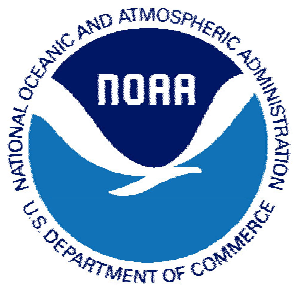


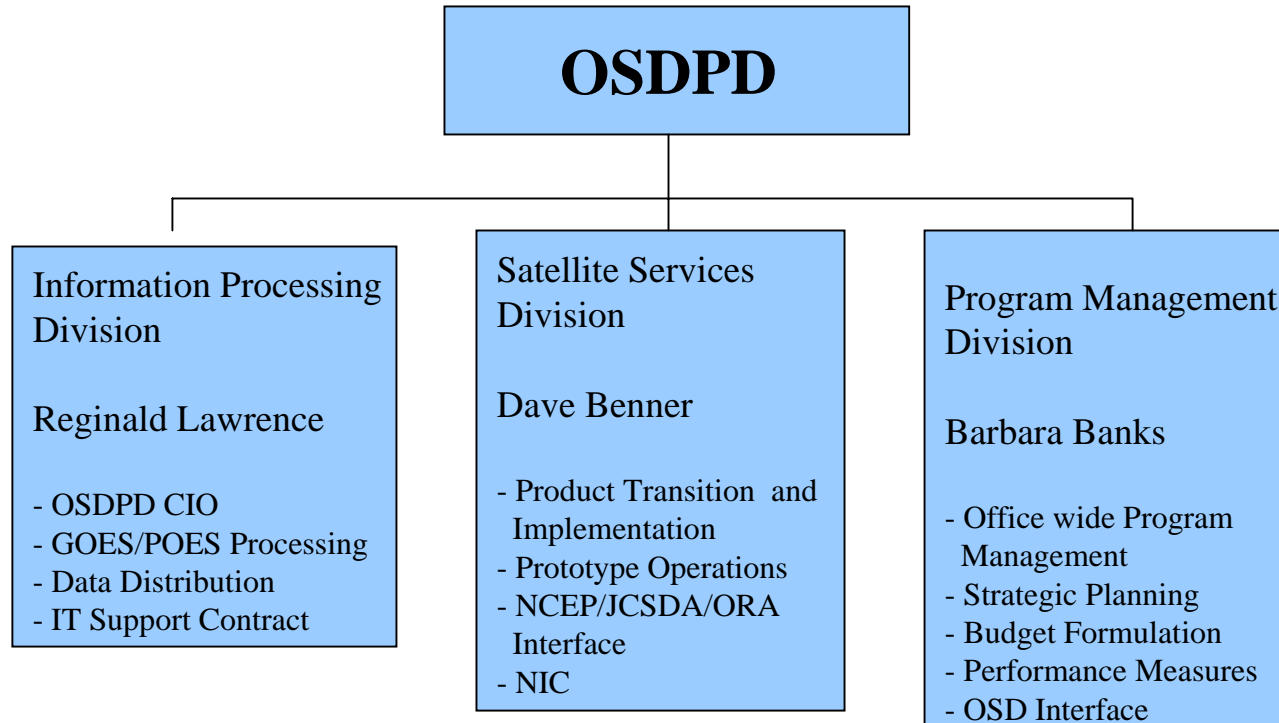
Initial Joint Polar System (IJPS) Era  
Processing and Beyond at the  
Information Processing Division (IPD)  
of the Office of Satellite Data  
Processing and Distribution

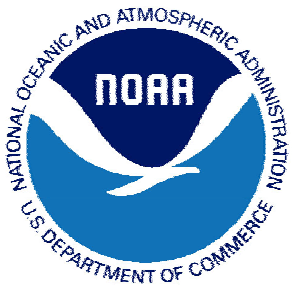
Vince Tabor

Office of Satellite Data Processing and Distribution  
ITSC – Beijing, May 30, 2005



# OSDPD Functional Re-alignment





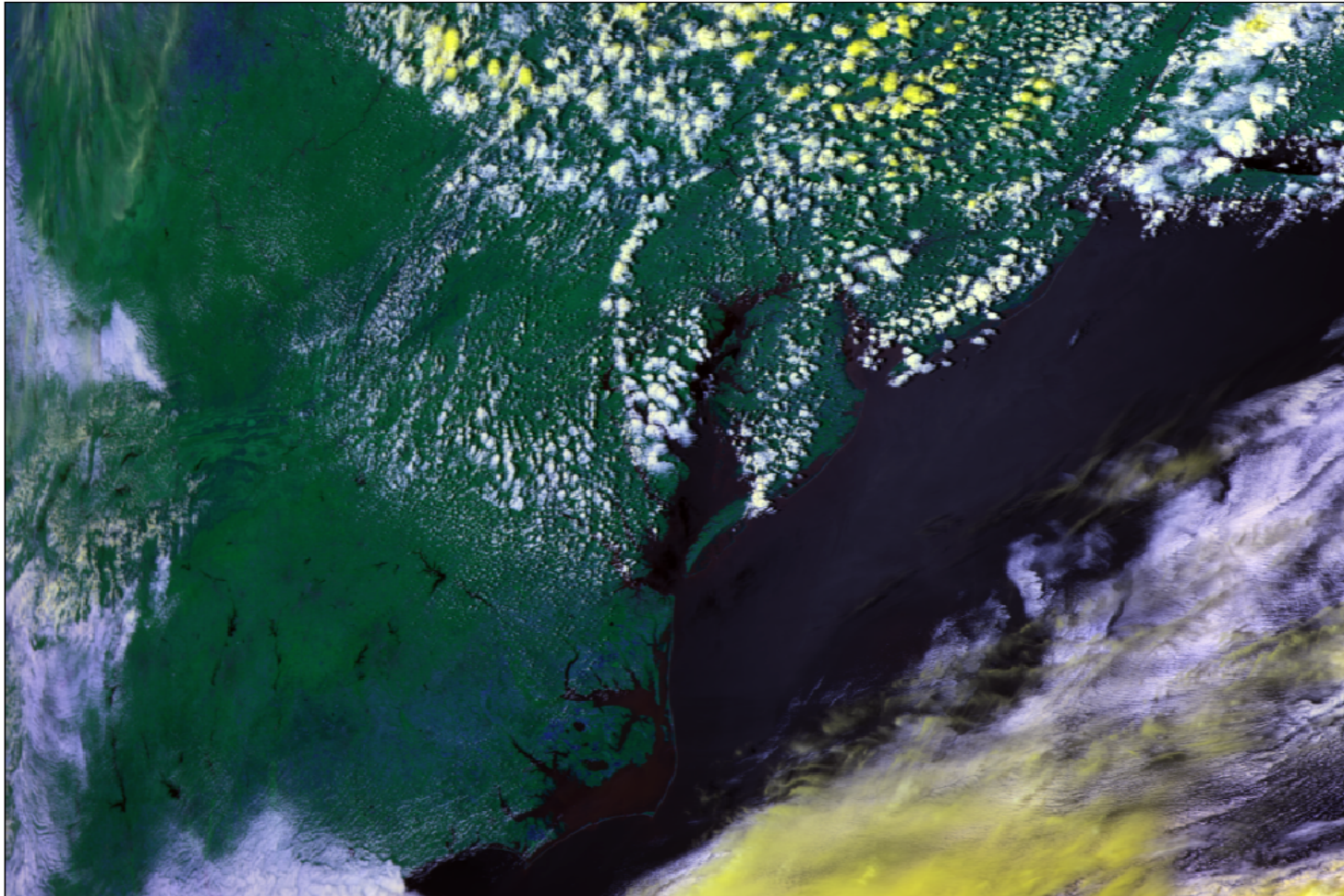
# A New Era was Launched


May, 20 2005






# NOAA-18 Visible Image May 21, 2005

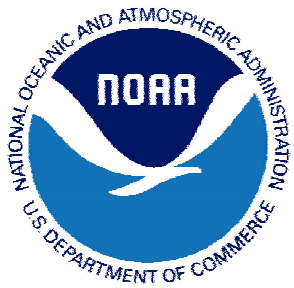


  
Data courtesy of:  
USDOC/NOAA/NESDIS

Satellite:  
NOAA-18  
Sensor:  
AVHRR  
Date:  
2005/05/21 JD 141  
Time:  
18:00:00 UTC  
13:00:00 -0500  
Scene time:  
DAY  
Projection type:  
SWATH  
Latitude bounds:  
31 N -> 43 N  
Longitude bounds:  
89 W -> 70 W



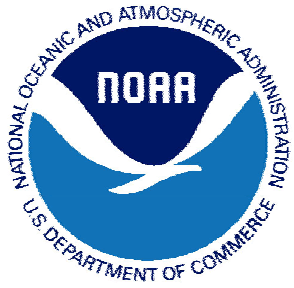




# Upcoming IJPS Launches



| POES Spacecraft | Launch Readiness or Need Date | Planned Launch Date |
|-----------------|-------------------------------|---------------------|
| METOP-1 (am)    | November 2005                 | April 2006          |
| NOAA-N' (pm)    | June 2007                     | December 2007       |
| METOP-2 (am)    | March 2010                    | August 2010         |



# Major IJPS Era Changes



- New Preprocessing Software
- New Data Processing Platform
- New Advanced Front End Processor (AFEP)
- New Distribution System
- New Facility
- New Preprocessor for Metop
- New Schemes for More Timely Data



# Modifications Implemented in New Preprocessor



- On April 28, implemented new Preprocessor and 1b format
- Incorporated MHS Code
  - MHS Replaced AMSU-B on NOAA-N
- Field of View (FOV) Size Change for HIRS
  - Field of View Changed from 20km to 10km on HIRS/4



# Modifications Implemented in New Preprocessor



- HIRS specific calibration and format changes
  - Calibration Modified for HIRS/4
    - Take into account 5<sup>th</sup> Internal Warm Target (PRT)
    - Third telescope temperature sensor
    - Patch Temperature changed from 100 to 95K
    - Added extra bit to the electronic serial number in the Digital A data stream Element 63 Bits 40-44
- HIRS specific calibration and format changes (cont.)
  - HIRS Calibration Algorithm Version 4.0
    - New algorithm to be introduced as a supplement or replacement to current operational HIRS calibration algorithm
    - Lunar Contamination Detection and Correct
  - Lunar contamination detection added

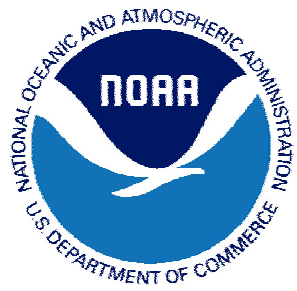




# Modifications Implemented in New Processor



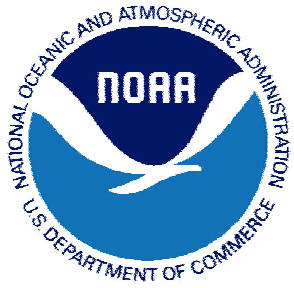
- AMSU-A Changes
  - Lunar contamination detection and correction
    - Required minor change to 1b format
      - Header and Data record
    - Plan to change implement in Earth Location System
  - Still working on correction for sudden jumps in the calibration counts (NOAA-17 Channel 3 & Metop anomaly)
    - Required minor change to 1b format
      - Header and Data record



# Modifications Implemented in New Preprocessor



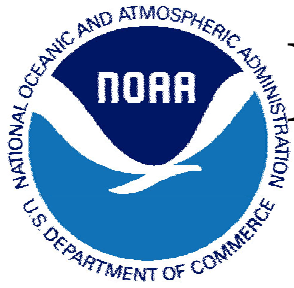
- AVHRR Issues
  - Change to AVHRR Scaling Factors for some of the AVHRR nonlinear radiance coefficients
    - IR Operational/Test Cal Channel 4 coefficient 3
    - IR Operational/Test Cal channel 5 Coefficient 3 AMSU-A Changes
- Archive of new telemetry data set



# New Data Processing Platform



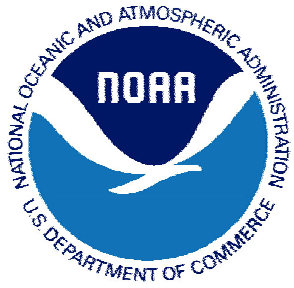
- On April 28, Moved Preprocessing System from Amdahl Enterprise Server to IBM p655
  - Improved Processing Speed
  - Reduced Processing Cost



# New Advanced Front End Processor (AFEP)



- Reason for change
  - Replace out dated Front End Processor (FEP)
  - Allow Ingest of Metop CCSDS data
- Internal Tests are being conducted
  - Encountered Problems with Interface to Satellite Operations Control Center (SOCC)
- Will resume testing with user community
- Transition to AFEP soon



# New Distribution Server



- Data Distribution will be moved from Amdahl Enterprise Server to an IBM p-series computer
  - System in design acceptance phase
  - Plan to begin transition to new server August time frame



# Move to New Facility



- IPD will move to new NOAA Satellite Operations Facility (NSOF)
  - Scheduled to begin moving equipment  
August time frame
  - Scheduled to begin moving staff  
October time frame
  - Plan to complete transition by January
  - No interruption to service plan





# Metop Processing



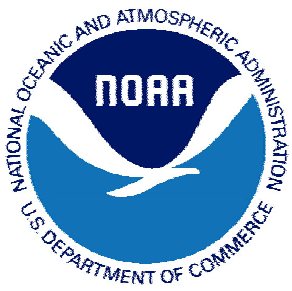
- Metop Development is underway
- Plan to employ pipeline processing scheme to reduce data age
- Data age should be more constant using this scheme
- User with timeliness requirements may elect to receive data granules for Metop
- User without timeliness requirements may elect to receive full orbit files
- NOAA may decide to employ pipeline processing scheme for NOAA satellites



# Other Schemes for Improved Data Timeliness



- Eumetsat NOAA-N & N' Blind Orbit Support
  - Plan to employ pipeline processing scheme
- Blind Orbit Support for KLM series
  - OSD is investigating avenues for obtaining blind orbits for KLM series of satellites



# Eumetsat Unique Instrument Processing Plans



- Receive ASCAT, GOME, GRAS 1b data from Eumetsat
- Receive full resolution ASCAT 1b file from Eumetsat
  - May elect to perform L0 processing for ASCAT
- Receive IASI 1c Data from Eumetsat
  - Plan to generate PCs and reconstructed radiance
  - May generate cloud cleared radiances

in future



# Beyond IJPS: Continuing Current Non-NOAA Satellite Activities



- Receiving raw Terra (MODIS) and Aqua (AIRS, MODIS, AMSR-E) data in real time from NASA
- Receiving raw QuikSCAT (SeaWINDS) data in real time from NASA
- Receiving processed TRMM products from NASA in near real time
- Receiving JASON-1 products from NASA/JPL
- Receiving raw WindSAT data from IPO



# Beyond IJPS: Jason-2



- Jason-2 provides continuity of sea surface height measurements beyond Topex/Poseidon and Jason-1, which is used in NOAA operations
  - Jason-1 is a cooperative program between NASA and the French Space Agency (CNES)
- NOAA and EUMETSAT have committed to join this partnership for Jason-2
- NOAA will leverage expertise from NASA and CNES and our own expertise in building ground systems and operating satellites



# Beyond IJPS:OSTM / Jason2 Responsibility Sharing



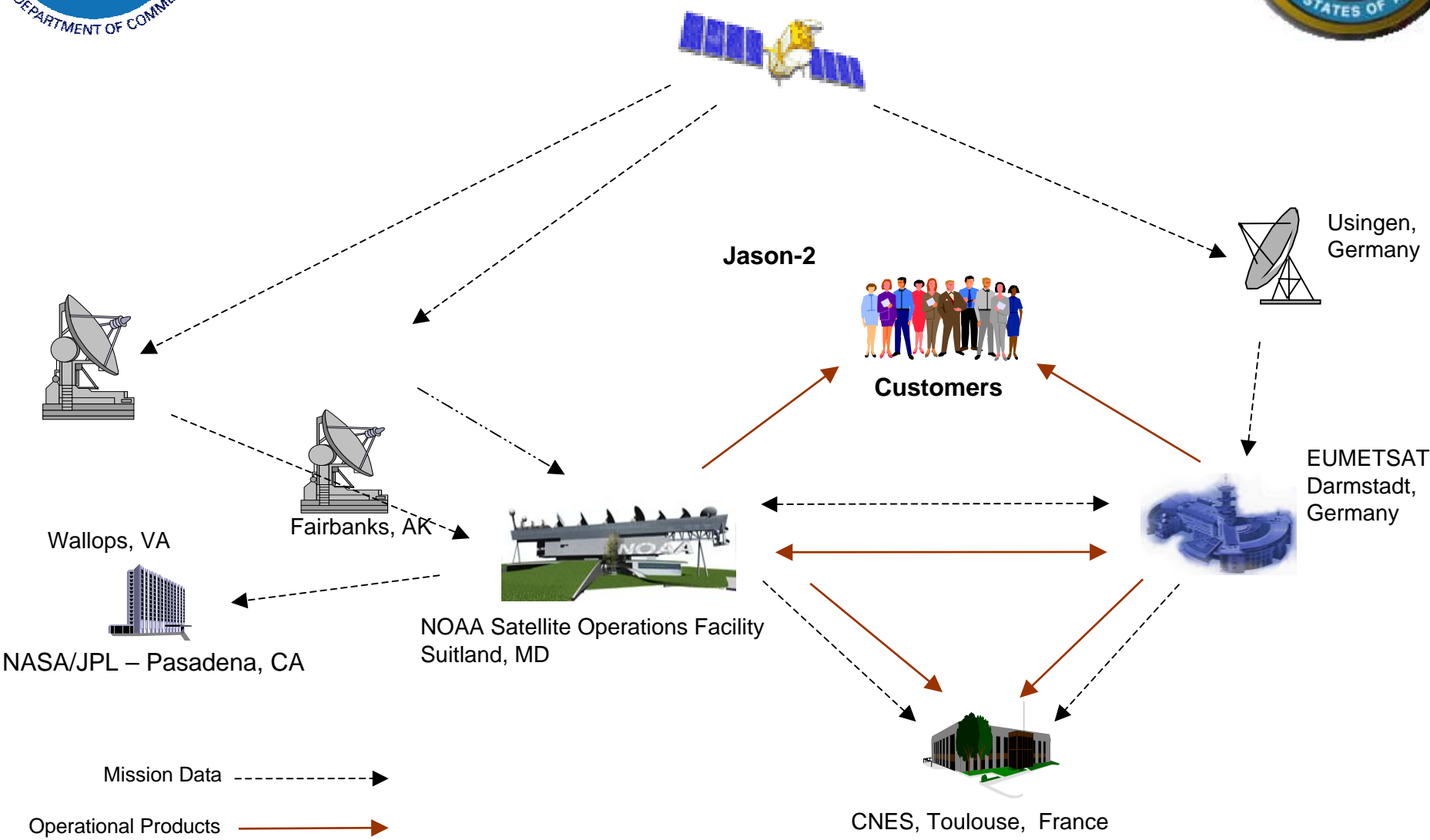
- **NASA responsibilities:**
  - **Project Management**
  - **Launch vehicle**
  - **Payload**
    - **Microwave Radiometer**
    - **Wide swath Ocean Altimeter (optional)**
    - **GPS Receiver**
    - **Laser Retroreflector Array**
  - **WSOA data validation processing and distribution**
  
- **NOAA responsibilities:**
  - **Mission Operations after commissioning**
  - **Ground system**
    - **Satellite Operations Control Center**
    - **Command and Data Acquisition Sites**
    - **Data Comm Network**
  - **Near Real Time GDR processing and distribution**
  - **User Interface**
  - **Archiving and Access services**

- **CNES responsibilities:**
  - **Project Management**
  - **Proteus bus**
  - **Payload**
    - **Nadir Altimeter**
    - **DORIS tracking receiver**
    - **WSOA TWTA**
  - **Ground System**
  - **System and Satellite integration & test**
  - **Mission Operations during commissioning**
  - **Data Processing, archiving and distribution**
  
- **EUMETSAT responsibilities:**
  - **Earth terminal**
  - **Operational product processing and distribution**
  - **User interface**





# Beyond IJPS: Jason - Data Flow





# Beyond IJPS: Evolutionary Roadmap



1960 - 2000

**DMSP** (Defense Meteorological Satellite Program)

**POES** (Polar Orbiting Operational Environmental Satellites)

Sensor data rate: 1.5 Mbps  
Data latency: 100-150 min.

2000 - 2010

**NPP** (NPOESS Preparatory Program)

**EOS** (Earth Observing System)

15 Mbps sensor data rate  
Data latency: 100-180 min.  
Data availability: 98%  
Ground revisit time: 12 hrs.

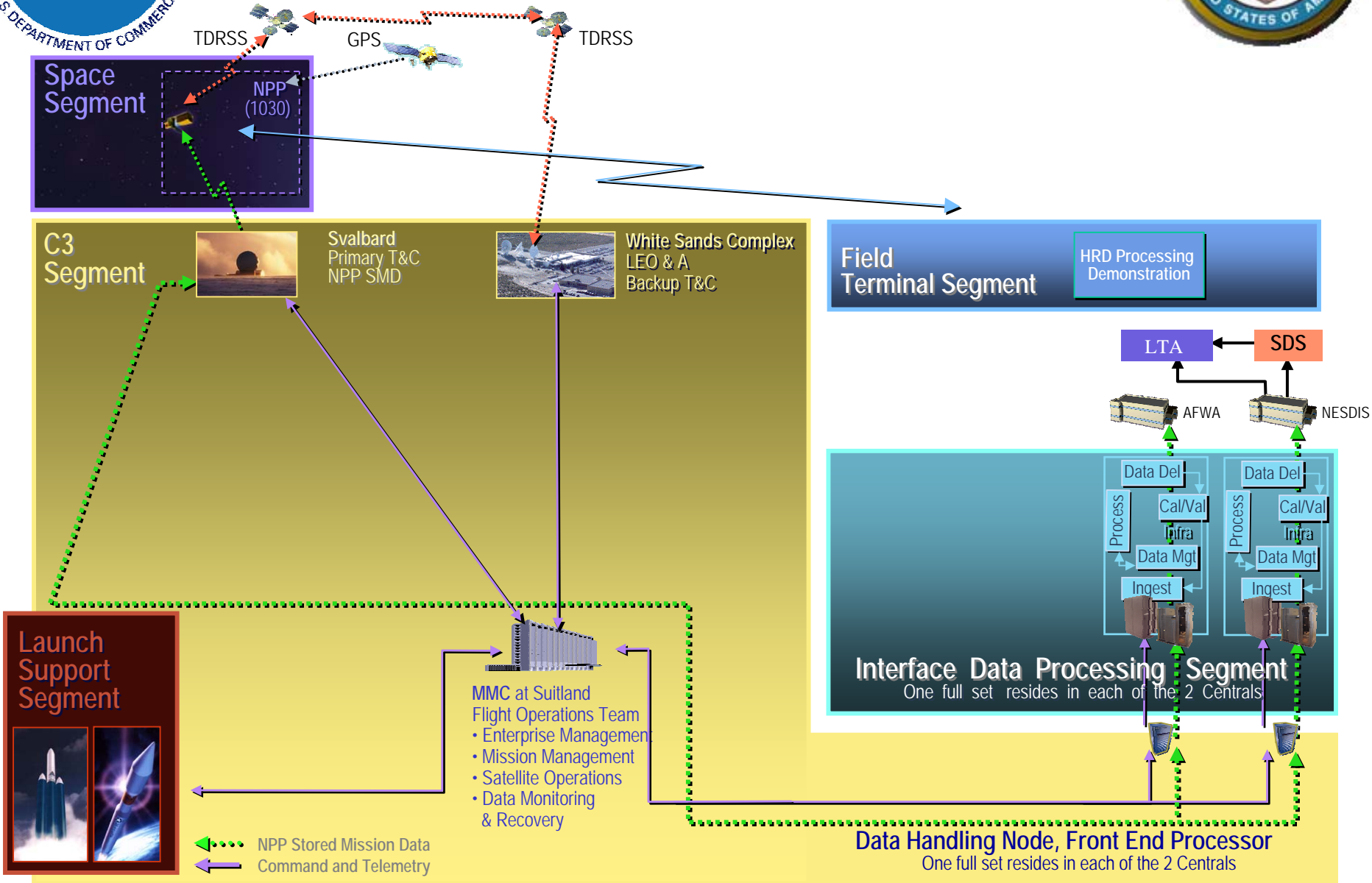
2010 - 2020+

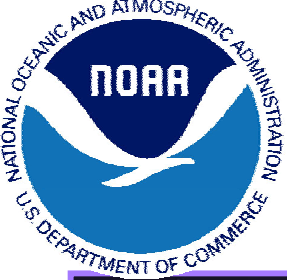
**NPOESS** (National Polar Orbiting Operational Environmental Satellite System)

20 Mbps sensor data rate  
Data latency: 28 min.  
Data availability: 99.98%  
Autonomy capability: 60 days  
Selective encryption/deniability  
Ground revisit time: 4-6 hrs.

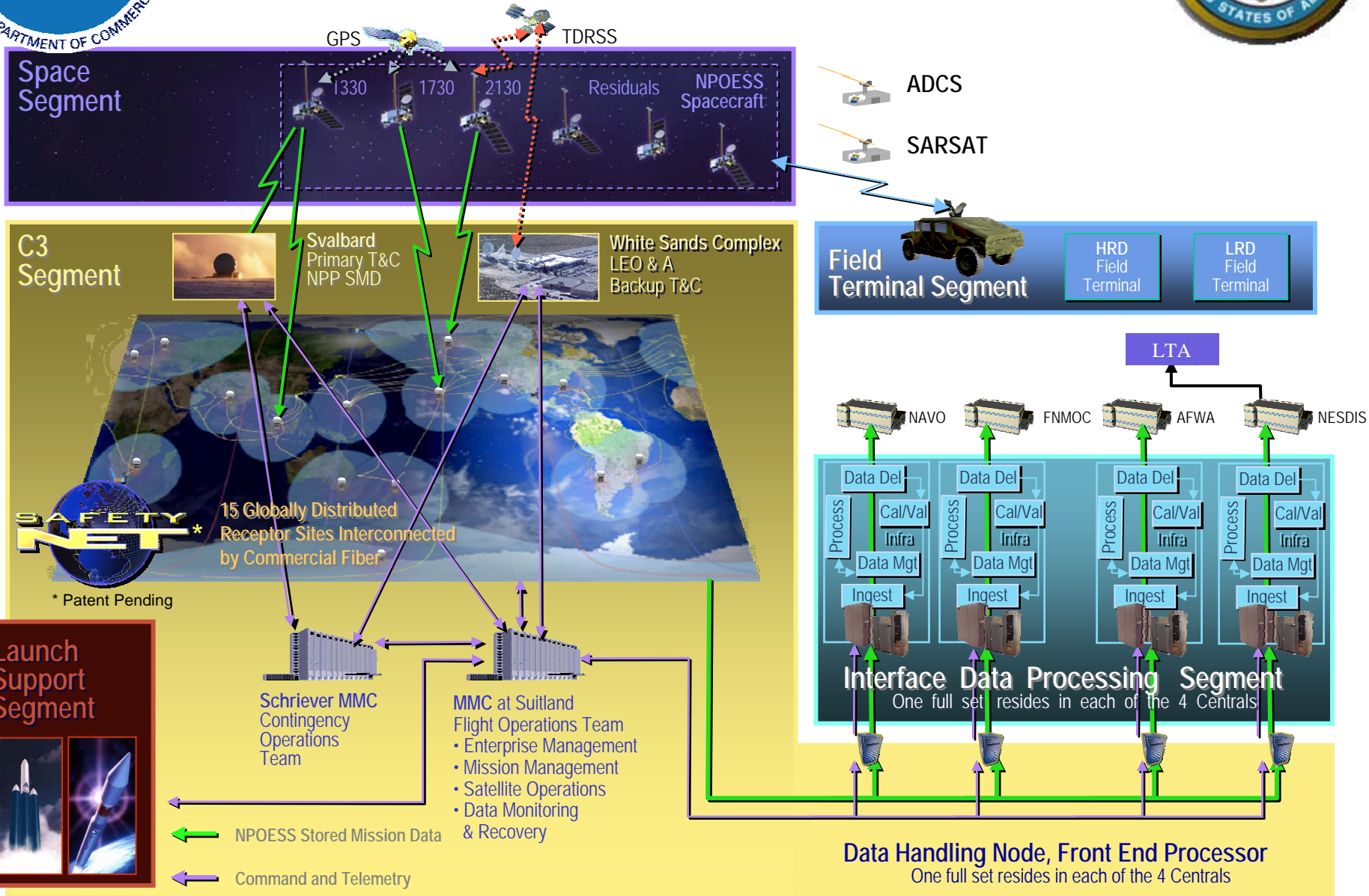


# Beyond IJPS: State 1 – NPP Mission Only Risk Reduction Mission Phase





# Beyond IJPS: State 3 – NPOESS Full Operational Capability (FOC)





# Sensor Suite vs EDR

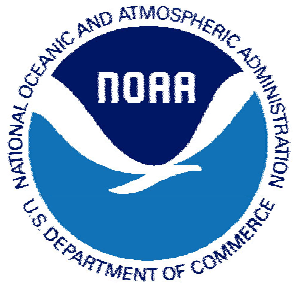
|   |                             |                                       |                            |
|---|-----------------------------|---------------------------------------|----------------------------|
| ★ | Atm Vert Moist Profile      | Cloud Top Pressure                    | Precipitable Water         |
| ★ | Atm Vert Temp Profile       | Cloud Top Temperature                 | Precipitation Type/Rate    |
| ★ | Imagery                     | Down LW Radiance (Sfc)                | Pressure (Surface/Profile) |
| ★ | Sea Surface Temperature     | Down SW Radiance (Sfc)                | Sea Ice Characterization   |
| ★ | Sea Surface Winds           | Electric Fields                       | Sea SFC Height/TOPO        |
| ★ | Soil Moisture               | Electron Density Profile              | Snow Cover/Depth           |
|   | Aerosol Optical Thickness   | Energetic Ions                        | Solar Irradiance           |
|   | Aerosol Particle Size       | Geomagnetic Field                     | Supra-Therm-Aurora Prop    |
|   | Aerosol Refractive Index    | Ice Surface Temperature               | Surface Type               |
|   | Albedo (Surface)            | In-situ Plasma Fluctuation            | Surface Wind Stress        |
|   | Auroral Boundary            | In-situ Plasma Temp                   | Suspended Matter           |
|   | Auroral Energy Deposition   | Ionospheric Scintillation             | Total Water Content        |
|   | Auroral Imagery             | Med Energy Chgd Parts                 | Vegetative Index           |
|   | Cloud Base Height           | Land Surface Temp                     |                            |
|   | Cloud Cover/Layers          | Net Heat Flux                         |                            |
|   | Cloud Effective Part Size   | Net Solar Radiation (TOA)             |                            |
|   | Cloud Ice Water Path        | Neutral Density Profile               |                            |
|   | Cloud Liquid Water          | Ocean Color/Chlorophyll               |                            |
|   | Cloud Optical Thickness     | Ocean Wave Character                  |                            |
|   | Cloud Particle Size/Distrib | Outgoing LW Rad (TOA)                 |                            |
|   | Cloud Top Height            | O <sup>3</sup> - Total Column Profile |                            |

## LEGEND

|           |       |
|-----------|-------|
| VIIRS     | GPSOS |
| CMIS      | ERBS  |
| CrIS/ATMS | TSIS  |
| OMPS      | ALT   |
| SES       | APS   |

★ - KPPs





# Conclusion

- There are many changes planned for the IJPS era and Beyond at IPD. These changes are required to keep up with changes in instrumentation, missions or to improve service. IPD will work with the user community to minimize or eliminate any negative impacts.