Ocean Color/Chlorophyll product shall provide chlorophyll-a density with a measurement precision of 30% below 10 mg/m^3, and 50% at and above 10 mg/m^3, over the measurement range of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ocean Color/Chlorophyll	VIIRS	ESPC	Inspection
DPS-93	The Ocean Color/Chlorophyll product	S-NPP JPSS-1	2.1.0	5.0.0	Ocean Color/Chlorophyll	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	shall provide ocean color with a measurement accuracy of 10%.	JPSS-2 JPSS-3 JPSS-4						
DPS-94	The Ocean Color/Chlorophyll product shall provide optical properties with a measurement accuracy of 35%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ocean Color/Chlorophyll	VIIRS	ESPC	Inspection
DPS-95	The Ocean Color/Chlorophyll product shall provide chlorophyll-a density with a measurement accuracy of 35% below 10 mg/m^3, and 40% at and above 10 mg/m^3.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ocean Color/Chlorophyll	VIIRS	ESPC	Inspection
DPS-104	The Polar Winds product shall provide polar wind vectors, at cloud tops, globally day and night, in cloudy areas, between the surface and the tropopause.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Polar Winds	VIIRS	ESPC	Inspection
DPS-806	The Polar Winds BUFR product shall provide geolocated polar wind vectors, converted from the Polar Winds product, in BUFR format.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Polar Winds BUFR	VIIRS	ESPC	Inspection
DPS-106	The Polar Winds product shall provide polar wind vectors with magnitudes from 3 to 100	S-NPP JPSS-1 JPSS-2 JPSS-3	2.1.0	5.0.0	Polar Winds	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	meters/second and directions from 0 to 360 degrees.	JPSS-4						
DPS-107	The Polar Winds product shall provide polar wind vectors with a measurement precision of 3.8 meters/sec, expressed as a mean vector difference.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Polar Winds	VIIRS	ESPC	Inspection
DPS-108	The Polar Winds product shall provide polar wind vectors with a measurement accuracy of 7.5 meters/sec, expressed as a mean vector difference.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Polar Winds	VIIRS	ESPC	Inspection
DPS-109	The Polar Winds product shall provide polar wind vectors with a horizontal resolution of 10 km.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Polar Winds	VIIRS	ESPC	Inspection
DPS-239	The Sea Ice Age product shall provide sea ice age class, globally over ocean, in daytime, under clear conditions, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Ice Age	VIIRS	ESPC	Inspection
DPS-902	The Sea Ice Age product shall provide sea ice age class as either ice free, new/young ice, and all other ice.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Ice Age	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-241	The Sea Ice Age product shall provide sea ice age class with a probability of correct typing of 70%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Ice Age	VIIRS	ESPC	Inspection
DPS-246	The Sea Ice Concentration product shall provide sea ice concentration, globally over ocean, in daytime, under clear conditions, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Ice Concentration	VIIRS	ESPC	Inspection
DPS-248	The Sea Ice Concentration product shall provide sea ice concentration with a measurement uncertainty of 25%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Ice Concentration	VIIRS	ESPC	Inspection
DPS-650	The Sea Ice Concentration product shall provide sea ice concentration with a measurement accuracy of 10%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Ice Concentration	VIIRS	ESPC	Inspection
DPS-133	The Sea Surface Temperature product shall provide sea surface temperature, globally day and night, for clear conditions, for ice-free ocean, excluding lakes and rivers, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Surface Temperature	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-813	The Sea Surface Temperature BUFR product shall provide geolocated sea surface temperature, converted from the Sea Surface Temperature product, in BUFR format.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Surface Temperature BUFR	VIIRS	ESPC	Inspection
DPS-134	The Sea Surface Temperature product shall provide sea surface temperatures with a measurement precision of 0.6 kelvin over the measurement range of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Surface Temperature	VIIRS	ESPC	Inspection
DPS-135	The Sea Surface Temperature product shall provide sea surface temperature products with a measurement accuracy of 0.2 kelvin over the measurement range of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Surface Temperature	VIIRS	ESPC	Inspection
DPS-302	The Snow Cover product shall provide fractional snow cover and binary snow cover mask, globally, in daytime, under clear conditions, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snow Cover	VIIRS	ESPC	Inspection
DPS-303	The Snow Cover product shall provide fractional	S-NPP JPSS-1	2.1.0	5.0.0	Snow Cover	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	snow cover with a measurement uncertainty of 20%.	JPSS-2 JPSS-3 JPSS-4						
DPS-304	The Snow Cover product shall provide the binary snow cover mask with a 90% probability of correct snow/no-snow classification.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snow Cover	VIIRS	ESPC	Inspection
DPS-375	The Surface Albedo product shall provide the broad-band earth surface albedo, from 0.4 to 4.0 microns, globally over land and ice, in daytime, in clear conditions, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Surface Albedo	VIIRS	ESPC	Inspection
DPS-376	The Surface Albedo product shall provide earth surface albedo with a measurement precision of 0.05.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Surface Albedo	VIIRS	ESPC	Inspection
DPS-377	The Surface Albedo product shall provide earth surface albedo with a measurement accuracy of 0.08.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Surface Albedo	VIIRS	ESPC	Inspection
DPS-1751	The Gridded Surface Albedo product shall provide the broad-band earth surface albedo from 0.4 to 4.0 microns, 1 km	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Gridded Surface Albedo	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	globally over land, ocean and ice, in daytime, in clear conditions, at the refresh rates of the instrument.							
DPS-1752	The Gridded Surface Albedo product shall provide earth surface albedo with a measurement precision of 0.05.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Gridded Surface Albedo	VIIRS	ESPC	Inspection
DPS-1753	The Surface Albedo product shall provide earth surface albedo with a measurement accuracy of 0.08.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Gridded Surface Albedo	VIIRS	ESPC	Inspection
DPS-1754	The Gridded Surface Albedo product shall be generated within 3 hours of receiving all the required data.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Gridded Surface Albedo	VIIRS	ESPC	Inspection
DPS-826	The Surface Reflectance product shall provide the narrowband, bi-directional surface reflectance, globally, in clear conditions, in daytime, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Surface Reflectance	VIIRS	ESPC	Inspection
DPS-828	The Surface Reflectance product shall provide surface reflectance with a measurement accuracy of 0.005 + (0.05 times the	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Surface Reflectance	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	retrieved surface reflectance value).							
DPS-829	The Surface Reflectance product shall provide surface reflectance with a measurement precision of 0.005 + (0.05 times the retrieved surface reflectance value).	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Surface Reflectance	VIIRS	ESPC	Inspection
DPS-445	The Surface Type product shall provide the IGBP land cover classification, globally, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Surface Type	VIIRS	ESPC	Inspection
DPS-448	The Surface Type product shall provide the IGBP land cover classification with a probability of correct typing of 70%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Surface Type	VIIRS	ESPC	Inspection
DPS-416	The Vegetation Health Index Suite shall provide vegetation condition index (VCI), temperature condition index (TCI), and vegetation health index (VHI); globally over land; geolocated; in daytime; in clear conditions.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Health Index Suite	VIIRS	ESPC	Inspection
DPS-418	The Vegetation Health Index Suite shall provide vegetation indices with a	S-NPP JPSS-1 JPSS-2 JPSS-3	2.1.0	5.0.0	Vegetation Health Index Suite	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	horizontal cell size of 4 kilometers.	JPSS-4						
DPS-419	The Vegetation Health Index Suite shall provide vegetation indices with a refresh every 7 days.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Health Index Suite	VIIRS	ESPC	Inspection
DPS-420	The Vegetation Health Index Suite shall provide vegetation indices with a measurement precision of 4%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Health Index Suite	VIIRS	ESPC	Inspection
DPS-421	The Vegetation Health Index Suite product shall provide geolocation of horizontal cell centers with a 3-sigma mapping uncertainty of 4 kilometers.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Health Index Suite	VIIRS	ESPC	Inspection
DPS-422	The Vegetation Health Index Suite shall provide vegetation indices with a measurement accuracy of 1%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Health Index Suite	VIIRS	ESPC	Inspection
DPS-425	The Vegetation Indices shall provide top-of-atmosphere (TOA) normalized difference vegetation index (NDVI), top-of-canopy (TOC) enhanced vegetation index (EVI), and top-of-canopy normalized difference	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Indices	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	vegetation index; 4 km globally and 1 km regionally over land; in daytime; in clear conditions; at the daily refresh rate.							
DPS-426	The Vegetation Indices shall provide TOA NDVI with a measurement accuracy of 0.05.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Indices	VIIRS	ESPC	Inspection
DPS-427	The Vegetation Indices shall provide TOA NDVI with a measurement precision of 0.04.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Indices	VIIRS	ESPC	Inspection
DPS-428	The Vegetation Indices shall provide TOC EVI with a measurement accuracy of 0.05.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Indices	VIIRS	ESPC	Inspection
DPS-429	The Vegetation Indices shall provide TOC EVI with a measurement precision of 0.04.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Indices	VIIRS	ESPC	Inspection
DPS-430	The Vegetation Indices shall provide TOC NDVI with a measurement accuracy of 0.05.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Indices	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-431	The Vegetation Indices shall provide TOC NDVI with a measurement precision of 0.04.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Vegetation Indices	VIIRS	ESPC	Inspection
DPS-586	The Volcanic Ash Detection and Height product shall provide detection, concentration, and top height of volcanic ash, for the total column, globally, under cloud-free conditions, in daytime, for aerosol optical depth greater than 0.15, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Volcanic Ash Detection and Height	VIIRS	ESPC	Inspection
DPS-587	The Volcanic Ash Detection and Height product shall provide volcanic ash concentration with a measurement accuracy of 2 tons per square kilometer.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Volcanic Ash Detection and Height	VIIRS	ESPC	Inspection
DPS-589	The Volcanic Ash Detection and Height product shall provide volcanic ash concentration with a measurement precision of 2.5 tons per square kilometer.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Volcanic Ash Detection and Height	VIIRS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-588	The Volcanic Ash Detection and Height product shall provide volcanic ash top height with a measurement accuracy of 3 kilometers.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Volcanic Ash Detection and Height	VIIRS	ESPC	Inspection
DPS-524	The Cloud Liquid Water product shall provide cloud liquid water, globally over ice-free ocean, day and night, for the total column, under all weather conditions, at the refresh rates of the instrument.	GCOM-W1	2.1.0	5.0.0	Cloud Liquid Water	AMSR-2	ESPC	Inspection
DPS-525	The Cloud Liquid Water product shall provide cloud liquid water with a measurement range of 0.005 to 1.0 millimeter.	GCOM-W1	2.1.0	5.0.0	Cloud Liquid Water	AMSR-2	ESPC	Inspection
DPS-526	The Cloud Liquid Water product shall provide cloud liquid water with a measurement uncertainty of 0.05 millimeter.	GCOM-W1	2.1.0	5.0.0	Cloud Liquid Water	AMSR-2	ESPC	Inspection
DPS-527	The Cloud Liquid Water product shall provide cloud liquid water with a measurement accuracy of 0.01 millimeter.	GCOM-W1	2.1.0	5.0.0	Cloud Liquid Water	AMSR-2	ESPC	Inspection
DPS-530	The Cloud Liquid Water product shall provide cloud liquid water, globally over	S-NPP JPSS-1 JPSS-2	2.1.0	5.0.0	Cloud Liquid Water	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	ice-free ocean, day and night, for the total column, under all weather conditions, at the refresh rates of the instrument.	JPSS-3 JPSS-4						
DPS-532	The Cloud Liquid Water product shall provide cloud liquid water with a measurement precision of 0.08 millimeter.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Liquid Water	ATMS	ESPC	Inspection
DPS-533	The Cloud Liquid Water product shall provide cloud liquid water with a measurement accuracy of 0.03 millimeter.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Cloud Liquid Water	ATMS	ESPC	Inspection
DPS-79	The Land Surface Emissivity product shall provide microwave land surface emissivity, globally, in clear and cloudy conditions, at the refresh rate of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Land Surface Emissivity	ATMS	ESPC	Inspection
DPS-80	The Land Surface Emissivity product shall provide land surface emissivity with a measurement precision of 3% at 23.8 GHz and 50.3 GHz, and 4% at 165.5 GHz.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Land Surface Emissivity	ATMS	ESPC	Inspection
DPS-81	The Land Surface Emissivity product shall provide land surface	S-NPP JPSS-1 JPSS-2	2.1.0	5.0.0	Land Surface Emissivity	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	emissivity with a measurement accuracy of 2% at 23.8 GHz, and 1.5% at 50.3 GHz and 165.5 GHz.	JPSS-3 JPSS-4						
DPS-407	The Land Surface Temperature product shall provide land surface temperatures, globally over land, day and night, under all weather conditions, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Land Surface Temperature	ATMS	ESPC	Inspection
DPS-408	The Land Surface Temperature product shall provide land surface temperatures with a measurement precision of 7.0 kelvin.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Land Surface Temperature	ATMS	ESPC	Inspection
DPS-409	The Land Surface Temperature product shall provide land surface temperatures with a measurement accuracy of 4.0 kelvin.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Land Surface Temperature	ATMS	ESPC	Inspection
DPS-535	The Moisture Profile product shall provide atmospheric moisture profiles, globally, day and night, under all weather conditions, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Moisture Profile	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-543	The Moisture Profile product shall provide atmospheric moisture profiles from the surface to 0.01 millibar.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Moisture Profile	ATMS	ESPC	Inspection
DPS-537	The Moisture Profile product shall provide atmospheric moisture profiles with a measurement precision over ocean in clear conditions of: 60% at 400 millibars (mb), 60% at 500 mb, 50% at 700 mb, and 30% at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Moisture Profile	ATMS	ESPC	Inspection
DPS-538	The Moisture Profile product shall provide atmospheric moisture profiles with a measurement precision over ocean in cloudy conditions of: 60% at 400 mb, 65% at 500 mb, 60% at 700 mb, and 30% at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Moisture Profile	ATMS	ESPC	Inspection
DPS-539	The Moisture Profile product shall provide atmospheric moisture profiles with a measurement precision over land of: 60% at 400 mb, 60% at 500 mb, 50% at 700 mb, and 50% at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Moisture Profile	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-540	The Moisture Profile product shall provide atmospheric moisture profiles with a measurement accuracy over ocean in clear conditions of: 30% at 400 mb, 20% at 500 mb, 20% at 700 mb, and 20% at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Moisture Profile	ATMS	ESPC	Inspection
DPS-541	The Moisture Profile product shall provide atmospheric moisture profiles with a measurement accuracy over ocean in cloudy conditions of: 30% at 400 mb, 20% at 500 mb, 10% at 700 mb, and 20% at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Moisture Profile	ATMS	ESPC	Inspection
DPS-542	The Moisture Profile product shall provide atmospheric moisture profiles with a measurement accuracy over land of: 30% at 400 mb, 10% at 500 mb, 10% at 700 mb, and 20% at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Moisture Profile	ATMS	ESPC	Inspection
DPS-214	The Precipitation Rate product shall provide the rate of stratiform or convective precipitation, globally, in all weather	GCOM-W1	2.1.0	5.0.0	Precipitation Rate	AMSR-2	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	conditions, at the refresh rates of the instrument.							
DPS-217	The Precipitation Rate product shall provide precipitation rate with a measurement precision of 0.05 millimeters per hour (mm/hr).	GCOM-W1	2.1.0	5.0.0	Precipitation Rate	AMSR-2	ESPC	Inspection
DPS-218	The Precipitation Rate product shall provide precipitation rate with a measurement uncertainty of 2 mm/hr over ocean and 5 mm/hr over land.	GCOM-W1	2.1.0	5.0.0	Precipitation Rate	AMSR-2	ESPC	Inspection
DPS-223	The Rainfall Rate product shall provide rainfall rate, globally, in all weather conditions, at the refresh rate of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Rainfall Rate	ATMS	ESPC	Inspection
DPS-225	The Rainfall Rate product shall provide rainfall rate with a measurement precision of 1.0 millimeter per hour (mm/hr) over ocean and 1.5 mm/hr over land.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Rainfall Rate	ATMS	ESPC	Inspection
DPS-226	The Rainfall Rate product shall provide rainfall rate with a measurement accuracy of 0.1 millimeter per hour (mm/hr) over	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Rainfall Rate	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	ocean and 0.05 mm/hr over land.							
DPS-227	The Rainfall Rate product shall provide rainfall rate with a probability of rainfall detection of 50% over land and ocean.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Rainfall Rate	ATMS	ESPC	Inspection
DPS-228	The Rainfall Rate product shall provide rainfall rate with a false alarm rate of 5% over ocean and 6% over land.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Rainfall Rate	ATMS	ESPC	Inspection
DPS-229	The Rainfall Rate product shall provide rainfall rate with a Heidke Skill Score of 0.3 over land and ocean.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Rainfall Rate	ATMS	ESPC	Inspection
DPS-264	The Sea Ice Characterization product shall provide sea ice age class, globally over ocean, in daytime and night, under all weather conditions, at the refresh rates of the instrument.	GCOM-W1	2.1.0	5.0.0	Sea Ice Characterization	AMSR-2	ESPC	Inspection
DPS-903	The Sea Ice Characterization product shall provide sea ice age class as either ice-free, first-year, or multi-year.		2.1.0	5.0.0	Sea Ice Characterization	AMSR-2	ESPC	Inspection
DPS-265	The Sea Ice Characterization product	GCOM-W1	2.1.0	5.0.0	Sea Ice Characterization	AMSR-2	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	shall provide sea ice age class with a probability of correct typing of 70%.							
DPS-273	The Sea Ice Characterization product shall provide sea ice concentration, globally over ocean, in daytime and night, under all weather conditions, at the refresh rates of the instrument.	GCOM-W1	2.1.0	5.0.0	Sea Ice Characterization	AMSR-2	ESPC	Inspection
DPS-274	The Sea Ice Characterization product shall provide sea ice concentration with a measurement uncertainty of 10%.	GCOM-W1	2.1.0	5.0.0	Sea Ice Characterization	AMSR-2	ESPC	Inspection
DPS-255	The Sea Ice Concentration product shall provide sea ice concentration, globally over ocean, day and night, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Ice Concentration	ATMS	ESPC	Inspection
DPS-256	The Sea Ice Concentration product shall provide sea ice concentration with a measurement precision of 25%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Sea Ice Concentration	ATMS	ESPC	Inspection
DPS-257	The Sea Ice Concentration product shall provide sea ice concentration with a	S-NPP JPSS-1 JPSS-2 JPSS-3	2.1.0	5.0.0	Sea Ice Concentration	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	measurement accuracy of 10%.	JPSS-4						
DPS-143	The Sea Surface Temperature product shall provide sea surface temperature globally, in all weather conditions, at the refresh rates of the instrument.	GCOM-W1	2.1.0	5.0.0	Sea Surface Temperature	AMSR-2	ESPC	Inspection
DPS-904	The Sea Surface Temperature BUFR product shall provide geolocated sea surface temperature, converted from the Sea Surface Temperature product, in the BUFR format.	GCOM-W1	2.1.0	5.0.0	Sea Surface Temperature	AMSR-2	ESPC	Inspection
DPS-144	The Sea Surface Temperature product shall provide sea surface temperatures with a measurement accuracy of 0.5 kelvin over the measurement range of the instrument.	GCOM-W1	2.1.0	5.0.0	Sea Surface Temperature	AMSR-2	ESPC	Inspection
DPS-145	The Sea Surface Temperature product shall provide sea surface temperatures with a measurement uncertainty of 1.0 kelvin over the	GCOM-W1	2.1.0	5.0.0	Sea Surface Temperature	AMSR-2	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	measurement range of the instrument.							
DPS-286	The Sea Surface Wind Speed product shall provide sea surface wind speed globally over ice-free ocean, in daytime and night, under all weather conditions, at the refresh rates of the instrument.	GCOM-W1	2.1.0	5.0.0	Sea Surface Wind Speed	AMSR-2	ESPC	Inspection
DPS-287	The Sea Surface Wind Speed product shall provide sea surface wind speed with a measurement range of 2 to 30 meters per second (m/s).	GCOM-W1	2.1.0	5.0.0	Sea Surface Wind Speed	AMSR-2	ESPC	Inspection
DPS-288	The Sea Surface Wind Speed product shall provide sea surface wind speed with a measurement uncertainty of the greater of 2 m/s or 10%.	GCOM-W1	2.1.0	5.0.0	Sea Surface Wind Speed	AMSR-2	ESPC	Inspection
DPS-289	The Sea Surface Wind Speed product shall provide sea surface wind speed with a measurement accuracy of 0.5 m/s.	GCOM-W1	2.1.0	5.0.0	Sea Surface Wind Speed	AMSR-2	ESPC	Inspection
DPS-295	The Snow Cover product shall provide snow cover globally, in daytime and night, under all weather	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snow Cover	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	conditions, at the refresh rates of the instrument.							
DPS-294	The Snow Cover product shall provide snow cover with a probability of detection of 0.80.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snow Cover	ATMS	ESPC	Inspection
DPS-296	The Snow Cover product shall provide snow cover with a false alarm ratio of 0.10.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snow Cover	ATMS	ESPC	Inspection
DPS-297	The Snow Cover product shall provide snow cover with a Heidke Skill Score of 0.55.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snow Cover	ATMS	ESPC	Inspection
DPS-308	The Snow Cover/Depth product shall provide snow cover and snow depth, globally, in daytime and night, under all weather conditions, at the refresh rates of the instrument.	GCOM-W1	2.1.0	5.0.0	Snow Cover/Depth	AMSR-2	ESPC	Inspection
DPS-309	The Snow Cover/Depth product shall provide snow cover with a probability of detection of 80%.	GCOM-W1	2.1.0	5.0.0	Snow Cover/Depth	AMSR-2	ESPC	Inspection
DPS-312	The Snow Cover/Depth product shall provide snow depth with a measurement range from 5 to 60 cm.	GCOM-W1	2.1.0	5.0.0	Snow Cover/Depth	AMSR-2	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-310	The Snow Cover/Depth product shall provide snow depth in clear conditions with a measurement uncertainty of 30 centimeters (cm) if forest cover exceeds 30%, and 20 cm otherwise.	GCOM-W1	2.1.0	5.0.0	Snow Cover/Depth	AMSR-2	ESPC	Inspection
DPS-579	The Snow Cover/Depth product shall provide snow depth in cloudy conditions with a measurement uncertainty of 20 cm.	GCOM-W1	2.1.0	5.0.0	Snow Cover/Depth	AMSR-2	ESPC	Inspection
DPS-315	The Snow Water-Equivalent product shall provide the snow water-equivalent depth, globally, in daytime and night, under all weather conditions, at the refresh rates of the instrument.	GCOM-W1	2.1.0	5.0.0	Snow Water-Equivalent	AMSR-2	ESPC	Inspection
DPS-316	The Snow Water-Equivalent product shall provide the snow water-equivalent depth over a measurement range of 10 to 200 millimeters (mm).	GCOM-W1	2.1.0	5.0.0	Snow Water-Equivalent	AMSR-2	ESPC	Inspection
DPS-317	The Snow Water-Equivalent product shall provide the snow water-equivalent depth with a measurement uncertainty of	GCOM-W1	2.1.0	5.0.0	Snow Water-Equivalent	AMSR-2	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	the greater of 20 mm or 50%, for snow water equivalents less than 100 mm; and 70% for snow water-equivalents greater than 100 mm.							
DPS-319	The Snow Water-Equivalent product shall provide snow water-equivalent depth, globally, in daytime and night, under all weather conditions, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snow Water-Equivalent	ATMS	ESPC	Inspection
DPS-320	The Snow Water-Equivalent product shall provide the snow water-equivalent depth with a measurement precision of 6 centimeters (cm).	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snow Water-Equivalent	ATMS	ESPC	Inspection
DPS-321	The Snow Water-Equivalent product shall provide the snow water-equivalent depth with a measurement accuracy of 3 cm.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snow Water-Equivalent	ATMS	ESPC	Inspection
DPS-325	The Soil Moisture product shall provide soil moisture in the skin layer, globally, in daytime and night, under all weather conditions, at	GCOM-W1	2.1.0	5.0.0	Soil Moisture	AMSR-2	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	the refresh rates of the instrument.							
DPS-326	The Soil Moisture product shall provide soil moisture with a measurement uncertainty of 6% volumetric root mean square error.	GCOM-W1	2.1.0	5.0.0	Soil Moisture	AMSR-2	ESPC	Inspection
DPS-545	The Temperature Profile product shall provide atmospheric temperature profiles, globally, day and night, under all weather conditions, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection
DPS-547	The Temperature Profile product shall provide atmospheric temperature profiles from the surface to 0.01 millibar.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection
DPS-548	The Temperature Profile product shall provide atmospheric temperature profiles with a measurement precision over ocean in clear conditions of: 2.0 kelvin (K) at 100 millibar (mb), 2.0 K at 300 mb, 2.0 K at 500 mb, and 3.0 K at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection
DPS-549	The Temperature Profile product shall provide	S-NPP JPSS-1	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	atmospheric temperature profiles with a measurement precision over ocean in cloudy conditions of: 2.0 K at 100 mb, 2.5 K at 300 mb, 2.0 K at 500 mb, and 3.0 K at 900 mb.	JPSS-2 JPSS-3 JPSS-4						
DPS-550	The Temperature Profile product shall provide atmospheric temperature profiles with a measurement precision over ocean in rainy conditions of: 2.5 K at 100 mb, 2.5 K at 300 mb, 2.5 K at 500 mb, and 3.5 K at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection
DPS-552	The Temperature Profile product shall provide atmospheric temperature profiles with a measurement precision over land in non-rainy conditions of: 2.0 K at 100 mb, 2.0 K at 300 mb, 2.5 K at 500 mb, and 5.5 K at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection
DPS-553	The Temperature Profile product shall provide atmospheric temperature profiles with a measurement precision over land in rainy conditions of:	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	2.5 K at 100 mb, 2.5 K at 300 mb, 3.0 K at 500 mb, and 5.5 K at 900 mb.							
DPS-554	The Temperature Profile product shall provide atmospheric temperature profiles with a measurement accuracy over ocean in clear conditions of: 0.2 kelvin (K) at 100 millibar (mb), 0.5 K at 300 mb, 0.2 K at 500 mb, and 1.5 K at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection
DPS-555	The Temperature Profile product shall provide atmospheric temperature profiles with a measurement accuracy over ocean in cloudy conditions of: 0.8 K at 100 mb, 0.8 K at 300 mb, 0.6 K at 500 mb, and 2.0 K at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection
DPS-556	The Temperature Profile product shall provide atmospheric temperature profiles with a measurement accuracy over ocean in rainy conditions of: 1.0 K at 100 mb, 1.5 K at 300 mb, 2.0 K at 500 mb, and 2.0 K at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-557	The Temperature Profile product shall provide atmospheric temperature profiles with a measurement accuracy over land in non-rainy conditions of: 0.5 K at 100 mb, 0.8 K at 300 mb, 0.2 K at 500 mb, and 2.5 K at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection
DPS-558	The Temperature Profile product shall provide atmospheric temperature profiles with a measurement accuracy over land in rainy conditions of: 1.5 K at 100 mb, 1.0 K at 300 mb, 0.5 K at 500 mb, and 2.5 K at 900 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Temperature Profile	ATMS	ESPC	Inspection
DPS-338	The Total Precipitable Water product shall provide total precipitable water, globally, over ice-free ocean, in daytime and night, under all weather conditions, at the refresh rates of the instrument.	GCOM-W1	2.1.0	5.0.0	Total Precipitable Water	AMSR-2	ESPC	Inspection
DPS-339	The Total Precipitable Water product shall provide ocean total precipitable water over a measurement	GCOM-W1	2.1.0	5.0.0	Total Precipitable Water	AMSR-2	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	range of 1 to 75 millimeters (mm).							
DPS-340	The Total Precipitable Water product shall provide ocean total precipitable water with a measurement uncertainty of the greater of 2 mm or 10%.	GCOM-W1	2.1.0	5.0.0	Total Precipitable Water	AMSR-2	ESPC	Inspection
DPS-341	The Total Precipitable Water product shall provide ocean total precipitable water with a measurement accuracy of 1 mm.	GCOM-W1	2.1.0	5.0.0	Total Precipitable Water	AMSR-2	ESPC	Inspection
DPS-348	The Total Precipitable Water product shall provide total precipitable water, globally, in daytime and night, under all weather conditions, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Total Precipitable Water	ATMS	ESPC	Inspection
DPS-349	The Total Precipitable Water product shall provide total precipitable water with a measurement precision of 2.5 millimeters (mm) over ocean; 2.0 mm over ocean ice; 5.5 mm over land; 2.0 mm over snow-covered land.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Total Precipitable Water	ATMS	ESPC	Inspection
DPS-350	The Total Precipitable Water product shall provide total precipitable water with	S-NPP JPSS-1 JPSS-2	2.1.0	5.0.0	Total Precipitable Water	ATMS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	a measurement accuracy of 1.5 mm over clear ocean; 0.5 mm over cloudy ocean; 2.0 mm over ocean ice; 2.5 mm over land; 0.5 mm over snow-covered land.	JPSS-3 JPSS-4						
DPS-351	The Total Precipitable Water product shall provide total precipitable water with a measurement uncertainty of 2.5 mm over ocean; 2.5 mm over ocean ice; 5.5 mm over land; 2.0 mm over snow-covered land.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Total Precipitable Water	ATMS	ESPC	Inspection
DPS-1755	The Snowfall Rate (SFR) product shall provide water equivalent snowfall amount in unit time globally.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snowfall Rate	ATMS	ESPC	Inspection
DPS-1756	The algorithm shall produce a SFR product that has a measurement precision of: 1.0 mm/hr.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snowfall Rate	ATMS	ESPC	Inspection
DPS-1757	The algorithm shall produce a SFR product that has a measurement accuracy of: ±0.3 mm/hr.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Snowfall Rate	ATMS	ESPC	Inspection
DPS-635	The Ozone Nadir Profile product shall provide atmospheric vertical ozone	S-NPP JPSS-1 JPSS-2	2.1.0	5.0.0	Ozone Nadir Profile	OMPS-NP	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	profiles, in daytime, in clear conditions, at the refresh rates of the instrument.	JPSS-3 JPSS-4						
DPS-811	The Ozone Nadir Profile BUFR product shall provide geolocated atmospheric vertical ozone profiles, converted from the Ozone Nadir Profile product, in BUFR format.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ozone Nadir Profile BUFR	OMPS-NP	ESPC	Inspection
DPS-637	The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles with a measurement range of 0.1 to 15 parts per million by volume (ppmv) for 0-60 km.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ozone Nadir Profile	OMPS-NP	ESPC	Inspection
DPS-638	The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles with a vertical cell size of 5 kilometers.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ozone Nadir Profile	OMPS-NP	ESPC	Inspection
DPS-984	The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles with a vertical retrieval resolution of 7-10 kilometer at altitudes between 30 and 1 millibar; and 10-20 km at altitudes	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ozone Nadir Profile	OMPS-NP	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	below 30 mb and above 1 mb.							
DPS-639	The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles with a measurement precision of the greater of 20% or 0.1 ppmv at altitudes below 30 millibar (mb); 10% from 30 to 1 mb; and the greater of 10% or 0.1 ppmv at altitudes above 1 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ozone Nadir Profile	OMPS-NP	ESPC	Inspection
DPS-640	The Ozone Nadir Profile product shall provide atmospheric vertical ozone profiles with a measurement accuracy of the greater of 10% or 0.1 ppmv below 30 mb and above 1 mb; and 10% from 30 to 1 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ozone Nadir Profile	OMPS-NP	ESPC	Inspection
DPS-643	The Ozone Total Column product shall provide the total column of atmospheric ozone, in daytime, for all scenes, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ozone Total Column	OMPS-NM	ESPC	Inspection
DPS-812	The Ozone Total Column BUFR product shall provide the geolocated total column of atmospheric	S-NPP JPSS-1 JPSS-2 JPSS-3	2.1.0	5.0.0	Ozone Total Column BUFR	OMPS-NM	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	ozone, converted from the Ozone Total Column product, in BUFR format.	JPSS-4						
DPS-645	The Ozone Total Column product shall provide the total column of atmospheric ozone with a measurement range of 50 to 650 Dobson units.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ozone Total Column	OMPS-NM	ESPC	Inspection
DPS-647	The Ozone Total Column product shall provide the total column of atmospheric ozone with a measurement precision of 6.0 Dobson units for columns below 250 Dobson units; 7.7 Dobson units for columns between 250 and 450 Dobson units; and 2.83 Dobson units for columns above 450 Dobson units.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ozone Total Column	OMPS-NM	ESPC	Inspection
DPS-648	The Ozone Total Column product shall provide the total column of atmospheric ozone with a measurement accuracy of 9.5 Dobson units for columns below 250 Dobson units; 13 Dobson units for columns between 250 and 450 Dobson units; and 16	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Ozone Total Column	OMPS-NM	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	Dobson units for columns above 450 Dobson units.							
DPS-166	The Atmospheric Vertical Moisture Profile product shall provide atmospheric vertical moisture profiles, globally day and night, for all scenes, for each field of regard (FOR) comprised by multiple fields of view (FOVs), at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Atmospheric Vertical Moisture Profile	ATMS CrIS	ESPC	Inspection
DPS-167	The Atmospheric Vertical Moisture Profile product shall provide atmospheric vertical moisture profiles with a horizontal cell size of 50 kilometers at nadir.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Atmospheric Vertical Moisture Profile	ATMS CrIS	ESPC	Inspection
DPS-168	The Atmospheric Vertical Moisture Profile product shall provide atmospheric vertical moisture profiles with vertical reporting intervals of 20 millibar (mb) from the surface to 850 mb; 50 mb from 850 to 100 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Atmospheric Vertical Moisture Profile	ATMS CrIS	ESPC	Inspection
DPS-169	The Atmospheric Vertical Moisture Profile product shall provide atmospheric vertical moisture profiles with a cloud-free and	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Atmospheric Vertical Moisture Profile	ATMS CrIS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	partly-cloudy measurement uncertainty of the greater of 20% or 0.2 gram per kilogram (g/kg) from the surface to 600 mb; greater of 35% or 0.1 g/kg from 600 mb to 100 mb.							
DPS-170	The Atmospheric Vertical Moisture Profile product shall provide atmospheric vertical moisture profiles with a cloudy-condition measurement uncertainty of the greater of 20% or 0.2 g/kg from the surface to 600 mb; greater of 40% or 0.1 g/kg from 600 mb to 100 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Atmospheric Vertical Moisture Profile	ATMS CrIS	ESPC	Inspection
DPS-160	The Atmospheric Vertical Temperature Profile product shall provide atmospheric vertical temperature profiles, globally day and night, for all scenes, for each field of regard (FOR) comprised by multiple fields of view (FOVs), at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Atmospheric Vertical Temperature Profile	ATMS CrIS	ESPC	Inspection
DPS-161	The Atmospheric Vertical Temperature Profile product shall provide	S-NPP JPSS-1 JPSS-2	2.1.0	5.0.0	Atmospheric Vertical	ATMS CrIS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	atmospheric vertical temperature profiles with a horizontal cell size of 50 kilometers at nadir.	JPSS-3 JPSS-4			Temperature Profile			
DPS-162	The Atmospheric Vertical Temperature Profile product shall provide atmospheric vertical temperature profiles with vertical reporting intervals of 20 millibar (mb) from the surface to 850 mb; 50 mb from 850 to 300 mb; 25 mb from 300 to 100 mb; 20 mb from 100 mb to 10 mb; 2 mb from 10 mb to 1.0 mb; 0.2 mb from 1.0 mb to 0.5 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Atmospheric Vertical Temperature Profile	ATMS CrIS	ESPC	Inspection
DPS-163	The Atmospheric Vertical Temperature Profile product shall provide atmospheric vertical temperature profiles with a cloud-free or partly cloudy measurement uncertainty of 1.6 kelvin (K) per layer from the surface to 300 mb; 1.5 K per layer from 300 mb to 1 mb; 3.5 K per layer from 1 mb to 0.5 mb.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Atmospheric Vertical Temperature Profile	ATMS CrIS	ESPC	Inspection
DPS-164	The Atmospheric Vertical Temperature Profile	S-NPP JPSS-1	2.1.0	5.0.0	Atmospheric Vertical	ATMS CrIS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	product shall provide atmospheric vertical temperature profiles with a cloudy-condition measurement uncertainty of 2.5 kelvin (K) per layer from the surface to 700 mb; 1.5 K per layer from 700 mb to 1 mb; 3.5 K per layer from 1 mb to 0.5 mb.	JPSS-2 JPSS-3 JPSS-4			Temperature Profile			
DPS-389	The Carbon Dioxide product shall provide carbon dioxide volume density, geolocated, globally, for the total vertical column, in all weather conditions, day and night, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Carbon Dioxide	CrIS	ESPC	Inspection
DPS-390	The Carbon Dioxide product shall provide carbon dioxide volume density with a measurement range of 300 to 500 parts per million by volume (ppmv).	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Carbon Dioxide	CrIS	ESPC	Inspection
DPS-391	The Carbon Dioxide product shall provide carbon dioxide volume density with a horizontal resolution of 100 km.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Carbon Dioxide	CrIS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-393	The Carbon Dioxide product shall provide carbon dioxide volume density with a measurement precision of 0.5% or 2 ppmv.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Carbon Dioxide	CrIS	ESPC	Inspection
DPS-394	The Carbon Dioxide product shall provide carbon dioxide volume density with a measurement accuracy of 1% or 4 ppmv.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Carbon Dioxide	CrIS	ESPC	Inspection
DPS-398	The Carbon Monoxide product shall provide carbon Monoxide volume density, geolocated, globally, for the total vertical column, in all weather conditions, day and night, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Carbon Monoxide	CrIS	ESPC	Inspection
DPS-399	The Carbon Monoxide product shall provide carbon Monoxide volume density with a measurement range of 0 to 200 parts per billion by volume (ppbv).	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Carbon Monoxide	CrIS	ESPC	Inspection
DPS-400	The Carbon Monoxide product shall provide carbon Monoxide volume density with a horizontal resolution of 100 km.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Carbon Monoxide	CrIS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
DPS-402	The Carbon Monoxide product shall provide carbon monoxide column value with a measurement precision of 15%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Carbon Monoxide	CrIS	ESPC	Inspection
DPS-403	The Carbon Monoxide product shall provide carbon Monoxide column value with a measurement accuracy of 5%.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Carbon Monoxide	CrIS	ESPC	Inspection
DPS-382	The Methane product shall provide methane volume density, geolocated, globally, for the total vertical column, in all weather conditions, day and night, at the refresh rates of the instrument.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Methane	CrIS	ESPC	Inspection
DPS-381	The Methane product shall provide methane volume density with a measurement range of 1100 to 2250 parts per billion by volume (ppbv).	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Methane	CrIS	ESPC	Inspection
DPS-383	The Methane product shall provide methane volume density with a horizontal resolution of 100 km.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Methane	CrIS	ESPC	Inspection
DPS-385	The Methane product shall provide methane volume	S-NPP JPSS-1 JPSS-2	2.1.0	5.0.0	Methane	CrIS	ESPC	Inspection

Req ID	Requirement Text	Mission Effectivity	Block Start	Block End	Product Name	Instrument	Allocated To	Verification Method
	density with a measurement precision of 1% or 20 ppbv.	JPSS-3 JPSS-4						
DPS-386	The Methane product shall provide methane volume density with a measurement accuracy of 4% or 80 ppbv.	S-NPP JPSS-1 JPSS-2 JPSS-3 JPSS-4	2.1.0	5.0.0	Methane	CrIS	ESPC	Inspection