Joint Polar Satellite System(JPSS) System Architecture
"NPP to the Future"

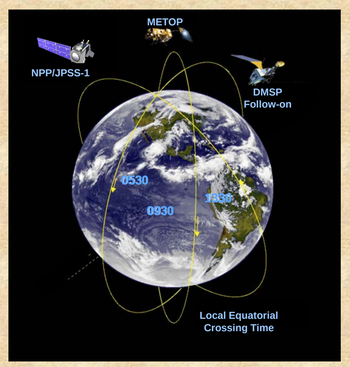
Glenn Trumbower, JPSS Ground DPA, Praxis

NPP Launched 28 October 2011

Environmental Monitoring in Support of Civil and Defense Applications

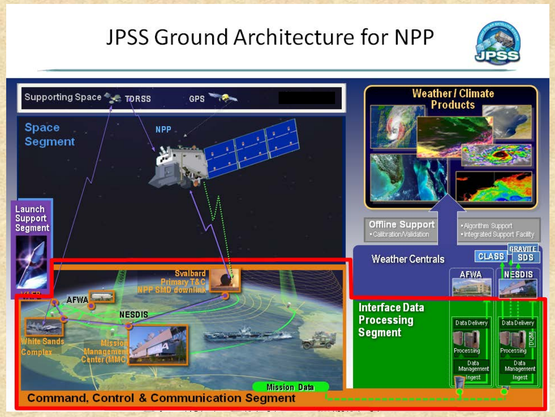
Features
- Rapid data delivery - 4 times faster than legacy systems (JPSS-2 and beyond)
- Quickly react to changing conditions
- 10 times the data
- More accurate data for better forecasts
- International collaboration

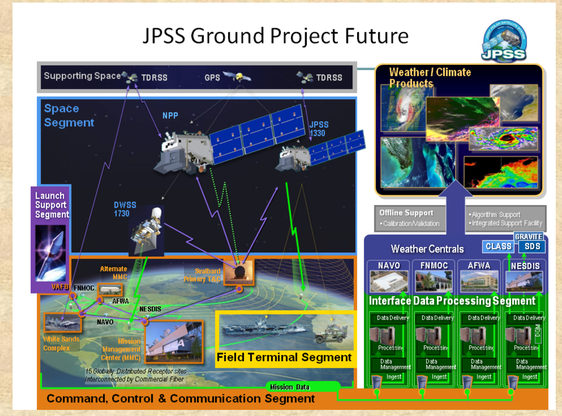
Benefits
- Critical inputs to weather forecast models
- Science quality data to users including research scientists
- Continuity of climate data records



NOAA through NASA, as its acquisition agent, will procure the afternoon orbit assets that support its civil weather and climate requirements and DoD will independently procure assets for the morning orbit military mission. Both agencies will continue to share environmental measurements made by the system and support the operations of a shared common ground system.

Our valuable international partnership with the Europeans will remain for support of the mid-morning orbit, and NOAA will continue to pursue additional partners for inclusion into the system. Some work remains to develop the most effective transition and alignment of responsibilities, as well as to refine the launch readiness dates.





Environmental Data Records (EDRs)

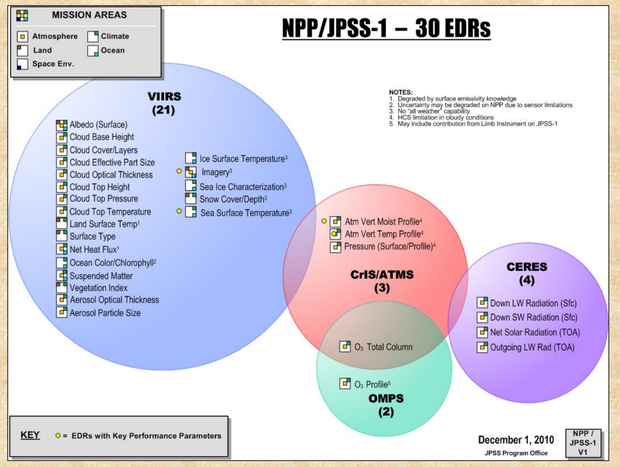
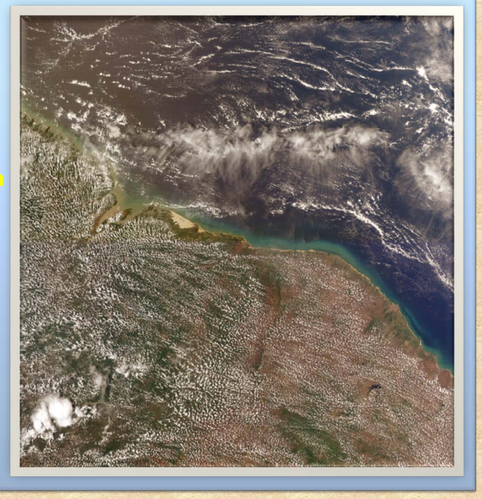
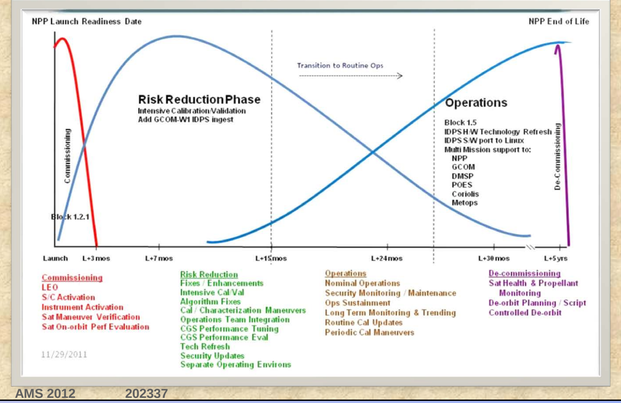


Image from VIIRS SDR Team (STAR)



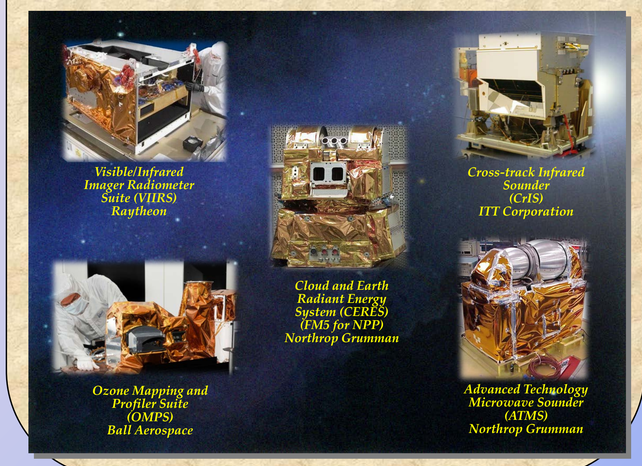
JPSS Ground System Evolution and NPP - On-Orbit Mission Phases



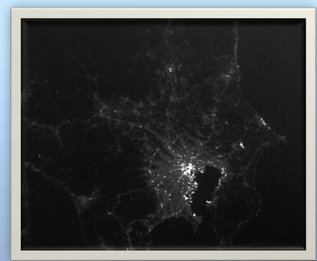
Flight Segment

	NPP*	JPSS-1
VIIRS	X	X
CrIS	X	X
ATMS	X	X
OMPS	X	X
CERES	X	X

* PM = 1330 LTAN orbit



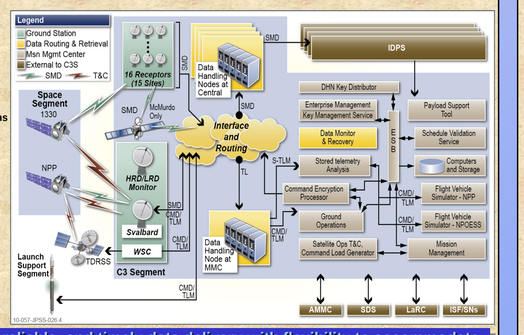
VIIRS DNB First Light Images – Tokyo
Steve Mills, Northrop Grumman



Common Ground System (CGS)

Command, Control and Communications (C³) Architecture

- Satellite Command and Control
- Global Mission Data Communications
- Enterprise Mission Management
- Heavily based upon IIS Reuse Products (CPR)
- IS HW based upon Intel / Windows environments

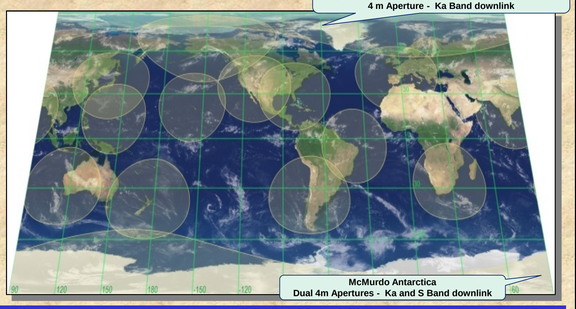


Low-cost, reliable, and timely data delivery with flexibility to accommodate system growth and technology insertion

JPSS Common Ground System (CGS) Distributed Receptor Network (DRN)

DRN Sites – 4m Receptor Ka Band downlink

Svalbard
13m Aperture - S Band uplink/downlink, X Band downlink
4 m Aperture - Ka Band downlink



Distributed Receptor Network (DRN) - Global fiber network connects 15 unattended distributed receptor sites to Centrals

First Image from VIIRS 11/21/11
Liam Gumley [Liam.Gumley@ssec.wise.edu]

JPSS Evolutionary Roadmap

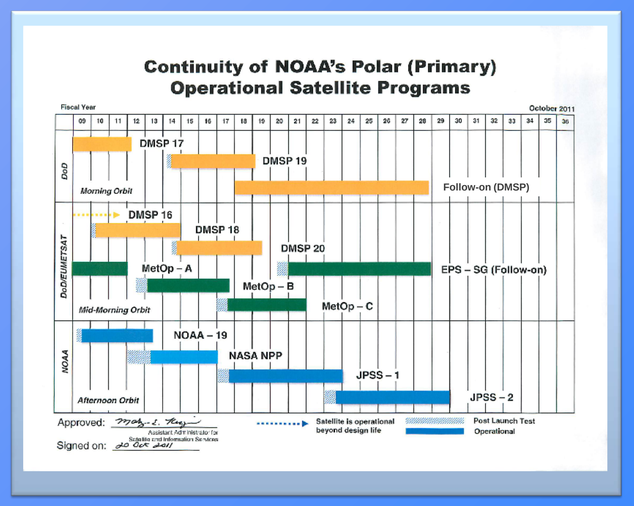
1960 - 2010	2000 - 2016	2016 – 2025+
DMSP (Defense Meteorological Satellite Program)	NPP (NPOESS Preparatory Project)	JPSS (Joint Polar Satellite System)
POES (Polar-orbiting Operational Environmental Satellites)	EOS (Earth Observing System)	DWSS (Defense Weather Satellite System)

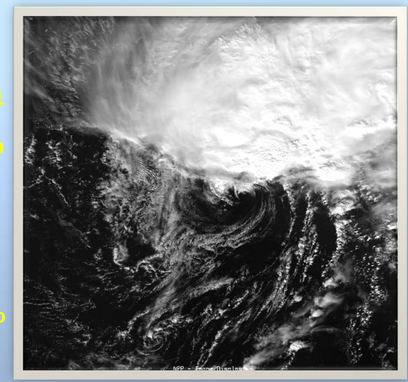
Sensor data rate: 1.5 Mbps
Data latency: 100 – 150 min.
1.7 Gigabytes per day (DMSP)
6.3 Gigabytes per day (POES)

Sensor data rate: 15 Mbps
Data latency: 100 – 180 min.
Data availability: 98%
Ground revisit time: 12 hrs
2.6 Terabytes per day (EOS)
2.4 Terabytes per day (NPP)

Sensor Data Rate: 20 Mbps
Data latency: 28 min.
Data availability: 99.95%
Autonomy capability: 60 days
Selective encryption/deniability
Ground revisit time: 4 – 6 hrs
5.4 Terabytes per day (JPSS)

JPSS Satisfies Evolutionary Program Needs with Enhanced Capabilities



VIIRS I-band1 image (375 m resolution) from 21 Nov 2011 at 1624 UTC over the north Atlantic, within an hour after the instrument was first turned on.

Daniel Lindsey [Lindsey@cira.colostate.edu]