National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, MD 20771

February 5, 2013

MEMORANDUM FOR THE RECORD

Reply to Attn of:

The National Environmental Policy Act (NEPA) Compliance Joint Polar Satellite System (JPSS) -1

1.0 Introduction

The National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321, *et seq.*), requires federal agencies to consider the environmental impacts of a project in their decision making process. To comply with NEPA and associated regulations (the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA [40 CFR Parts 1500-1508] and NASA policy and procedures [14 CFR, Part 1216, Subpart 1216.3]), NASA has prepared an Environmental Assessment (EA) for routine payloads launched on expendable launch vehicles (Ref: *Environmental Assessment (Final) for Launch of NASA Routine Payloads*, November 2011). The 2011 NASA Routine Payload Environmental Assessment (NRPEA) assesses the environmental impacts of missions launched with spacecraft that are considered routine payloads from existing launch facilities at Cape Canaveral Air Force Station (CCAFS), Florida, Vandenberg Air Force Base (VAFB), California, the United States Army Kwajalein Atoll/Reagan Test Site (USAKA/RTS), Republic of the Marshall Islands (RMI), NASA's Wallops Flight Facility (WFF), Virginia, and the Kodiak Launch Complex (KLC), Alaska.

Spacecraft defined as routine payloads utilize materials, quantities of materials, launch vehicles, launch sites, and operational characteristics that are consistent with normal and routine spacecraft preparation and flight activities at CCAFS, VAFB, USAKA/RTS, WFF, KLC, and NASA's Kennedy Space Center. The environmental impacts of launching routine payloads from these sites fall within the range of routine, ongoing and previously documented impacts, that have been determined not to be significant. Spacecraft within the scope of this EA meet specific criteria ensuring that the spacecraft, its operation and decommissioning, do not present any new or substantial environmental or safety concerns.

To determine the applicability of a routine payload classification for a mission, the mission is evaluated against the criteria defined in the EA using the Routine Payload Checklist (RPC).

2.0 Mission Description

The JPSS program is the restructured civilian portion of the National Polar-orbiting Operational Environmental Satellite System. Polar-orbiting satellites observe Earth from space and collect and disseminate data on Earth's weather, atmosphere, oceans, land, and near-space environment, and are able to monitor the entire planet and provide data for long-range weather and climate forecasts.

JPSS is a partnership between National Oceanic and Atmospheric Administration (NOAA) and NASA, and will be the next generation of polar Earth observing science data satellites that will make afternoon observations as it orbits Earth. NOAA is responsible for the overall program and is also responsible for operations, data exploitation, and archiving infrastructure. NASA is the acquisition agent for the flight systems (satellite, instruments, and launch vehicle), ground systems, as well as leads the program's systems engineering, and program's safety and mission assurance.

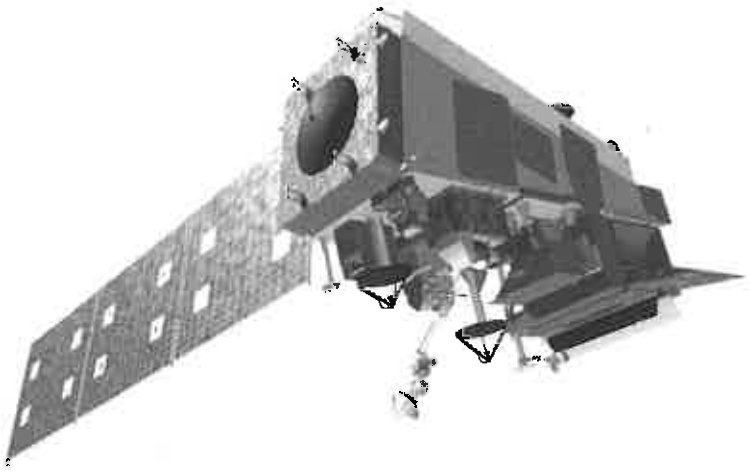
JPSS mission will provide global imagery and atmospheric measurements using polar-orbiting satellites. The JPSS mission objective is to sustain continuity of and enhance Earth observation analysis, forecasting, and climate monitoring capabilities from global polar-orbiting observations.

JPSS will provide and enhance global environmental data used in numerical weather prediction models for forecasts, as well as provide space weather observations, search and rescue detection capabilities, and direct read-out and data collection products and services to customers. Data and imagery obtained from the JPSS will increase timeliness and accuracy of public warnings and forecasts of climate and weather events, thus reducing the potential loss of human life and property and advancing the national economy.

JPSS program consists of five satellites (Suomi-National Polar-orbiting Partnership (NPP), JPSS-1, JPSS-2, Free Flyer-1, Free Flyer-2), the ground systems and operations through 2028. The three primary satellites are Suomi-NPP, JPSS-1, and JPSS-2. Suomi-NPP was launched in October 2011 and is currently in operation. The other two satellites (Free Flyer-1 and Free Flyer-2) will be complementary missions to fly instruments not manifested on the JPSS-1 satellite. The ground system consists of the Command, Control and Communications Segment (C3S), the Interface Data Processing Segment for science data processing, and the Field Terminal Segment for support to direct broadcast users.

The JPSS-1 design is a near clone of the Suomi-NPP spacecraft with the same instrument suite as Suomi-NPP (less the Ozone Mapper Profiler Suite Limb instrument) as shown below. JPSS-1 is planned to launch from VAFB in late 2016 aboard a United Launch Alliance Delta II rocket.

Spacecraft characteristics	
Lifetime: 7yr (Spacecraft)	
Mass: 2640 kg	Power: 1871 W (EOL)
Dimensions (in launch configuration): 4.2 m x 2.2 m x 2.6 m	
Communications: S-band: Command & Telemetry via Svalbard and Tracking and Data Relay Satellite (TDRS); Ka-band: 300 Mbps Science Mission Data (SMD) link to ground (Primary) and Tracking and Data Relay Satellite System (TDRSS) (contingency); X-band: 15 Mbps High-Rate Data (HRD) link to direct users	



JPSS Instrument		Measurement
	**ATMS** - Advanced Technology Microwave Sounder	ATMS and CrIS together provide profiles of atmospheric temperature, moisture, and pressure
	**CrIS** - Cross-track Infrared Sounder	
	**VIIRS** – Visible Infrared Imaging Radiometer Suite	Provides daily high-resolution imagery and radiometry across the visible to long wave infrared spectrum
	**OMPS** - Ozone Mapping and Profiler Suite	Spectrometers with UV bands for ozone total column measurements
	**CERES** - Clouds and the Earth's Radiant Energy System	Scanning radiometer which supports studies of Earth Radiation Budget

http://www.jpss.noaa.gov/spacecraft.html

3.0 NASA Routine Payload Determination

The components utilized in the JPSS-1 spacecraft are made of materials normally encountered in the space industry. The JPSS-1 mission will not utilize radioactive sources or lasers, will not carry any pathogenic organisms, and will not return samples to Earth. A controlled reentry is planned for the JPSS-1 spacecraft.

The JPSS-1 mission has been evaluated against the 2011 NRPEA, using the RPC (see enclosed Evaluation Recommendation Package). The site-specific impacts of the JPSS-1

launch vehicle/launch site combination are addressed in the EA. Based on the analyses set forth in the 2011 NRPEA, NASA has determined that the environmental impacts associated with JPSS-1 will not individually or cumulatively have a significant impact on the quality of the human environment, and that a routine payload classification for the JPSS-1 mission is applicable.

George W. Morrow
Director of Flight Projects

1/17/13
Date

Christopher J. Scolese
Director

5 FEBRUARY 2013
Date

Enclosure

cc:
100/Mr. A. Obenschain
400/Mr. D. Scheve
400/Mr. S. Shinn
470/Mr. P. Burch
472/Mr. B. Fafaul

EVALUATION RECOMMENDATION PACKAGE

Record of Environmental Consideration
Routine Payload Checklist
NEPA Environmental Checklist

Enclosure

RECORD OF ENVIRONMENTAL CONSIDERATION

1. Project Name: Joint Polar Satellite System (JPSS-1)

2. Description/location of proposed action: The JPSS-1 mission objective is to sustain continuity of and enhance NOAA's Earth observation analysis, forecasting, and climate monitoring capabilities from global polar-orbiting observations.

   Date and/or Duration of project: Launch – Late 2016

3. It has been determined that the above action:

☒ a. Is adequately covered in an existing EA or EIS.
   Title: *Environmental Assessment (Final) for Launch of NASA Routine Payloads*
   Date: November 2011

☐ b. Qualifies for Categorical Exclusion and has no special circumstances which would suggest a need for and Environmental Assessment.
   Categorical Exclusion:

☐ c. Is exempt from NEPA requirements under the provisions of:

☐ d. Is covered under EO 12114, not NEPA.

☐ e. Has no significant environmental impacts as indicated by the results of an environmental checklist and/or detailed environmental analysis. (Attach checklist or analysis as applicable)

☐ f. Will require the preparation of an Environmental Assessment.

☐ g. Will require the preparation of an Environmental Impact Statement.

☐ h. Is not federalized sufficiently to qualify as a major federal action.

Beth Montgomery — NEPA Program Manager, Code 250 — 1/15/2013 Date

Bryan Fafaul — Project Manager, Code 472 — 1/15/2013 Date

APPENDIX C.
NASA ROUTINE PAYLOAD EVALUATION AND DETERMINATION PROCESS AND CHECKLIST

After a proposed spacecraft mission is sufficiently well formulated (usually the Phase B design study), the Sponsoring Entity, in coordination with the local Environmental Management Office (EMO), will prepare an environmental evaluation. An environmental evaluation is a preliminary review that determines what aspects of the proposal are of potential environmental concern. The environmental evaluation also assists in determining the appropriate level of National Environmental Policy Act (NEPA) documentation (i.e., environmental assessment [EA], or environmental impact statement [EIS]) for the proposal. The local EMO uses a comprehensive checklist to provide a level of rigor to this early evaluation of the proposal, helping to ensure that pertinent considerations are not overlooked. Local EMO review of the Routine Payload Checklist (RPC, below) forms the basis for evaluating the applicability of a NASA Routine Payload (NRP) spacecraft classification for a proposed mission.

The local EMO uses the completed RPC (and required attachments) to evaluate the proposed mission against the NRP EA criteria. If the EMO evaluation of the RPC indicates that a NRP categorization may be appropriate, the Sponsoring Entity documents this in an Evaluation Recommendation Package (ERP). The ERP is then processed for review and approval in accordance with established National Aeronautics and Space Administration (NASA) procedures and guidelines. If approved, the ERP would be attached to a Record of Environmental Consideration (REC).

The Sponsoring Entity can then proceed with the proposal while monitoring the project activities, for changes or circumstances during implementation that could affect classification of the proposed mission as a NRP spacecraft. If a NRP spacecraft categorization is determined to be inappropriate, the local EMO will initiate plans for preparation of additional NEPA documentation.

NASA Routine Payload Checklist (1 of 2)

PROJECT NAME: JPSS 1 DATE OF LAUNCH: 11/2016
PROJECT CONTACT: BRYAN FAFAUL PHONE NUMBER: 240-684-0602 MAILSTOP: 472
PROJECT START DATE: 2010 PROJECT LOCATION: GSFC
PROJECT DESCRIPTION: JOINT POLAR SATELLITE PROGRAM WAS FORMED AFTER THE NPOESS PROGRAM WAS CANCELLED IN 2010. THE JPSS PRORAM ASSUMED CONTRACTS FOR THE INSTRUMENT DEVELOPMENT CONTRACTS THAT WERE WELL UNDERWAY. THE JPSS-1 SATELLITE IS A NEAR CLONE TO NPP AND IS A CONTROLLED RE-ENTRY

	YES	NO
A. SAMPLE RETURN:		
1. Would the candidate mission return a sample from an extraterrestrial body?		X
B. RADIOACTIVE MATERIALS:	YES	NO
1. Would the candidate spacecraft carry radioactive materials in quantities that produce an A2 mission multiple value of 10 or more?		X
Provide a copy of the Radioactive Materials On Board Report as per NPR 8715.3 with the ERP submittal		
C. LAUNCH AND LAUNCH VEHICLES:	YES	NO
1. Would the candidate spacecraft be launched on a vehicle and launch site combination other than those listed in Table C–1 below?		X
2. Would launch of the proposed mission exceed the approved or permitted annual launch rate for the particular launch vehicle or launch site?		X
Comments:		
D. FACILITIES:	YES	NO
1. Would the candidate mission require the construction of any new facilities or substantial modification of existing facilities?		X
Provide a brief description of the construction or modification required, including whether ground disturbance and/or excavation would occur:		
E. HEALTH AND SAFETY:	YES	NO
1. Would the candidate spacecraft utilize batteries, ordnance, hazardous propellant, radiofrequency transmitter power, or other subsystem components in quantities or levels exceeding the EPCs in Table C–2 below?		X
2. Would the expected risk of human casualty from spacecraft planned orbital reentry exceed the criteria specified by NASA Standard 8719.14?		X
3. Would the candidate spacecraft utilize any potentially hazardous material as part of a flight system whose type or amount precludes acquisition of the necessary permits prior to its use or is not included within the definition of the Envelope Payload Characteristics?		X
4. Would the candidate mission, under nominal conditions, release material other than propulsion system exhaust or inert gases into the Earth's atmosphere or space?		X
5. Are there changes in the preparation, launch or operation of the candidate spacecraft from the standard practices described in Chapter 3 of this EA?		X
6. Would the candidate spacecraft utilize an Earth-pointing laser system that does not meet the requirements for safe operation (ANSI Z136.1-2007 and ANSI Z136.6-2005)?		X
7. Would the candidate spacecraft contain, by design (e.g., a scientific payload) pathogenic microorganisms (including bacteria, protozoa, and viruses) which can produce disease or toxins hazardous to human health or the environment beyond Biosafety Level 1 (BSL 1)[1]?		X
Comments: JPSS-1 is a controlled re-entry mission		

[1] The use of biological agents on payloads is limited to materials with a safety rating of "Biosafety Level 1." This classification includes defined and characterized strains of viable microorganisms not known to consistently cause disease in healthy human adults. Personnel working with Biosafety Level 1 agents follow standard microbiological practices including the use of mechanical pipetting devices, no eating drinking, or smoking in the laboratory, and required hand-washing after working with agents or leaving a lab where agents are stored. Personal protective equipment such as gloves and eye protection is also recommended when working with biological agents.

NASA Routine Payload Checklist (2 of 2)

PROJECT NAME: DATE OF LAUNCH:
PROJECT CONTACT: PHONE NUMBER: MAILSTOP:
PROJECT START DATE: PROJECT LOCATION:
PROJECT DESCRIPTION:

F. OTHER ENVIRONMENTAL ISSUES:	YES	NO
1. Would the candidate spacecraft have the potential for substantial effects on the environment outside the United States?		X
2. Would launch and operation of the candidate spacecraft have the potential to create substantial public controversy related to environmental issues?		X
3. Would any aspect of the candidate spacecraft that is not addressed by the EPCs have the potential for substantial effects on the environment (i.e., previously unused materials, configurations or material not included in the checklist)?		X
Comments:		

Table C–1. Launch Vehicles and Launch Sites

Launch Vehicle and Launch Vehicle Family	Space Launch Complexes and Pads				
	Eastern Range (CCAFS)	Western Range (VAFB)	USAKA/RTS	WFF	KLC
Athena I, IIc, III[a]	LC-46	CA Spaceport (SLC-8)	N/A	Pad 0	LP-1[a]
Atlas V Family	LC-41	SLC-3	N/A	N/A	N/A
Delta II Family	LC-17	SLC-2	N/A	N/A	N/A
Delta IV Family	LC-37	SLC-6	N/A	N/A	N/A
Falcon 1/1e	LC-36	SLC-4W	Omelek Island	Pad 0	LP-3[b]
Falcon 9	LC-40	SLC-4E	Omelek	Pad 0	LP-3[b]
Minotaur I	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Minotaur II-III	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Minotaur IV	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Minotaur V	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Pegasus XL	CCAFS skidstrip KSC SLF	VAFB Airfield	Kwajalein Island	WFF Airfield	N/A
Taurus	LC-46 and/or LC-20	SLC-576E	N/A	Pad 0	LP-1
Taurus II	NA	NA	N/A	Pad 0	LP-3[b]
Any other launch vehicle/launch site combination for which NASA has completed or cooperated on the NEPA compliance					

a. Athena III and LP-3 are currently under design.

b While not explicitly listed in this table, the Minotaur IV includes all configurations of this launch vehicle, including the Minotaur IV+, which is a Minotaur IV with a Star 48V 4th stage.

Key: CA=California; CCAFS=Cape Canaveral Air Force Station; KSC=Kennedy Space Center; LC=Launch Complex; LP=Launch Pad; MARS=Mid-Atlantic Regional Spaceport; SLC=Space Launch Complex; SLF=Shuttle Landing Facility; USAKA/RTS=United States Army Kwajalein Atoll/Reagan Test Site; VAFB=Vandenberg Air Force Base; WFF=Wallops Flight Facility.

Table C–2. Summary of Envelope Payload Characteristics by Spacecraft Subsystems

Structure	• Unlimited: aluminum, beryllium, carbon resin composites, magnesium, titanium, and other materials unless specified as limited.
Propulsion[a]	• Liquid propellant(s); 3,200 kg (7,055 lb) combined hydrazine, monomethyhydrazine and/or nitrogen tetroxide. • Solid Rocket Motor (SRM) propellant; 3,000 kg (6,614 lb) Ammonium Perchlorate (AP)-based solid propellant (examples of SRM propellant that might be on a spacecraft are a Star-48 kick stage, descent engines, an extra-terrestrial ascent vehicle, etc.)
Communications	• Various 10-100 Watt (RF) transmitters
Power	• Unlimited Solar cells; 5 kilowatt-Hour (kW-hr) Nickel-Hydrogen (NiH_2) or Lithium ion (Li-ion) battery, 300 Ampere-hour (A-hr) Lithium-Thionyl Chloride (LiSOCl), or 150 A-hr Hydrogen, Nickel-Cadmium (NiCd), or Nickel-hydrogen ($Ni-H_2$) battery.
Science Instruments	• 10 kilowatt radar • American National Standards Institute safe lasers (see Section 4.1.2.1)
Other	• U. S. Department of Transportation (DoT) Class 1.4 Electro-Explosive Devices (EEDs) for mechanical systems deployment • Radioactive materials in quantities that produce an A2 mission multiple value of less than 10 • Propulsion system exhaust and inert gas venting • Sample returns are considered outside of the scope of this environmental assessment

a. Propellant limits are subject to range safety requirements.

Key: kg=kilograms; lb=pounds.

Goddard Space Flight Center
FLIGHT PROJECT ENVIRONMENTAL CHECKLIST

1. PROJECT/PROGRAM	Date:
Joint Polar Satellite System (JPSS) / JPSS-1	January 9, 2013

2. SCHEDULE

PDR/CDR:	Launch Date:
Flight SRR: 04/2012, MPDR: 02/2013, MCDR: 01/2014	December 2016

3. CURRENT STATUS

The JPSS-1 Satellite is currently in development and is a clone of the NPP satellite. Unlike NPP, which had the OMPS, VIIRS, and CrIS instruments provided GFE from NOAA's Integrated Program Office, JPSS will now be providing the same instrument suite because the NPOESS Program was cancelled and moved to NASA under JPSS. All NPOESS instr. contracts have been moved to NASA contracts and are now in implementation. The JPSS-1 Spacecraft design will be the same Ball BCP200 bus that was used on NPP. Currently JPSS-1 is planning a SRR in 04/2012, MPDR in 02/2013, MCDR 01/2014.

4. PROJECT DESCRIPTION

a. Purpose:
The JPSS mission objective is to sustain continuity of and enhance NOAA's Earth observation analysis, forecasting and climate monitoring capabilities from global polar-orbiting observations. JPSS is NOAA's portion of the restructured NPOESS program. JPSS will provide operational continuity of satellite-based observations and products for NOAA POES and the NPP system.

b. Spacecraft:

JPSS-1 Spacecraft is is Ball Aerospace and Technology Corp (BATC) BCP2000 bus and is identical to the NPP Spacecraft with the addition of a Ka-band gimbal antenna included

c. Instruments:

JPSS-1 Instrument suite is the same as NPP and includes: ATMS/NGES, CrIS/ITT, VIIRS/Raytheon SAS, CERES/NGAS, and OMPS/BATC (no LIMB sensor)

d. Launch Vehicle:

JPSS-1 Delta II Launch Vehicle was selected in July 2012

e. Launch Site:

JPSS-1 launch is from the Western Range at VAFB.

f. NASAs Involvement/Responsibility:

NASA is responsible for all Space Segment elements (Spacecraft, Instruments (ATMS, CrIS, VIIRS, CERES, and OMPS), System engineering, Mission integration, and Launch Vehicle)

g. Participants/Locations:

Mission Management - GSFC (Greenbelt, MD), Spacecraft (Boulder, CO), ATMS (Azusa, CA), VIIRS (El Segundo, CA), CERES (Langley, VA and Redondo Beach, CA), OMPS (Boulder, CO), LV (KSC, FL), Launch Site (VAFB, CA)

h. End-of-Mission Plan: Planned Re-entry (controlled/uncontrolled?)

Controlled Re-entry -- identical to NPP

5. Is there anything controversial or unique about the mission, spacecraft or instruments? If yes, Explain. Yes ☐ No ☑

6. Is the mission compliant with NASA requirements for limiting orbital debris (NPR 8715.6, and NASA Standard 8719.14? Explain non-compliances. Yes ☑ No ☐

Controlled Re-entry -- identical to NPP
Launch Vehicle is Delta II -- identical to NPP

7. During any phase, does the mission/project include or involve: Check yes for all that apply. If uncertain, check the corresponding box. For all that apply, provide an explanation. Use the additional space below if needed.	Yes	No	Uncertain
A. Fuels	☑	☐	☐
B. Ionizing Radiation Devices/Sources	☐	☑	☐
C. Explosives	☐	☑	☐
D. Hazardous Materials/Substances/Chemicals	☑	☐	☐
E. Lasers (Class, Earth Pointing)	☐	☑	☐
F. Disease Producing Pathogenic Microorganisms/Biological Agents	☐	☑	☐
G. Discharges/Venting of any Substances into Air, Water, or Soil	☐	☑	☐
H. Hazardous Waste Generation	☐	☑	☐
I. High Noise Levels	☐	☑	☐
J. Sample Return to Earth	☐	☑	☐
K. Radio Frequency Communications	☑	☐	☐
L. Construction/Modification/Demolition of a Facility/Lab (onsite - offsite)	☐	☑	☐
M. Land Disturbance, Tree Clearing, Removal of Vegetation	☐	☑	☐
N. Impact on Threatened or Endangered Species	☐	☑	☐
O. Impact/Destruction of Sensitive Wildlife Habitat	☐	☑	☐
P. Impact on/near Areas of Cultural Significance	☐	☑	☐
Q. Impact on Local Social or Economic Conditions (Increase in Traffic, Employment, etc.)	☐	☑	☐
R. Impact on Minority or Low Income Populations	☐	☑	☐
S. New or Foreign Launch Vehicle	☐	☑	☐
T. Other Issues of Potential Environmental Impact	☐	☑	☐
U. Environmental Permits	☐	☑	☐

Additional Information
7A) Fuel: ~362 kg of Monopropellant Hydrazine
7D) Hazardous Materials: ~164 g of Anhydrous Ammonia and ~26.5 kg Beryllium
7K) Radio Frequency Communications: 10W X-band (qty 2), 10W S-band (qty 2), and 70W Ka-band (qty 2) transmitters

8. What Safety hazards are associated with the mission?

Crane lifts, RF radiation, launch, re-entry, battery reconditioning, and spacecraft fueling

9. Summary of Subsystem Components

Propulsion (Include fuel type, amount, tank size, materials, dimensions	Monopropellant Hydrazine, 362 kg, 40-inch oblate spheroid tank of 6Al-4V titanium
Communications	10 W X-band transmitters (qty 2), 10 W S-band transmitters (qty 2), and 70W Ka-band travelling wave tube amplifier (qty 2)
Structural Materials	Aluminum honeycomb sandwich panels with machined aluminum frame
Power	Two 126 Ahr. Li-Ion battery assemblies (Total capacity is 252 Ahr.) and Triple Junction Gallium Arsenide (GaAs) solar array cells
Science Instruments	ATMS, CrIS, VIIRS, OMPS, and CERES
Hazardous Components (radioactive materials, lasers, chemicals, etc.)	(~164 g) Anhydrous Ammonia in Spacecraft Heat Pipes, 23 kg Beryllium in CrIS instrument, 2.5 kg Beryllium in ATMS instrument, 0.9 kg Beryllium in VIIRS
Other (include dimensions and weight of s/c)	Satellite Dimensions: X 4.2 m, Y 2.2 m, Z 2.6 m Satellite Weight: 2640 kg

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FLIGHT PROJECT ENVIRONMENTAL CHECKLIST

Project Manager Printed Name:	Project Manager Signature:		
Bryan Fafaul	Bryan Fafaul		
Project Name:	**Date:**	**Phone Number:**	**Org. Code:**
JPSS Flight Project	1-15-2013	240-684-0602	472

Comments:

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