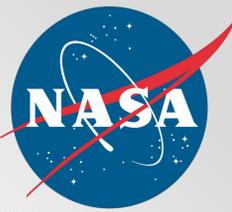


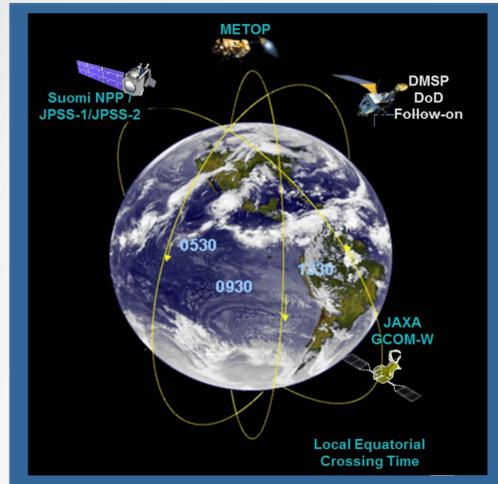


Joint Polar Satellite System (JPSS) System Architecture



“Suomi NPP to the Future”

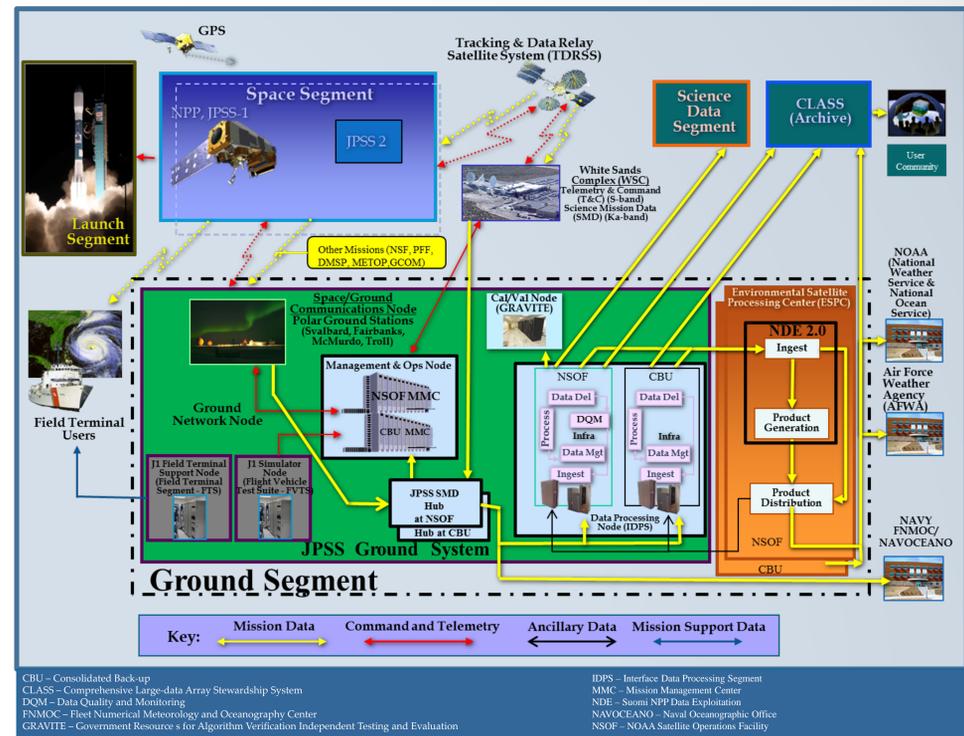
Arron Layns, NOAA JPSS, arron.layns@noaa.gov
 John Furgerson, NOAA JPSS, john.furgerson@noaa.gov
 Janna Feeley, janna.h.feeley@nasa.gov
 Ashley Griffin, ashley.griffin@nasa.gov
 Glenn Trumbower, glenn.trumbower@nasa.gov



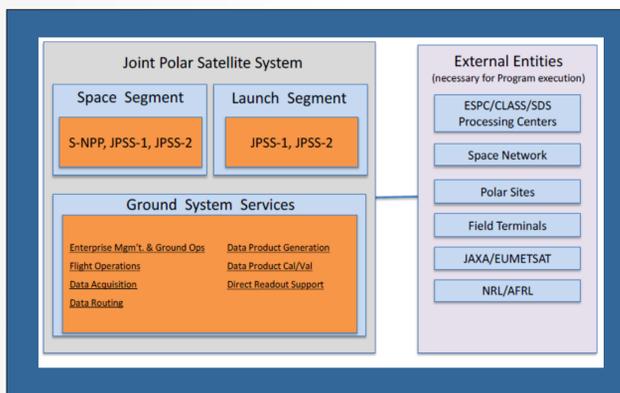
NOAA has partnered with NASA to implement the Joint Polar Satellite System (JPSS) Program to maintain continuity of critical earth observations to support weather and ocean forecasting and prediction. JPSS is responsible for the “System of Systems” which satisfies NOAA’s Level 1 Requirements and includes utilizing partner assets, including, but not limited to the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) Meteorological Operational (Metop) satellites and the Japanese Aerospace Exploration Agency (JAXA) Global Change Observation Mission (GCOM) satellites.

The JPSS is comprised of a space segment, launch segment, and ground system. The space segment consists of two satellites, which are launched by the launch support segment. The ground system is a shared ground infrastructure consisting of multiple subsystems that support a heterogeneous constellation of polar-orbiting satellites, both JPSS Missions and JPSS Supported Missions. The JPSS ground system is currently operating the Suomi National Polar-orbiting Partnership (S-NPP) mission and will be upgraded in time to meet the launch of JPSS-1, which is planned to launch in the 2nd quarter of FY17. JPSS-2 will be ready for launch in the 1st quarter of FY22.

JPSS Top Level Architecture



System Approach



Summary of Mission Attributes

Full life cycle mission operations supported by a full set of JPSS Ground System services

Missions	Mission Orbit	Launch	Payloads	Mission Communications	Data Latency
S-NPP	824 km, 1330 LTAN, Polar Sun-Synchronous, 16 day Repeat Cycle	ULA - Delta II (Vandenberg)	VIIRS, CRIS, ATMS, OMPS-N, OMPS-L, CERES	SMD: X band, 300 Mbps, Svalbard/Fairbanks/Troll HRD: X band, 15 Mbps T&C: S band, Svalbard/Fairbanks/Troll, TDRSS	<140 minutes
JPSS-1	824 km, 1330 LTAN, Polar Sun-Synchronous, 16 day Repeat Cycle, Mission Constellation with S-NPP	ULA - Delta II (Vandenberg)	VIIRS, CRIS, ATMS, OMPS-N, CERES	SMD: Ka band, 300 Mbps, Svalbard & McMurdo, Fairbanks, Troll SMD Backup: Ka band, 150 Mbps, TDRSS HRD: X band, 15 Mbps T&C: S band, Svalbard/Fairbanks/Troll, TDRSS	<96 minutes
JPSS-2	824 km, 1330 LTAN, Polar Sun-Synchronous, 16 day Repeat Cycle, Mission Constellation with S-NPP and JPSS-1	TBD (Vandenberg)	VIIRS, CRIS, ATMS, OMPS-N, OMPS-L (TBR-ESM), RRB (ESM provided)	SMD: Ka band, 300 Mbps, Svalbard & McMurdo, Fairbanks, Troll SMD Backup: Ka band, 150 Mbps, TDRSS HRD: X band, 15 Mbps LRD: L band, 4 Mbps (TBR) T&C: S band, Svalbard/Fairbanks/Troll, TDRSS	<96 minutes

Mission Data Rates and Volumes

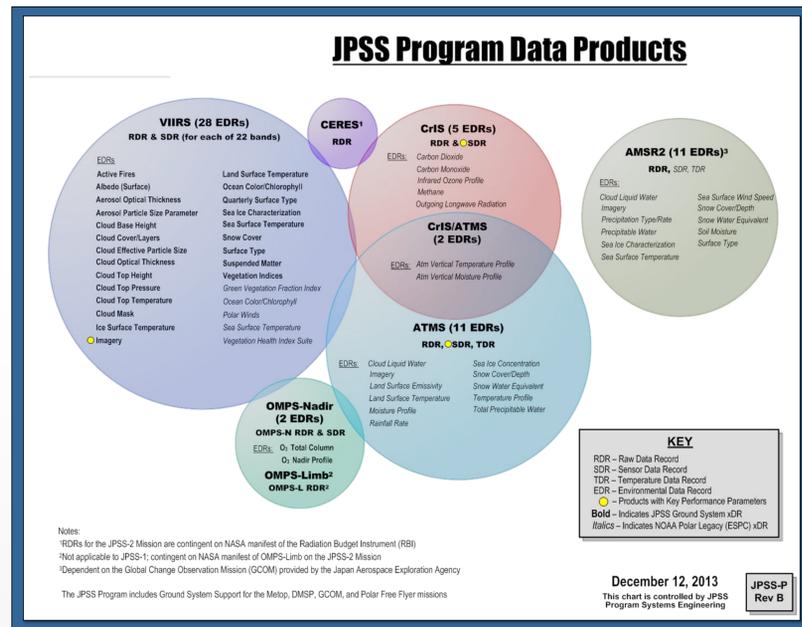
Mission Data Rates and Volumes from Svalbard Station					
Mission	Downlink Rate (Mbps)	Passes per Day	Data Volume per Day (GB)	Outbound Rate (Mbps)	Notes
S-NPP	300	14	100	90	
JPSS-1	300	14	55	90	½ orbit of data
GCOM-W1*	10	14	1.6	90	

Mission Data Rates and Volumes from McMurdo Station					
Mission	Downlink Rate (Mbps)	Passes per Day	Data Volume per Day (GB)	Outbound Rate (Mbps)	Notes
JPSS-1	300	14	55	43 - 49	½ orbit of data
DMSP*	7	14	6	1 - 7	Outbound rate depends on mission priority
Metop*	70	14	21	5 - 20	Outbound rate depends on mission priority

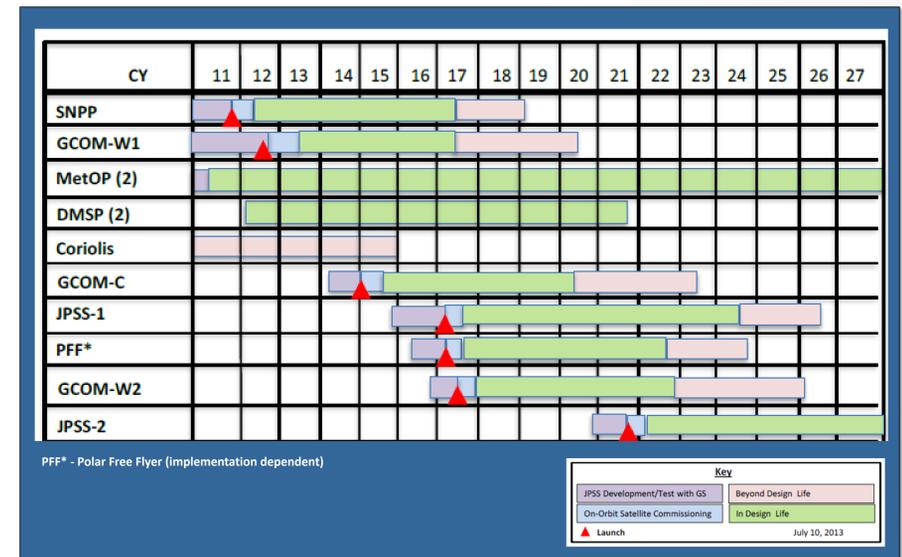
Daily Mission Data Volumes from Data Processing Node at ESPC				
Mission	RDR (GB)	xDR Generation (GB)	xDR Delivery (GB)	Notes
S-NPP	100	4,600	11,140	S-NPP today generates 3,480 GB daily excluding Retained Intermediate Products (RIP)
JPSS-1	110	5,110	12,374	With higher resolution CHS/CI/MS
GCOM-W1	1.6	n/a	7	RDR only
Total	212	9,710	23,521	At Block 2.0

Notes:
 1. xDRs include RIPs
 2. DPN at ESPC delivers xDR to GRAVITE, SDS (RDR only), CLASS, and NDE. NDE ingests only ~40% of total xDRs

Environmental Products



Mission Support Time Lines



Ground System Evolution

Block	Mission	ORR date	Contents	Note
0	Coriolis/WindSat, EOS, POES	Operational	Coriolis/WindSat, EOS, POES support from Svalbard	
1.0	S-NPP	Operational	S-NPP support	
1.1	MetOp	Operational	MetOp-A support from McMurdo	
1.1	DMSP	Operational	DMSP support from McMurdo	
1.2	S-NPP, GCOM-W1	5/12- 3/14	System patches, upgrades and enhancement. Stop-Gap MMC capability GCOM-W1 FOC-A capability, ATOM, security enhancements, AFWA Migration	1.2.1 (10/11) 1.2.2 (10/12) 1.2.3 (9/13) 1.2.4 (3/14)
TRANSITION TO JPSS TECH BASELINE				
2.0	JPSS-1 / FF-1	12/2015	JPSS-1 / FF-1 support, NIST-FIPS High, Hardware and COTS upgrades, software fixes, separate operation configurations, situational awareness. Data delivery to NAVO and FNMOC, COOP	In time to support JPSS-1 JCT 2 testing (7/15)
2.1	GCOM-W2	TBD	GCOM-W2 support	
3.0	JPSS-2	2019 (Ready)	JPSS-2 support, Tech Refresh	In time to support JPSS-2 I&T