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Joint Polar Satellite System (JPSS)
JPSS Level 1 Requirements -
J2 Follow-On
Final

Goddard Space Flight Center
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NOAA/NASA

JPSS Level 1 Requirements - J2 Follow-On Final Review/Signature/Approval Page

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Preface

This document is under JPSS Program 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 & CCR/ERB Approval Date)
1.0	09/19/12	Original Document
1.1	10/12/12	NOSC Review Release
1.4	10/19/12	Baseline Version
1.5	12/21/12	Multiple changes to synchronize with L1RDS-F v2.4
1.6	01/24/13	Pg. 23. Spelled out IST in Note 4 of App A, Table 1.
1.7	06/27/13	Miscellaneous administrative corrections plus changes necessitated by the NJO Direction in response to the 2014 President's Budget. See JPSS L1RD-F v1.6 to v1.7 CRM Rev F for details.
1.8	06/25/14	Incorporated NJO PCB & DUS-O approved CCRs: NJO-2013-018, 052A, 058; NJO-2014-004 C.1, 009A, 010A, 022C.
2.0	03/03/16	Incorporated NJO PCB & DUS-O approved CCRs: NJO-2013-053, Rev D.1 and NJO-2014-016D. Also incorporated CCRs NJO-2015-014C, 015C, 018C. Additional changes were made to reflect the Polar Follow-On (PFO) Program and the updated International Joint Polar System Agreement. Multiple administrative changes were made to "Applicable Document" section and throughout the document.
2.1	02/07/19	Incorporated CCRs: NJO-2016-015C, -018, -021A, -026, -028, -030A, NJO-2017-005, -017, and 470-CCR-19-0283.

Deviations/Waivers Record

Section # / Requirement	Deviation / Waiver #	CCR #	Date Approved	Title	Mission
None					

Table of TBDs/TBRs

Item No.	Location	Summary	Individual/ Organization	Due Date
None				

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1 INTRODUCTION

1.1 Purpose

The purpose of the Joint Polar Satellite System (JPSS) Level 1 Requirements Document (L1RD) – Final is to identify the top-level, user-driven requirements for NOAA's polar environmental satellite observing capability (data products and functional and performance requirements) needed to achieve NOAA's mission. Requirements definition is an initial step in the NOAA program management process and follows NOAA Administrative Order (NAO) 216-108, Requirements Management. The Level 1 observational and data product requirements (Appendix A) represent a subset of the NOAA Consolidated Observing Users Requirements List (COURL) that can be satisfied by a realistically executable observing program. The JPSS L1RD includes functional and performance requirements and defines mission success.

This document replaces the JPSS L1RD – Final (Version 1.x) document for JPSS-2 and beyond, in order to incorporate the Polar Follow-On Program and modifications to the ground segment. NOAA's L1RDs are produced as "preliminary" and "final" versions, reflecting an evolution in the understanding of system needs against cost, schedule, performance and organizational dependencies. The JPSS L1RD - Preliminary was approved September 22, 2011. It captured the January 2010 National Polar-orbiting Operational Environmental Satellite System (NPOESS) baseline, the President's restructuring of NPOESS (e.g., specifying a shared NOAA and Department of Defense (DoD) ground system for polar satellites), and adjustments approved by the JPSS Transition Team (e.g., the addition of Global Change Observation Mission – Water (GCOM-W) requirements) as well as agreed to support for NOAA polar requirements outside JPSS; e.g., European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) support for Meteorological Operational (MetOp) at McMurdo, Antarctica.

This JPSS L1RD – Final provides a refined system concept and architecture to provide context for the requirements and reflects program changes in data product, functional, and performance requirements. This includes JPSS-2 from the Program of Record (POR), as well as the addition of the JPSS-3 and JPSS-4 missions as part of the Polar Follow-on. In general, requirements have been specified to provide latitude to allow cost effective acquisition decisions to be made. Because the JPSS is being developed using considerable material investments from NPOESS, many procurement decisions have already been made and are reflected in the requirements; e.g., the instrument suite. This L1RD includes the provisions for cooperation with EUMETSAT for their EUMETSAT Polar System – Second Generation (EPS-SG) follow-on satellites.

1.2 Scope

The scope of this JPSS L1RD – Final includes all requirements to continue the NOAA polar mission and to optimize the value of JPSS over the life of the Program. This includes the Program of Record (POR), which includes JPSS-1 and JPSS-2, and the Polar Follow-On (PFO), adding the JPSS-3 and JPSS-4 missions, lasting through 2038. The JPSS will provide global environmental data from low Earth-orbiting satellites in support of NOAA's missions for a

weather ready nation, healthy oceans, climate adaptation and mitigation and resilient coastal communities and economies.

1.3 Applicable Documents

Applicable documents consist of documents that contain provisions or other pertinent requirements directly related to and necessary for the management and performance of the activities specified by this Level 1 Requirements Document. Unless specifically noted/tailored, all requirements contained in these documents, of the current revision number/date of issue, are applicable to the JPSS Program and system.

- Joint Polar Satellite System Program Determination of Readiness and Baseline Report to Congress (September 2014)
- NOAA – NASA JPSS IAA General Terms and Conditions – 03-06-12NOAA
- Joint Polar Satellite System (JPSS) Program Commitment Agreement (PCA) Version 1.0, July 2013
- NOAA/NASA Joint Polar Satellite System (JPSS) Management Control Plan (MCP), Version 2.0, January 2013
- NOAA JPSS Office (NJO) Configuration Management Plan, Version 1 PRELIMINARY, July 2012
- NOA 216-108: Requirements Management, Issued 10/31/05; Effective 10/24/05
- National Security Presidential Directive, NSPD- 51/Homeland Security Presidential Directive, HSPD-20, National Continuity Policy, May 9, 2007
- Consolidated Appropriations Act, 2008 (P.L. 110-161), as amended by P.L.1 12-55, Approved December 26, 2007
- NESDIS Policy for Continuity of Operational Polar Orbiting Environmental Satellite Observations (Draft)
- NOAA Administrative Order (NAO) 212-13, NOAA Information Technology Security Policy, Issued 03/17/03; Effective 03/07/03
- NAO 212-15, Management of Environmental Data and Information, Issued 08/22/91; Effective 11/04/10
- NPR 7120.5E, NASA Space Flight Program and Project Management Requirements w/Changes 1-14 Effective Date: August 14, 2012, Expiration Date: August 14, 2017
- NPR 8000.4A, Agency Risk Management Procedural Requirements (Revalidated 1/29/14) Effective December 16, 2008 Expiration December 16, 2019
- NPD 8610.7D, Launch Services Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Missions – Revalidated w/Change 1 (08/27/2012) Effective Date: January 31, 2008 Expiration Date: January 31, 2018
- NPR 8705.4, Risk Classification for NASA Payloads (Updated w/change 3 10/2/14) Effective Date: June 14, 2004 Expiration Date: June 14, 2018

- Federal Information Processing Standards (FIPS) 199, Standards for Security Categorization of Federal Information and Information Systems, February 01, 2004
- FIPS 200, Minimum Security Requirements for Federal Information and Information Systems, March 01, 2006
- National Institute of Standards and Technology (NIST) Special Publications (SP) 800-37, Guide for Applying the Risk Management Framework to Federal Information Systems: A Life Cycle Approach, February 2010
- NIST SP 800-53, Security and Privacy Controls for Federal Information Systems and Organizations, April 2013
- NOAA5042 FIPS-200, Security Control Baseline
- NOAA5048 FIPS-200, Security Control Baseline
- Homeland Security Presidential Directive 12 (HSPD-12), Policy for a Common Identification Standard for Federal Employees and Contractors, August 27, 2004
- DOC IT Security Program Policy (ITSPP) and the Commerce Information Technical Requirements (CITRs), September 16, 2014
- NOAA Security Manual, March 31, 2008
- NESDIS IT Security Policies and Procedures, NESDIS IT Security Handbook (Note: NESDIS IT Security Policies and Procedures are posted on the Office of the Chief Information Officer's website at https://intranet.nesdis.noaa.gov/ocio/it_security/handbook/it_security_handbook.php)
- DOC Manual of Regulations and Procedures for Federal Radio Frequency Management
- NOAA/NASA Management Plan for Suomi-National Polar-orbiting Partnership (Suomi-NPP) Operations, Effective Date, January 31, 2013, Revision –
- Agreement between the United States National Oceanic and Atmospheric Administration (NOAA) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) on an Initial Joint Polar-orbiting Operational Satellite System (11/11/1998)
- Agreement between the United States National Oceanic and Atmospheric Administration (NOAA) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) on Joint Transition Activities Regarding Polar-orbiting Operational Environmental Satellite System (2003), Fourth Amendment (8/16/2011)
- Agreement Between The United States National Oceanic And Atmospheric Administration And The European Organisation For The Exploitation Of Meteorological Satellites On A Joint Polar System (JPS) (Dec 2015)
- 2012 NOAA - NSF McMurdo Cooperation Agreement, NOAA as the requesting agency, Sept 12, 2012.

- 2013 NSF - NOAA McMurdo Cooperation Agreement, NSF as the requesting agency, June 10, 2013.
- Memorandum of Understanding Between National Oceanic and Atmospheric Administration (NOAA) and Japan Aerospace Exploration Agency (JAXA) In relation for the Cooperation For The Global Change Observation Mission 1-Water (GCOM-W1), signed July 18, 2011. Amendment 1 signed July 17, 2013.
- Memorandum of Agreement Between the National Aeronautics and Space Administration Space Communications and Navigation Program and the National Environmental Satellite and Data Service of the National Oceanic and Atmospheric Administration Concerning the Use of NASA's Space Network, signed October 9, 2014.
- Agreement Between the National Oceanic and Atmospheric Administration and the National Aeronautics and Space Administration for Cooperation Relating to the Clouds and Earth's Radiant Energy System (CERES) Flight Model (FM)-6 Instrument and the Radiation Budget Instrument (RBI), version 3.7, July 16, 2014
- Agreement Between the National Oceanic and Atmospheric Administration and the National Aeronautics and Space Administration for Cooperation Relating to the Ozone Mapping and Profiler Suite – Limb (OMPS-L) Sensor Accommodation on Joint Polar Satellite System (JPSS)-2, version 1
- The Communications and Security Services Division Communication Services Office Memorandum of Agreement Between the National Aeronautics And Space Administration Science Data Segment And the National Oceanic And Atmospheric Administration National Environmental Satellite, Data, & Information Service Suomi-National Polar-Orbiting Partnership Joint Polar Satellite System in Support of System Interconnectivity, version

1.4 Reference Documents

- JPSS-PLN-3110, JPSS Project Management Plan for NOAA Projects
- 470-00206, JPSS Multi-Mission System Architecture and Concept of Operations
- JPSS-REF-5108, JPSS Functional and Performance Priorities, v1.0
- 470-00041, JPSS Program Lexicon
- JPSS-REF-5109, NESDIS/JPSS Data Products Objective Capabilities, v1.0
- NIST SP 800-53A, Guide for Assessing the Security Controls in Federal Information Systems and Organizations; Building Effective Security Assessment Plans, December 2014
- JPSS-REQ-1009 Ground Segment Data Product Specification

2 PROGRAM DEFINITION

2.1 System Need

The primary missions of NOAA are Science, Service, and Stewardship: for a weather ready nation, healthy oceans, climate adaptation and mitigation and resilient coastal communities and economies. Polar environmental satellites provide timely global observations from space that are used for numerous applications. NOAA requires a global and continuous/enduring space-based capability in polar orbit to provide for:

- Weather situational awareness and forecasting – Data from instruments in polar-orbit are the main source for numerical weather forecasting, which uses mathematical models of the atmosphere and oceans to predict the weather based on current conditions. Data from satellites in polar orbits constitutes approximately 85% of all the input data to the National Centers for Environmental Prediction's global models. In addition, visible imagery from polar satellites is the primary situational awareness observation source for NOAA weather warning services in the Alaskan Region.

- Environmental monitoring – Data from instruments in polar orbits are used to monitor the environment including, for example, the health of ecosystems, drought conditions, operational ozone monitoring for treaty compliance and UV forecast, volcanic ash for transportation, floods, oil spills, the state of oceans.

- Climate monitoring – Data from instruments in mid-morning and afternoon polar sun-synchronous orbits have provided more than 30 years of continuous global observations that have allowed scientists to monitor the climate. These records and products are critical to climate modelers, scientists, and decision makers concerned with advancing climate understanding, prediction, mitigation and adaptation strategies, and policies.

2.2 Ownership and Oversight

2.2.1 Program Management

The JPSS Program is a partnership between NOAA and NASA. NOAA has final decision authority and is responsible for overall program commitment. NASA is the acquisition agent for the flight systems (satellites, instruments and launch services) and components of the ground segment, and leads mission integration, program systems engineering, program safety, and mission assurance. NOAA is the acquisition agent for components of the ground segment and is responsible for operations, science, data exploitation, archiving, and infrastructure. The partnership is governed by the NOAA/NASA JPSS Management Control Plan.

The NOAA Administrator has program management oversight authority and the NOAA/NASA Agency-level Program Management Council (APMC) provides the forum for regular reviews and assessments of the JPSS acquisition. The NOAA Administrator and NASA Associate

Administrator co-chair the APMC and provide primary oversight on an ongoing basis. The NOAA Deputy Under Secretary for Operations (DUS/O) has operational authority, however, the NOAA Administrator has final decision authority.

2.2.2 Requirements

JPSS Level 1 requirements are managed and controlled by the NJO Program Control Board (PCB); the JPSS L1RD requirements management process is documented in the NJO Configuration Management Plan. Approvals for new requirements/changes to existing requirements, including changes to the Key Performance Parameters, require review by the NOAA Observing Systems Council (NOSC) before submission to the DUS/O for approval.

For JPSS-1, detailed requirements are captured in the Supplement to the L1RD; the Supplement contains threshold and objective requirements and requirements related to reimbursable and partnership agreements. The L1RD Supplement was approved by the DUS/O with concurrence by the NOSC. Changes to the Supplement are approved by the JPSS Director, with concurrence by the NOSC. The JPSS L1RD Version 1.x and Supplement together form the JPSS-1 acquisition baseline.

JPSS-2/3/4 detailed mission requirements are captured in the JPSS Multi Mission System Specification (MMSS); the JPSS MMSS contains high-level mission requirements and requirements related to reimbursable and partnership agreements. The JPSS MMSS is approved by the Program Director, with concurrence by the NOSC for data product requirements, as detailed in the Ground Segment Data Product Specification. Changes to the JPSS MMSS will be approved by the JPSS Director, with concurrence by the NOSC for any changes in data product requirements. This JPSS L1RD and the JPSS MMSS together form the JPSS acquisition baseline for JPSS-2, JPSS-3, and JPSS-4.

Allocation of acquisition responsibilities and budgets to NOAA and NASA to meet requirements is captured in the Program Implementation Document (PID). The PID is reviewed by NOAA and NASA and approved by the JPSS Director.

2.2.3 Approach to Enhance Performance

The performance requirements stated in this L1RD represent the baseline JPSS performance. However, the government expects to continue optimizing the value of JPSS over the life of the Program and may invest in system capabilities beyond those currently itemized in the L1RD if justified by operational requirements and allowed by available resources. The National Oceanic and Atmospheric Administration (NOAA) will periodically assess and prioritize evolving customer needs for JPSS performance that exceed L1RD requirements and the JPSS Director will direct any and all JPSS initiatives to enhance system capabilities beyond that driven by these requirements. These initiatives may be designed to facilitate closure on documented objective requirements found in the NESDIS/JPSS Polar Satellite Objective Capabilities Specification, or may represent the pursuit of new requirements where the positive impact of emerging science and technology on data product quality is deemed significant by NOAA.

3 SYSTEM CONCEPT

The overarching concept of the JPSS is the continuation of polar-orbiting environmental satellite observations required to support NOAA's mission for a weather ready nation, healthy oceans, climate adaptation and mitigation and resilient coastal communities and economies. JPSS implements the U.S. civil commitment, and interagency and international agreements.

JPSS satellites are the NOAA follow-on to the current POES satellites. The Suomi-NPP (S-NPP), launched in October 2011, is the bridge between the NASA Earth Observing System (EOS) satellites/POES satellites and JPSS satellites. The European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) Polar Satellite (EPS) contribution is the Meteorological Operational (MetOp) satellites and EPS -Second Generation (EPS-SG) satellites. JPSS will acquire and route data from other satellites to meet Program requirements, e.g., MetOp, EPS-SG, Japan Aerospace Exploration Agency's (JAXA's) Global Change Observation Mission - Water (GCOM-W) satellites, and the Department of Defense (DoD) Defense Meteorological Satellite Program (DMSP) satellites. There is also the potential for loose-formation flying between the S-NPP and the European Space Agency's (ESA) Sentinel 5 Precursor (S5P) mission to maximize science return.

While the overarching JPSS concept is to provide critical observations for all of NOAA's mission goals, the minimum system requirement is to support weather forecasting and NOAA's mission to protect life and property. The JPSS architecture and operations (satellite orbits, sensors, and data products) are focused on meeting the weather situational awareness and forecasting need.

4 JPSS ARCHITECTURE

The JPSS is comprised of satellite missions and ground and space components for command, control, and communications (C3) and making data products available to users. The JPSS system architecture is shown in Figure 1. The satellite missions include S-NPP, JPSS-1, JPSS-2, JPSS-3 and, JPSS-4 and are configured to provide environmental sensing from polar sun-synchronous orbit and broadcast of environmental data to distributed users. JPSS will provide data to the Direct Readout community through a High Rate Data (HRD) broadcast.

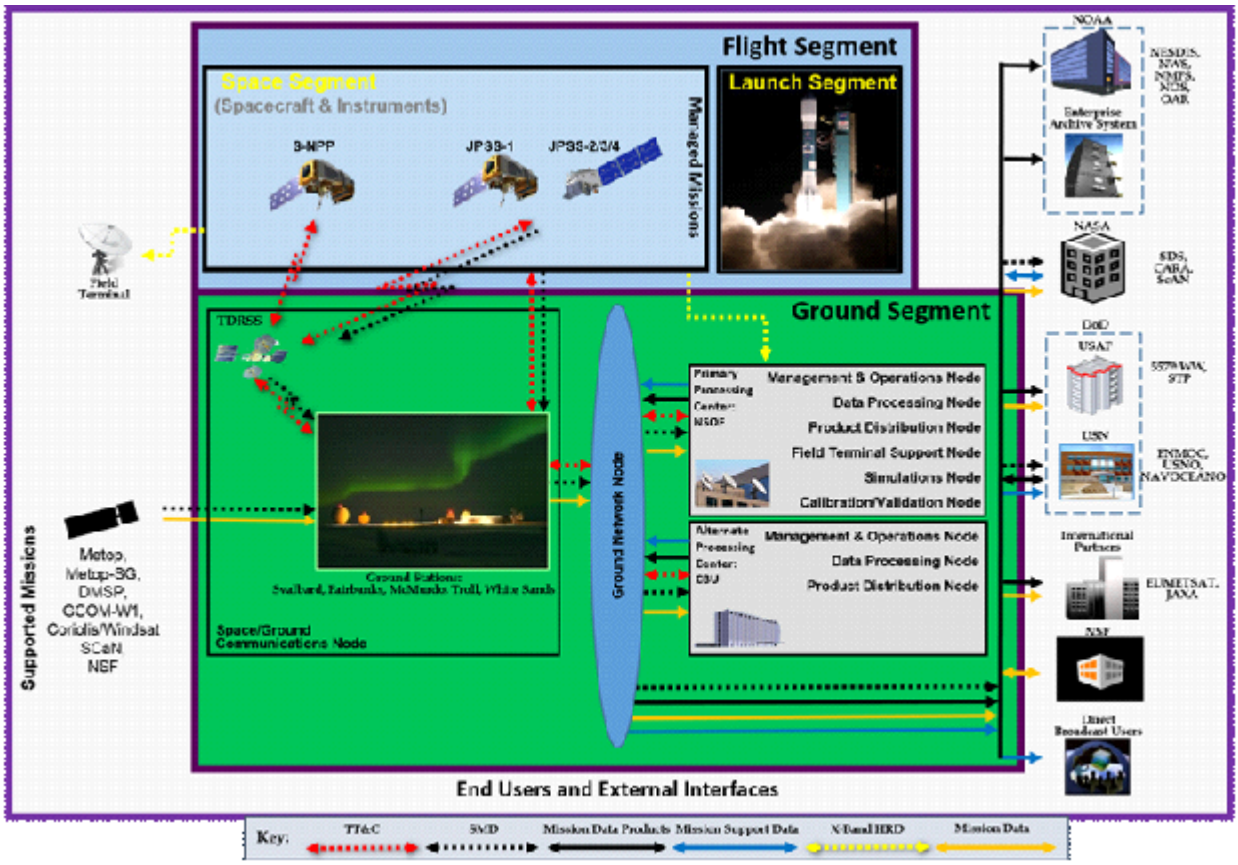

Figure 1: JPSS System Architecture

The integrated system of the JPSS Ground System and the NOAA enterprise ground systems constitute the JPSS Ground Segment. The JPSS Ground Segment is comprised of command and data acquisition sites (ground stations); communication systems for transmission of commands, telemetry, and stored mission data; mission management centers, and product processing and distribution centers. Enterprise synergies across missions are planned for similar ground system functions. Science Mission Data reception is accomplished via both the space-based TDRSS (Tracking and Data Relay Satellite System) and ground-based receiving stations located in Svalbard, Norway and Fairbanks, Alaska in the Northern Hemisphere; and McMurdo and Troll, Antarctica in the Southern Hemisphere.

Primary mission management, product processing, and distribution are located at the NOAA Satellite Operations Facility (NSOF) in Suitland, Maryland; alternate processing center operations are located at the Vertex Center in Fairmont, WV.

Real-time JPSS data products will be delivered to users and to the NOAA Comprehensive Large Array-data Stewardship System (CLASS). In addition to providing data to NOAA users and approved international partners, real-time JPSS data products will be made available to the US Air Force 557th Weather Wing, the Fleet Numerical Meteorology and Oceanography Center (FNMOC), and the Naval Oceanographic Office (NAVOCEANO). JPSS data products will be available to the National Centers for Environmental Information (NCEI) Reference Environmental Data Record (EDR) Program via CLASS. The JPSS archive function is the responsibility of the NCEI.

JPSS will provide services from Svalbard to enable receipt of mission data from GCOM-W, and relay of that data to JAXA; and from McMurdo to enable receipt of mission data from DMSP and MetOp satellites, and relay of that data to the DoD and EUMETSAT respectively. Real-time GCOM-W data products to raw data will be delivered to ESPC for product generation and then archived at the CLASS. Requirements for reimbursable mission services (e.g. DMSP data acquisition and data routing to NSOF DMSP service delivery point) are contained in the MMSS.

For JPSS, mission robustness has been defined as maintaining, on-orbit, a primary and secondary source of Advanced Technology Microwave Sounder (ATMS) and Cross-track Infrared Sounder (CrIS) sounder data, and developing and maintaining on-ground a tertiary asset carrying at least ATMS and CrIS to return to a “two failure to a gap” condition if a failure occurs. During the JPSS-3 development, there is a plan to complete ATMS and CrIS as quickly as possible in the event of the contingency mission. For JPSS-3 and JPSS-4 missions, a launch on need (LON) mission capability is provided so that once the satellite is completed and placed in storage, it can be made available for launch within 12 months of an on-orbit operational failure of a JPSS-managed satellite. Timing of the actual launch date, relative to the LON notification, will depend on national manifest priorities. Contingency measures and policies are documented in the NESDIS Policy for Continuity of Operational Polar Orbiting Environmental Satellite Observations.

5 SYSTEM SUCCESS CRITERIA

Full system success[1] requires all JPSS data products' requirements (Appendix A) to be met or exceeded.

Minimum system success[1] of the JPSS requires all four performance attributes identified as Key Performance Parameters (KPPs) listed below to be met for one set of products. KPPs are those polar system capabilities that if they cannot be met, would compromise NOAA's weather mission to provide essential warnings and forecasts to protect lives and property, and would be cause for program reevaluation or cancellation.

The JPSS KPPs are:

- ATMS Temperature Data Records (TDRs)
- CrIS SDRs
- For latitudes greater than 60ºN in the Alaskan region, VIIRS Imagery EDR at 0.64µm (I1), 1.61µm (I3), 3.74µm (I4), 11.45µm (I5), 8.55 µm (M14), 10.763 µm (M15), 12.03 µm (M16), and 0.7 µm Near Constant Contrast (NCC) EDR.
- 87 minute data latency for the ATMS TDRs, CrIS SDRs and the VIIRS Imagery EDR channels specified above.

[1]The use of "Full / Minimum system success" is a deliberate departure from NPR 7120.5 (which uses "baseline requirements" and "threshold requirements"). The use of "Full" and "Minimum" meets NOAA stakeholder communication needs.

6 PERFORMANCE REQUIREMENTS

The following performance requirements have been prioritized by NOAA to assist in managing JPSS program scope and capability against budget and schedule constraints. The requirements and capabilities supporting the generation and delivery of the Key Performance Parameters (KPPs) identified in section 5 are considered to be Priority 1. The remaining requirements were prioritized as Priority 2 or 3 based on how they support or are derived from statutory or regulatory obligations, policy directives, international agreements, or can be fully or partially met by alternative sources, as documented in the JPSS Functional and Performance Priorities document. The prioritized requirements will help decision makers determine those requirements that can be dropped, relaxed, deferred, or reinstated should the need/opportunity arise; and help in evaluating requests for waivers/deviations to the requirements. Changes and/or waivers/deviations to any of these requirements require approval of the DUS/O, regardless of priority. The observable requirement priorities are shown in Appendix A. Implementation of the requirements as stated in Section 6 assume implicit compliance with the Applicable Documents listed in Section 1.3. Where NASA and NOAA policies conflict regarding IT security, NOAA policies shall have precedence over the NASA policies. For data products, the complete set of functional requirements in support of operational data products (production, availability, archive) from primary and secondary sensors are provided at Level 2 and Level 2.5.

6.1 Missions

6.1.1 JPSS-1

L1RD-75 6.1.1.1 The JPSS-1 satellite shall be designed for a mission life of 7 years. [Priority 1]

Mission Effectivity: JPSS-1

L1RD-97 6.1.1.2 Reserved.

L1RD-98 6.1.1.3 Excluding on-orbit failures, JPSS-1 shall maintain an Operational Availability of greater than or equal to 98% over any 30 day period for the mission lifetime. [Priority 1]

Mission Effectivity: JPSS-1

L1RD-121 6.1.1.4 JPSS-1 shall be operated in a polar sun-synchronous orbit with the following characteristics: altitude of 824 +/- 17 kilometers, ground track repeat accuracy of 20 km at the Equator with a repeat cycle less than 20 days, and ascending equator crossing time of 1330 +/- 10 minutes. [Priority 1]

Mission Effectivity: JPSS-1

L1RD-126 6.1.1.5 JPSS-1 shall be Category 1 per NASA Procedural Requirements (NPR) 7120.5 and the risk classification shall be B per NPR 8705.4. [Priority 1]

Mission Effectivity: JPSS-1

L1RD-116 6.1.1.6 The JPSS-1 satellite shall be launched on an expendable launch vehicle of risk category 2 or higher, per NASA Policy Directive (NPD) 8610.7. [Priority 1]

Mission Effectivity: JPSS-1

L1RD-129 6.1.1.7 The JPSS-1 instrument payload shall include

- Advanced Technology Microwave Sounder (ATMS) [Priority 1]
- Cross-track Infrared Sounder (CrIS) [Priority 1]
- Visible Infrared Imaging Radiometer Suite (VIIRS) [Priority 1]
- Ozone Mapper and Profiler Suite-Nadir (OMPS-N) [Priority 2]
- Clouds and the Earth's Radiant Energy System (CERES) [Priority 2]

Mission Effectivity: JPSS-1

L1RD-1412 6.1.1.8 JPSS-1 shall provide Ka-band stored mission and telemetry data transmission from the satellite to the ground acquisition sites. [Priority 1]

Mission Effectivity: JPSS-1

L1RD-1413 6.1.1.9 JPSS-1 shall provide command, real-time and stored mission and telemetry data transmission to TDRSS. [Priority 1]

Mission Effectivity: JPSS-1

L1RD-101 6.1.1.10 JPSS-1 shall provide a real-time X-band direct broadcast of instrument data to the direct readout community (i.e., High Rate Data (HRD)). [Priority 3]

Mission Effectivity: JPSS-1

L1RD-1414 6.1.1.11 On a 30-day basis, at least 99% of the data collected by operational sensors on the JPSS-1 satellite shall be delivered to the data processing system. [Priority 1]

Mission Effectivity: JPSS-1

6.1.2 JPSS-2

L1RD-1415 6.1.2.1 The JPSS-2 satellite shall be designed for a mission life of 7 years. [Priority 1]

Mission Effectivity: JPSS-2

L1RD-1416 6.1.2.2 Reserved.

L1RD-1417 6.1.2.3 Excluding on-orbit failures, JPSS-2 shall maintain an Operational Availability of greater than or equal to 98% over any 30 day period for the mission lifetime. [Priority 1]

Mission Effectivity: JPSS-2

L1RD-1418 6.1.2.4 JPSS-2 shall be operated in a polar sun-synchronous orbit with the following characteristics: altitude of 824 +/- 17 kilometers, ground track repeat accuracy of 20 km at the Equator with a repeat cycle of 16 days, and ascending equator crossing time of 1330 +/- 10 minutes. [Priority 1]

Mission Effectivity: JPSS-2

L1RD-1419 6.1.2.5 JPSS-2 shall be Category 1 per NASA Procedural Requirements (NPR) 7120.5 and the risk classification shall be B per NPR 8705.4. [Priority 1]

Mission Effectivity: JPSS-2

L1RD-1420 6.1.2.6 The JPSS-2 satellite shall be launched on an expendable launch vehicle of risk category 2 or higher, per NASA Policy Directive (NPD) 8610.7. [Priority 1]

Mission Effectivity: JPSS-2

L1RD-130 6.1.2.7 The JPSS-2 instrument payload shall include

- ATMS [Priority 1]
- CrIS [Priority 1]
- VIIRS [Priority 1]
- OMPS-N [Priority 2]
- OMPS-Limb (OMPS-L) [Priority 3, if provided by NASA[2]]
- Radiation Budget Instrument (RBI) [Priority 3, if provided by NASA[2]]

Mission Effectivity: JPSS-2

L1RD-1421 6.1.2.8 JPSS-2 shall provide Ka-band stored mission and telemetry data transmission from the satellite to the ground acquisition sites. [Priority 1]

Mission Effectivity: JPSS-2

L1RD-1422 6.1.2.9 JPSS-2 shall provide command, real-time and stored mission and telemetry data transmission to TDRSS. [Priority 1]

Mission Effectivity: JPSS-2

L1RD-1423 6.1.2.10 JPSS-2 shall provide a real-time X-band direct broadcast of instrument data to the direct readout community (i.e., High Rate Data (HRD)). [Priority 3]

Mission Effectivity: JPSS-2

L1RD-102 6.1.2.11 On a 30-day basis, at least 99% of the data collected by operational sensors on the JPSS-2 satellite shall be delivered to the data processing system. [Priority 1]

Mission Effectivity: JPSS-2

[2]Delivery compatible with the JPSS-2 integration schedule.

6.1.3 JPSS-3

L1RD-1533 6.1.3.1 The JPSS-3 satellite shall be designed for a mission life of 7 years. [Priority 1]

Mission Effectivity: JPSS-3

L1RD-1534 6.1.3.2 Reserved.

L1RD-1535 6.1.3.3 Excluding on-orbit failures, JPSS-3 shall maintain an Operational Availability of greater than or equal to 98% over any 30 day period for the mission lifetime. [Priority 1]

Mission Effectivity: JPSS-3

L1RD-1536 6.1.3.4 JPSS-3 shall be operated in a polar sun-synchronous orbit with the following characteristics: altitude of 824 +/- 17 kilometers, ground track repeat accuracy of 20 km at the Equator with a repeat cycle of 16 days, and ascending equator crossing time of 1330 +/- 10 minutes. [Priority 1]

Mission Effectivity: JPSS-3

L1RD-1538 6.1.3.5 JPSS-3 shall be Category 1 per NASA Procedural Requirements (NPR) 7120.5 and the risk classification shall be B per NPR 8705.4. [Priority 1]

Mission Effectivity: JPSS-3

L1RD-1539 6.1.3.6 The JPSS-3 satellite shall be launched on an expendable launch vehicle of risk category 2 or higher, per NASA Policy Directive (NPD) 8610.7. [Priority 1]

Mission Effectivity: JPSS-3

L1RD-1540 6.1.3.7 The JPSS-3 instrument payload shall include

- ATMS [Priority 1]
- CrIS [Priority 1]
- VIIRS [Priority 1]
- OMPS-N [Priority 2]
- OMPS-Limb (OMPS-L) [Priority 3, if provided by NASA[3]]
- Radiation Budget Instrument (RBI) [Priority 3, if provided by NASA[3]]

Mission Effectivity: JPSS-3

L1RD-1541 6.1.3.8 JPSS-3 shall provide Ka-band stored mission and telemetry data transmission from the satellite to the ground acquisition sites. [Priority 1]

Mission Effectivity: JPSS-3

[3]Delivery compatible with the JPSS-3 integration schedule.

L1RD-1542 6.1.3.9 JPSS-3 shall provide command, real-time and stored mission and telemetry data transmission to TDRSS. [Priority 1]
Mission Effectivity: JPSS-3

L1RD-1543 6.1.3.10 JPSS-3 shall provide a real-time X-band direct broadcast of instrument data to the direct readout community (i.e., High Rate Data (HRD)). [Priority 3]
Mission Effectivity: JPSS-3

L1RD-1559 6.1.3.11 On a 30-day basis, at least 99% of the data collected by operational sensors on the JPSS-3 satellite shall be delivered to the data processing system. [Priority 1]
Mission Effectivity: JPSS-3

6.1.4 JPSS-4

L1RD-1545 6.1.4.1 The JPSS-4 satellite shall be designed for a mission life of 7 years. [Priority 1]
Mission Effectivity: JPSS-4

L1RD-1546 6.1.4.2 Reserved.

L1RD-1547 6.1.4.3 Excluding on-orbit failures, JPSS-4 shall maintain an Operational Availability of greater than or equal to 98% over any 30 day period for the mission lifetime. [Priority 1]
Mission Effectivity: JPSS-4

L1RD-1548 6.1.4.4 JPSS-4 shall be operated in a polar sun-synchronous orbit with the following characteristics: altitude of 824 +/- 17 kilometers, ground track repeat accuracy of 20 km at the Equator with a repeat cycle of 16 days, and ascending equator crossing time of 1330 +/- 10 minutes. [Priority 1]
Mission Effectivity: JPSS-4

L1RD-1549 6.1.4.5 JPSS-4 shall be Category 1 per NASA Procedural Requirements (NPR) 7120.5 and the risk classification shall be B per NPR 8705.4. [Priority 1]
Mission Effectivity: JPSS-4

L1RD-1550 6.1.4.6 The JPSS-4 satellite shall be launched on an expendable launch vehicle of risk category 2 or higher, per NASA Policy Directive (NPD) 8610.7. [Priority 1]
Mission Effectivity: JPSS-4

L1RD-1551 6.1.4.7 The JPSS-4 instrument payload shall include
- ATMS [Priority 1]
- CrIS [Priority 1]
- VIIRS [Priority 1]
- OMPS-N [Priority 2]
- OMPS-Limb (OMPS-L) [Priority 3, if provided by NASA[4]]
- Radiation Budget Instrument (RBI) [Priority 3, if provided by NASA[4]]

Mission Effectivity: JPSS-4

L1RD-1552 6.1.4.8 JPSS-4 shall provide Ka-band stored mission and telemetry data transmission from the satellite to the ground acquisition sites. [Priority 1]

Mission Effectivity: JPSS-4

L1RD-1553 6.1.4.9 JPSS-4 shall provide command, real-time and stored mission and telemetry data transmission to TDRSS. [Priority 1]

Mission Effectivity: JPSS-4

L1RD-1554 6.1.4.10 JPSS-4 shall provide a real-time X-band direct broadcast of instrument data to the direct readout community (i.e., High Rate Data (HRD)). [Priority 3]

Mission Effectivity: JPSS-4

L1RD-1555 6.1.4.11 On a 30-day basis, at least 99% of the data collected by operational sensors on the JPSS-4 satellite shall be delivered to the data processing system. [Priority 1]

Mission Effectivity: JPSS-4

6.2 System

L1RD-1452 6.2.1 The JPSS ground segment shall have an operational life through at least FY 2038. [Priority 1]

Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4

L1RD-133 6.2.2 The JPSS shall command and control S-NPP and all JPSS missions. [Priority 1]

Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4

L1RD-137 6.2.3 The JPSS shall comply with the NOAA/NESDIS Policy for Continuity of Operational Polar Orbiting Environmental Satellite Observations. [Priority 1]

Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4

[4]Delivery compatible with the JPSS-4 integration schedule.

L1RD-104	6.2.4 The JPSS shall produce and make available one complete set of data products identified in Appendix A from the primary mission sensors to ESPC Registered Users. [Priority 1] *Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4*
L1RD-105	6.2.5 The JPSS shall produce and make available one complete set of mission unique data products identified in Appendix A from the secondary mission sensors to ESPC Registered Users. [Priority 1] *Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4*
L1RD-93	6.2.6 The JPSS shall support EUMETSAT missions per the International Joint Polar System Agreement (JPS). [Priority 1] *Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4*
L1RD-1454	6.2.7 The JPSS primary command and control and data processing site shall be located at the NOAA Satellite Operations Facility (NSOF) in Suitland, MD. [Priority 1] *Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4*
L1RD-143	6.2.8 The JPSS alternate command and control and data processing site shall be located at the Consolidated Backup (CBU) Facility in the Vertex Center in Fairmont, WV. [Priority 1] *Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4*
L1RD-110	6.2.9 The JPSS Alternate Processing Center shall make available the specific data products identified in Appendix A, from all sensor science data acquired from the primary mission sensors to the CLASS and to ESPC Authorized APC Users that require access for supporting minimum mission essential functions. [Priority 1] *Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4*
L1RD-154	6.2.10 On a 30-day basis, data latency requirements, as specified in Appendix A, Table 1 and Table 1.1, shall be met at least 95% of the time for data collected by the primary operational sensors on the JPSS [Priority 1] and GCOM [Priority 3] satellites. *Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4*
L1RD-156	6.2.11 The JPSS shall comply with NOAA information technology security policies and procedures. [Priority 1] *Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4*

L1RD-1456 6.2.12 The JPSS shall acquire at least 99%, on a 30-day basis, of sensor science data from GCOM-W satellites and relay it to JAXA. [Priority 2]

Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4

L1RD-1457 6.2.13 The JPSS shall have the capability to make data available for long-term archive and storage in accordance with NOAA policy for the Management of Environmental Data and Information. [Priority 2]

Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4

L1RD-1458 6.2.14 The JPSS shall support the capability for management of mission constellation operations. [Priority 2]

Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4

L1RD-1459 6.2.15 The JPSS shall make available, from all primary sensor science data acquired, the mission unique S-NPP and JPSS Application Packets and the GCOM APID Sorted Data listed in Appendix A, Table 1 and Table 1.1, to FNMOC and NAVOCEANO. [Priority 3].

Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4

L1RD-1460 6.2.16 The JPSS shall make available all sensor science data acquired to the NASA Science Data Segment (SDS) service delivery point at the NSOF. [Priority 3]

Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4

L1RD-1561 6.2.17 The JPSS shall provide the Direct Readout community with software, documentation, and periodic updates to enable civilian and military agencies to produce data products from JPSS, using their own hardware to receive the JPSS High Rate Data (HRD) broadcast. [Priority 3]

Mission Effectivity: JPSS-1, JPSS-2, JPSS-3, JPSS-4

APPENDIX A. OBSERVATIONAL DATA PRODUCTS

JPSS data products include Application Packets, Raw Data Records (RDRs), Sensor Data Records (SDRs), Temperature Data Records (TDRs), Environmental Data Records (EDRs), and AMSR2 APID Sorted Data (ASD). These data records are collectively called xDRs. Table 1 and 1.1 lists JPSS mission unique data products and associated latency and priorities; Table 2 and 2.1 lists NESDIS Enterprise products that are supported by the JPSS mission unique products. Technical specifications for the data products are provided in the JPSS L1RD Supplement (for JPSS-1) and in the Data Product Specification (for JPSS-2/3/4). The Low earth-Orbiting Requirements Working Group (LORWG), with review by the NOAA Observing System Council (NOSC), has identified product priorities across all NOAA Line Offices. Table 2.1 lists the AMSR2 GCOM-W1 Products. The observational data prioritization criteria are shown in Table 3.

Table 1: Mission Unique Data Products

Product	Latency (min)	Priority	Produced at APC
AMSR ASD	117	2	√
ATMS Application Packet	80	1	√
ATMS RDR	80	1	√
ATMS TDR	87	1	√
ATMS SDR	87	2	√
CERES Application Packet	N/A	3	√
CERES RDR	N/A	3	√
CrIS Application Packet	80	1	√
CrIS RDR	80	1	√
CrIS SDR	87	1	√
OMPS-N Application Packet	80	3	√
OMPS-N RDR	80	3	√
OMPS-N SDR	83	3	√
OMPS-L Application Packet	80	3	√
OMPS-L RDR	80	3	√
OMPS-L SDR	96	3	√
RBI Application Packet	N/A	3	√
VIIRS Application Packet	80	1	√
VIIRS RDR	80	1	√
VIIRS SDR	87	1	√
VIIRS Imagery	87	1	√

Table 1.1: AMSR2 GCOM-W1 MUPs

Product	Latency (min)	Priority	Produced at APC
AMSR ASD	117	2	√

Table 2: Enterprise Data Products

Product	Latency (min)	Priority	Produced at APC	ATMS	CrIS	VIIRS	OMPS-N	OMPS-L
Aerosol Detection	96	3				√		
Active Fires	96	3				√		
Aerosol Optical Depth	103	4				√		
Aerosol Particle Size	96	4				√		
Albedo (Surface)	96	4				√		
Annual Surface Type[5]	12 months	4				√		
Atmospheric Vertical Moisture Profile	96	3		√	√			
Atmospheric Vertical Temperature Profile	96	3		√	√			
Carbon Dioxide (CO_2)	96	4			√			
Carbon Monoxide (CO)	96	4			√			
Cloud Cover/Layers	96	3				√		
Cloud Height (Top and Base)	96	3				√		
Cloud Liquid Water	96	3		√				
Cloud Mask	96	3				√		
Cloud Optical Depth	96	3				√		
Cloud Particle Size Distribution	96	3				√		
Cloud Phase	96	3				√		
Cloud Top Pressure	96	4				√		
Cloud Top Temperature	96	4				√		
Green Vegetation Fraction	25 hr.	2	√			√		
Ice Age/Thickness	96	3				√		
Ice Concentration	96	3				√		
Ice Surface Temperature	96	4				√		
Imagery	96	3		√				
Infrared Ozone Profile	96	3			√			
Land Surface Emissivity	96	2	√	√				
Land Surface Temperature	96	4		√		√		
Methane (CH_4)	96	4			√			
Moisture Profile	96	4		√				
Ocean Color /Chlorophyll	118	2	√			√		
Outgoing Long Wave Radiation	96	3			√			
Ozone Limb Profile	119	3						√
Ozone Nadir Profile	103	3	√				√	
Ozone Total Column	103	3	√				√	
Polar Winds	204	2	√			√		

Product	Latency (min)	Priority	Produced at APC	ATMS	CrIS	VIIRS	OMPS-N	OMPS-L
Rainfall Rate	96	3		√				
Sea Ice Concentration[3]	96	3	√	√				
Sea Surface Temperature[1]	12hr/103	2	√			√		
Snow Cover[1,2]	96	3		√		√		
Snowfall Rate	96	3		√		√		
Snow Water Equivalent	96	3		√				
Surface Reflectance	96	4				√		
Temperature Profile	96	4		√				
Total Precipitable Water	96	3		√				
Vegetation Indices	24	4				√		
Vegetation Health Index Suite	175 hr.	4				√		
Volcanic Ash Detection and Height	96	3				√		
ESPC Blended[4]								
JPSS Derived[4]								

Notes:

1. The NOS/NMFS operational requirement for the Priority 2 (Critical) SST product is 12 hours since they do not run 24/7 operations. The NWS requires this product quicker (within 103 minutes) but at a Priority 3 criticality. However, the lower latency capability is beneficial to NOS/NMFS, consistent with what is done with current operations, and therefore the ground system shall be developed and procured to meet the 103 minute requirement.
2. ATMS and VIIRS produce only a Snow Cover product.
3. The Ice Concentration product for ATMS is only validated over the ocean so it is specified as Sea Ice Concentration in the L1RD Supplement and all subsequent requirements documents.
4. Requirements for the ESPC Blended and JPSS Derived Products are in the JPSS Multi Mission System Specification.
5. The Annual Surface Type product is provided from the Center of Satellite Applications and Research (STAR) as Government Furnished Information (GFI) by the JPSS Program.

Table 3.1: AMSR2 GCOM-W1 Enterprise Data Products

Product	Latency(min)	Priority	Produced at APC
AMSR Calibrated Sensor Data	137	2	√
Cloud Liquid Water	130	3	
Imagery	130	3	
Rainfall (Type/Rate)	130	3	
Sea Ice Characterization	137	3	
Sea Surface Temperature	137	2	√
Sea Surface Wind Speed	130	3	
Snow Cover[1]	130	3	
Snow Water Equivalent	130	3	
Soil Moisture	130	3	
Total Precipitable Water	130	3	

Notes:

1. AMSR produces both a Snow Cover and a Snow Depth product

Table 4: Observational Data Prioritization Criteria

Priority[1]	Comment
1	Key Performance Parameter (KPPs) - essential to system success
2	Products with critical impact to NOAA Line Office operations and/or outcomes
3	Products with high impact to NOAA Line Office operations and/or outcomes
4	Products with lower impact to NOAA Line Office operations and/or outcomes

Notes:

1 The JPSS priorities KPP/Critical, Supplemental High and Supplemental Low are equivalent to the NOAA's Technology, Planning, and Integration for Observations (TPIO) priorities of Mission Critical, Mission Optimal, and Mission Enhancing, respectively.

APPENDIX B. ACRONYMS

557WW	557th Weather Wing
AK	Alaska
AMSR	Advanced Microwave Scanning Radiometer
APC	(JPSS) Alternate Processing Center
APID	Application Packet Identifier
APMC	Agency-level Program Management Council
ASD	AMSR2 APID Sorted Data
ATMS	Advanced Technology Microwave Sounder
C3	Command, Control and communications
CBU	(NOAA) Consolidated Backup Facility
CCB	Configuration Control Board
CERES	Clouds and the Earth's Radiant Energy System
COURL	Consolidated Observing Users Requirements List
CLASS	Comprehensive Large Array-Data Stewardship System
CrIS	Cross-track Infrared Sounder
DMSP	Defense Meteorological Satellite Program
DOC	U.S. Department of Commerce
DoD	Department of Defense
DUS/O	Deputy Under Secretary of Commerce for Oceans and Atmosphere for Operations
EDR	Environmental Data Record
EOS	NASA Earth Observing System
EPS-SG	European Polar System - Second Generation
ESPC	Environmental Satellite Processing Center
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
FNMOC	Fleet Numerical Meteorology and Oceanography Center
FT	Field Terminal
GCOM	Global Change Observation Mission
GCOM-W	GCOM-Water
GPS	Global Positioning System
GSFC	Goddard Space Flight Center

HRD	High Rate Data
HSPD	Homeland Security Presidential Directive
JAXA	Japan Aerospace Exploration Agency
JPSS	Joint Polar Satellite System
KPP	Key Performance Parameter
L1RD	Level 1 Requirements Document
LEO	Low-Earth orbiting or orbit
LORWG	Low earth-Orbiting Requirements Working Group
LST	Local Solar Time
LTAN	Local Time Ascending Node
MCP	Management Control Plan
MGS	McMurdo Ground Station
MetOp	EUMETSAT Meteorological Operational satellites
MOU	Memorandum of Understanding
NAO	NOAA Administrative Order
NASA	National Aeronautics and Space Administration
NAVOEANO	Naval Oceanographic Office
NCC	Near Constant Contrast
NCEI	National Centers for Environmental Information
NESDIS	National Environmental Satellite, Data, and Information Service
NIST	National Institute of Standards and Technology
NJO	NOAA JPSS Office
NOAA	National Oceanic and Atmospheric Administration
NOSC	NOAA Observing Systems Council
NPOESS	National Polar-orbiting Operational Environmental Satellite System
NPD	NASA Policy Directive
NPP	National Polar-orbiting Partnership
NPR	NASA Procedural Requirement
NSA	National Security Agency
NSOF	NOAA Satellite Operations Facility
NSPD	National Security Presidential Directive
NWS	National Weather Service

OMPS	Ozone Mapping and Profiler Suite
PID	Program Implementation Document
PMC	Program Management Council
POES	NOAA Polar-orbiting Operational Environmental Satellites
RBI	Radiation Budget Instrument
RDR	Raw Data Record
SDR	Sensor Data Record
SDS	Science Data Segment
SN	NASA Space Network
S-NPP	Suomi NPP
SS	Space System
STAR	NOAA's Center for Satellite Applications and Research
TDR	Temperature Data Record
TDRSS	Tracking and Data Relay Satellite System
USAF	United States Air Force
VCDU	Virtual Channel Data Unit
VIIRS	Visible Infrared Imaging Radiometer Suite
WSF	Weather Satellite Follow-on
xDR	Data Record

APPENDIX C. GLOSSARY

Advanced Microwave Scanning Radiometer 2 (AMSR2) Application Process Identifier (APID) Sorted Data (ASD) File: Raw data files associated with the AMSR2 mission. The ASD files are sent from Svalbard to the DPN where they are converted into RDRs by the DPN and sent to NDE and converted back into ASD files for input into the Level 1 processing software. The DPN output will be classified as an RDR but will not have all of the metadata as provided for other instrument RDRs. The data files (ASD files for ID 1376, AMSR2 science data) will be treated similarly to an ancillary file with minimal metadata included in the HDF5 wrapper.

Application Packet (AP): The unit of data created by a spacecraft or a spacecraft sensor according to CCSDS standards. An Application Packet contains a primary header and an optional secondary header.

ATMS and CrIS: The Cross-track Infrared Sounder (CrIS) combined with the Advanced Technology Microwave Sounder (ATMS) globally produces atmospheric temperature, moisture and pressure profiles from space. The combined ATMS/CrIS sensor suite is called the Cross-track Infrared and Microwave Sounder Suite (CrIMSS).

Baseline: Operational Baseline refers to an operationally significant performance level between the threshold and objective that is expected to be delivered by the program. The System Baseline refers to capabilities on contract.

CERES and RBI: The Clouds and the Earth's Radiant Energy System. Part of NASA's EOS, CERES products include both solar-reflected and Earth-emitted radiation from the top of the atmosphere to the Earth's surface. Cloud properties are determined using simultaneous measurements by other EOS instruments such as the Moderate Resolution Imaging Spectro-radiometer (MODIS). The Radiation Budget Instrument (RBI) will be the NASA follow-on to CERES.

Comprehensive Large Array-data Stewardship System (CLASS): CLASS is an IT system that supports the NOAA Data Center's mission to archive data and other artifacts from its polar and geostationary satellites and from in situ sources.

Data Availability: Data Availability is the percentage of data collected by operational sensors on each JPSS satellite that is delivered to the JPSS distribution system. Data availability is calculated on a 30 day basis.

Data Latency is defined as the period from the time of observation of all requisite data by the satellite until the EDR or data product produced from those data is available to the user at the distribution system.

Development: The creation of a new system, or the system modifications necessary to add completely new functionality to an existing baseline system to comply with mission requirements. It includes the testing, fielding, and verification of these new capabilities (with support from the receiving organization at the installation site.)

Direct Broadcast: A spacecraft capability to broadcast satellite mission data via a High Rate Data (HRD) downlink directly to users equipped with suitable field terminals.

Direct Readout: Refers to the user community on the ground that receives and processes HRD data in their own field terminals and to the support provided to those users by the JPSS program.

Environmental Data: Environmental data as used in this document is also termed mission data and refers to all data (atmospheric, oceanographic, terrestrial, space environmental and climatic) being sensed and collected by the spacecraft.

Environmental Data Record (EDR): Data record produced when an algorithm is used to convert Sensor or Temperature Data Records (SDRs, TDRs) to geolocated geophysical parameters (including ancillary parameters, e.g., cloud cleared radiation, etc.).

Environmental Satellite Processing Center (ESPC): The NOAA ESPC is located within the NSOF. The ESPC is composed of multiple systems that receive RDRs, SDRs and EDRs from the IDPS, process these data into unique NOAA products, and make these products available to the user community.

ESPC Registered User: Authorized users who have a formal agreement with OSPO, via the ESPC Data Access form, for acquisition of data products.

Field Terminals: Field Terminals include the various receivers used by deployed/remote units to obtain environmental satellite data in real time.

High Rate Data (HRD) Broadcast: The JPSS satellites will broadcast data to the Direct Broadcast Users' field terminals via a near continuous, X-Band, transmission. The HRD broadcast is expected to include virtually all collected mission data.

Interface Data Processing System (IDPS): The IDPS is a subsystem of the JPSS Ground System that receives raw data from the polar satellites and processes these data into RDRs, SDRs, TDRs and EDRs and makes these products available to the user community.

Imagery: Two-dimensional array of numbers, in digital format, each representing the brightness of a small elemental area.

Key Mission Sensor: A Primary Mission Sensor which provides data to meet JPSS mission success criteria, e.g., ATMS, CrIS or VIIRS.

Key Performance Parameter: A parameter so significant to the user community that all designated requirements must be met to achieve minimal mission success.

Management Control Plan (MCP): A document authorized by a Memorandum of Understanding between NOAA and NASA which establishes the business processes, management controls, and organizational structure of the program.

Minimum Essential Functions: functions that must be continued throughout or resumed rapidly after a disruption of normal activities. In order, those are: 1) secure the spacecraft (health and safety of the asset), 2) resume data/services that are critical for maintaining public safety.

Mission Sensors: Any sensor on the spacecraft directly used to satisfy any of the environmental data requirements.

Objective: Objectives represent an improved performance level above and beyond the threshold requirements that would better meet user needs and which are realistically achievable with current technology.

OMPS: Ozone Mapping and Profiler Suite collects data to permit the calculation of the vertical and horizontal distribution of ozone in the Earth's atmosphere. OMPS consists of separate nadir and limb sensors. The OMPS Nadir sensor consists of Mapper and Profiler components.

Operational Availability (A_o): The measure of the probability that a system is operationally capable (ready for tasking) of performing an assigned mission (e.g., delivering a KPP) at any given time. Once on orbit, the JPSS satellites are assumed to operate 24/7, 365 days per year for the mission lifetime. The availability criteria include system reliability (besides the satellite reliability which is specified separately), redundancy, and planned outages (downtime for spacecraft maneuvers and calibration and ground system sustainment).

Operational Satellite: A spacecraft containing an operational sensor/instrument that is providing useful data to meet or supplement one or more of the JPSS observational data or service requirements.

Operations: The staff necessary to operate a system and the recurring costs necessary to keep the operation active (for example, facilities, networks, utilities, software licensing, and hardware maintenance).

Payload: Mission sensors and on-board processor.

Primary Mission Sensor: A sensor on any of the S-NPP or JPSS operational satellites which is used as the primary source of essential data needed to satisfy a specific set of environmental data requirements. Normally this is the most capable sensor of its type in the constellation.

Primary Satellite: For polar-orbiting operational satellites, the primary satellite designation indicates that the satellite and KPP sensors have been capitalized by NOAA, the KPP products have been validated to a level of maturity which allows their operational use, users are ready to use KPP products operationally, and all IT systems required to acquire, process and distribute KPP products have an Authorization to Operate.

Raw Data Record (RDR): Full resolution digital sensor data, time referenced and earth located, with absolute radiometric and geometric calibration coefficients available, but not applied, to the data. Aggregates (sums or weighted averages) of detector samples are considered to be full resolution data if the aggregation is normally performed to meet resolution and other requirements. Sensor data must be unprocessed with the following exceptions: time delay and integration, detector array non-uniformity correction (i.e., offset and responsivity equalization), and data compression are allowed. Lossy data compression is allowed only if the total measurement error is dominated by error sources other than the data compression algorithm. All calibration data will be retained and communicated to the ground without lossy compression.

Refresh: Refresh is the time interval between successive collections of measurements of the same parameter from the same geographical point on, or above, the surface of the earth.

Secondary Mission Sensor: A sensor on any of the S-NPP or JPSS operational satellites which is still functioning but is not used as the primary source of data to satisfy a specific set of environmental data requirements. Normally this sensor has some degraded capability but some data from the sensor will be processed on the ground on a best effort basis to supplement the primary source to increase temporal or spatial coverage.

Secondary Satellite - For polar-orbiting operational satellites, the secondary satellite designation indicates that the satellite provides full, or limited operational capability and meets the definition of a primary satellite; however, only KPP data products are required to be processed and distributed.

Sensor Data Record (SDR): Data record produced when an algorithm is used to convert Raw Data Records (RDRs) to geolocated calibrated brightness temperatures, radiances, or reflectances with associated ephemeris data.

Service Delivery Point: The functional location or locations where the JPSS must provide data or services.

Space System: The spacecraft including its associated sensors, subsystems, equipment, and processors.

Sustainment: The work required to keep a baseline system architecture functioning as technology and security requirements evolve, and the effort necessary to fix problems identified in the system during operations. System refresh as required.

Threshold: Threshold requirements represent the minimally acceptable level of performance that must be achieved.

Temperature Data Records (TDRs): Data records that are geolocated antenna temperatures (T_a) with all relevant calibration data counts and ephemeris data to revert from T-sub-a into counts. The existence of the SDRs provides reversible data tracking back from the EDRs to the raw data.

Tracking and Data Relay Satellite System (TDRSS): NASA's TDRSS consists of a constellation of geosynchronous satellites and associated ground systems and operates as a bent pipe relay system between customer space platforms and customer ground facilities.

VIIRS: The Visible Infrared Imaging Radiometer Suite collects visible and infrared radiometric data of the Earth's atmosphere, ocean, and land surfaces. Data types include atmospheric parameters, clouds, Earth radiation budget, land/water and sea surface temperature, ocean color, and low light imagery.