



NPOESS Preparatory Project (NPP) *Access to Data*

The 14th International TOVS Study Conference

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Beijing, China

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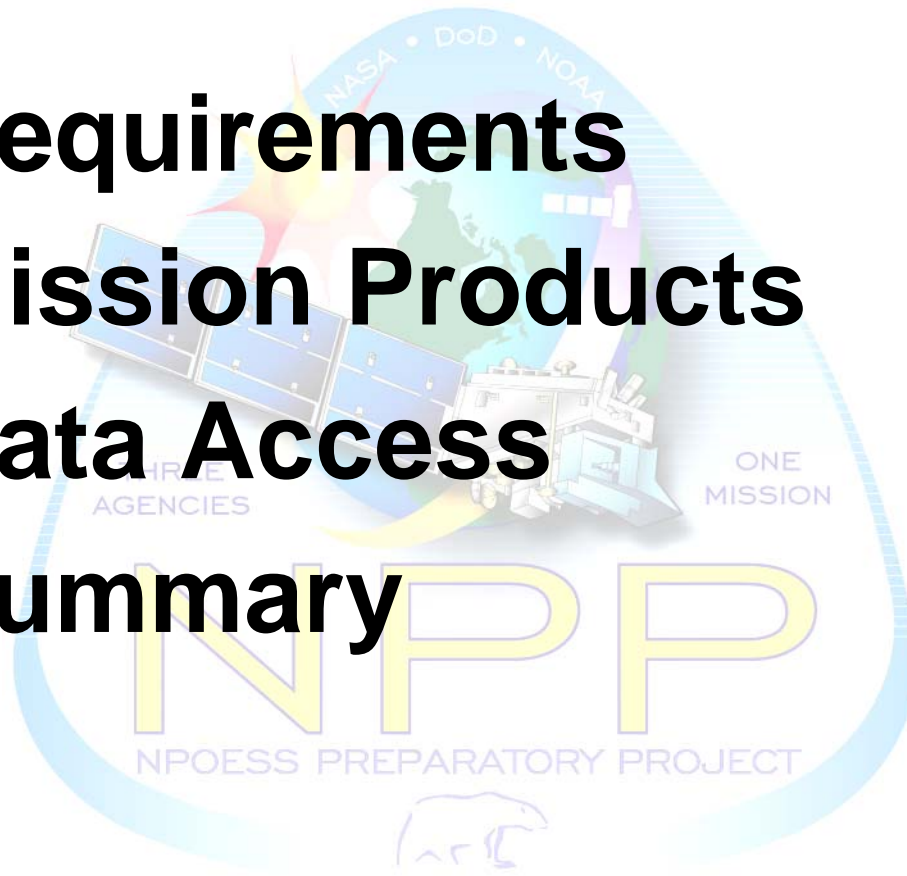
NPOESS Integrated Program Office (IPO)

Silver Spring, MD USA



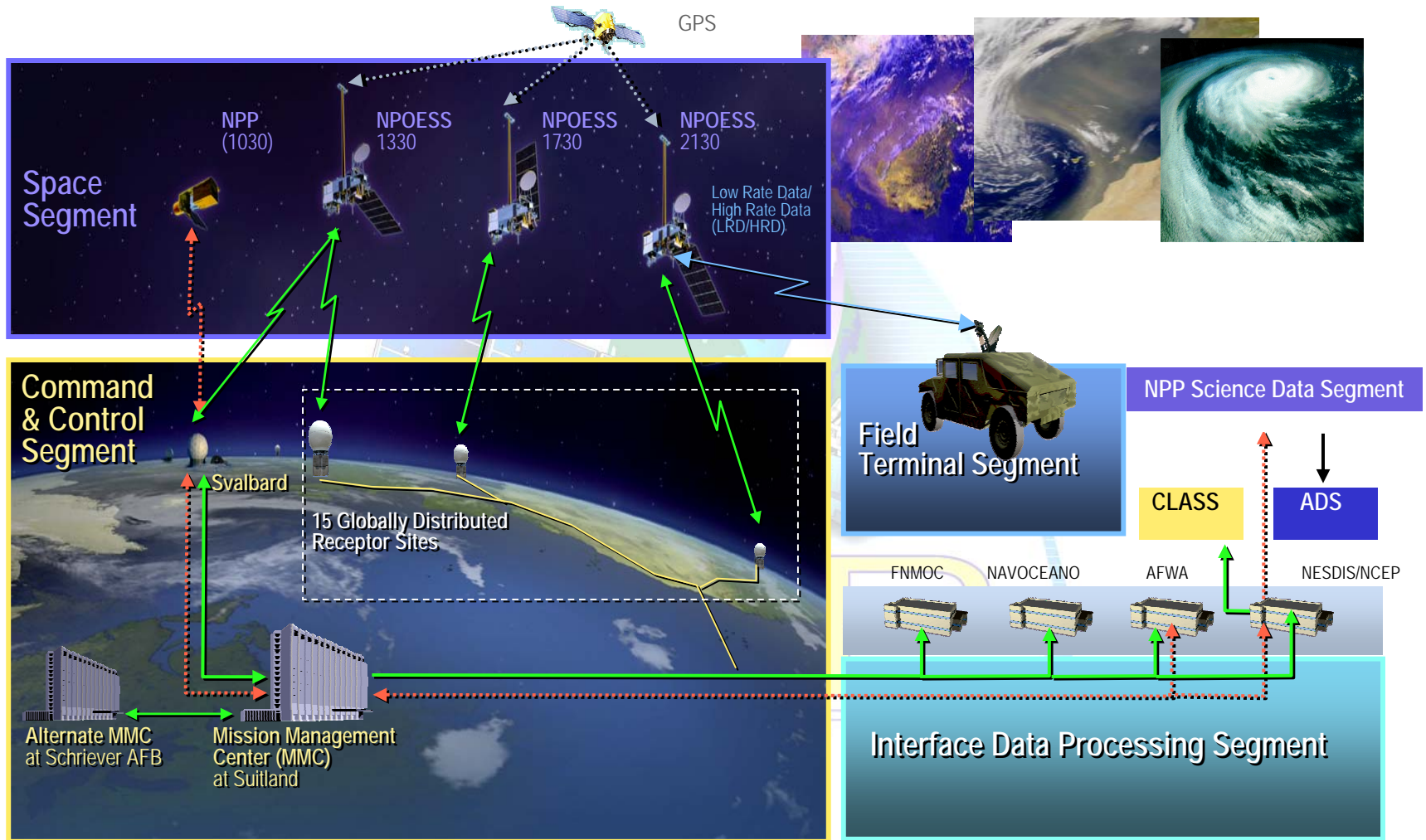
Overview

- **Requirements**
- **Mission Products**
- **Data Access**
- **Summary**





NPOESS & NPP Top Level Architecture



←--- NPP Data & Control Flow

← NPOESS Data & Control Flow

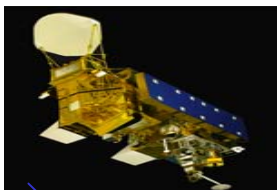
CLASS NOAA Comprehensive Large Array Data Stewardship System

ADS NPP Archive & Distribution Seg



Real-Time Operational Demonstrations

Aqua (2002)
AIRS/AMSU/HSB & MODIS



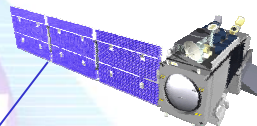
Coriolis
WindSat (2003)



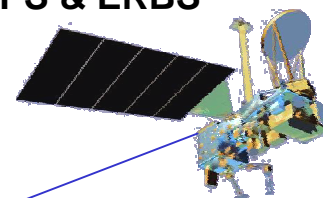
METOP (2006)
IASI/AMSU/MHS & AVHRR



NPP (2008)
CrIS/ATMS
VIIRS
OMPS



NPOESS (2009-2010)
CrIS/ATMS, VIIRS, CMIS,
OMPS & ERBS



Use of Advanced Sounder Data for Improved Weather Forecasting/Numerical Weather Prediction

**NOAA Real-Time Data Delivery Timeline
Ground Station Scenario**

C3S

IDPS

**NOAA
Real-time
User**

Joint Center for Satellite Data Assimilation

**NWS/NCEP
GSFC/DAO
ECMWF
UKMO
FNMOC
Meteo-France
BMRC-Australia
Met Serv Canada**

**NWP
Forecasts**

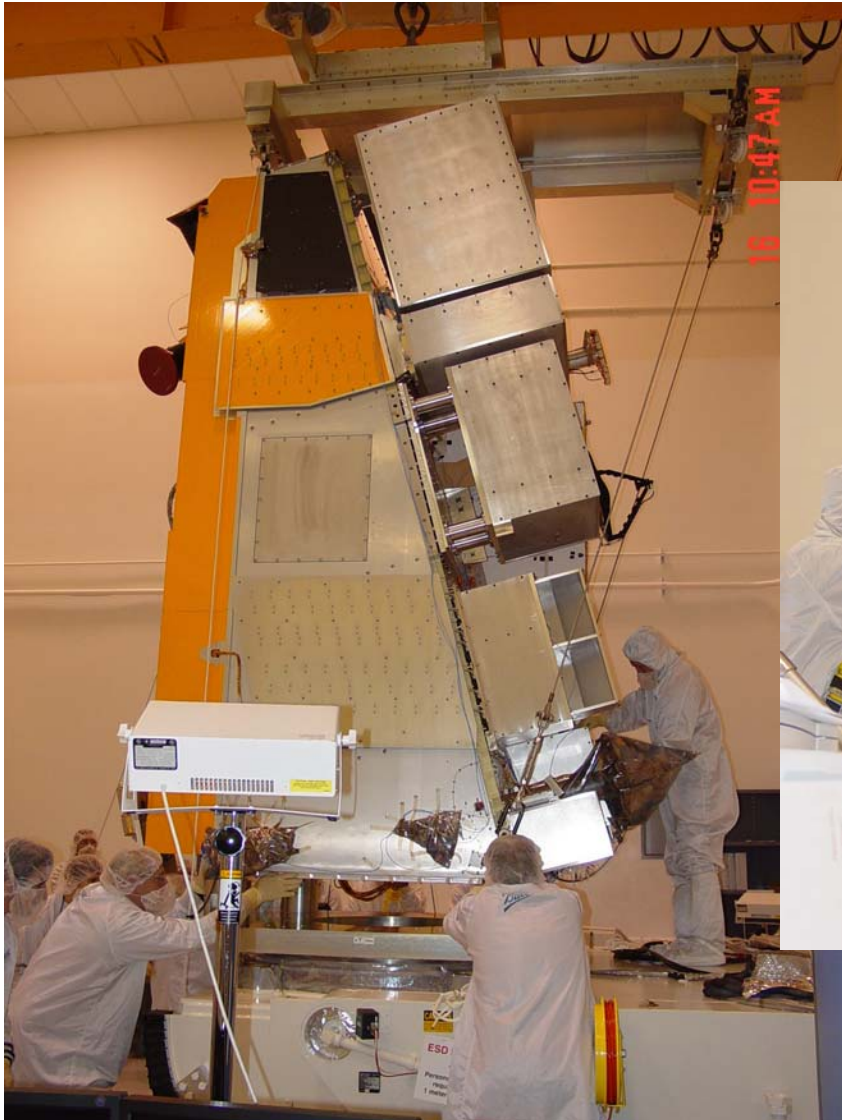


NPP Requirements Summary

- **NPP programmatic requirements established by NASA Mission Level 1 Requirements document and science performance by NPOESS Integrated Operational Requirements Document (IORD).**
- **Key Level 1 requirements include:**
 - **5 year mission lifetime.**
 - **Accommodation of the ATMS, CrIS, OMPS, and VIIRS instruments.**
 - **Concurrent operations of all instruments.**
 - **Real-time direct broadcast of VIIRS, CrIS, OMPS and ATMS instrument data.**
 - **Polar sun-synchronous orbit (824km, 20km ground track repeat, 20 day cycle, and descending equatorial crossing time of 10:30 AM).**
 - **Science Data Segment shall be a research tool (with no operational requirements) used to test the usefulness of NPP EDRs for accomplishing climate research.**
 - > **SDS shall use a fully distributed interoperable architecture with 5 (nominally) independent elements (Climate Analysis Research System or CARS) organized around key EDRs.**
 - **Delta II Launch Vehicle with a 2008 Launch Readiness Date.**



Spacecraft Progress



DoD • NOAA



Ground Systems Progress




IPO Antenna Ribbon Cutting March 1, 2005

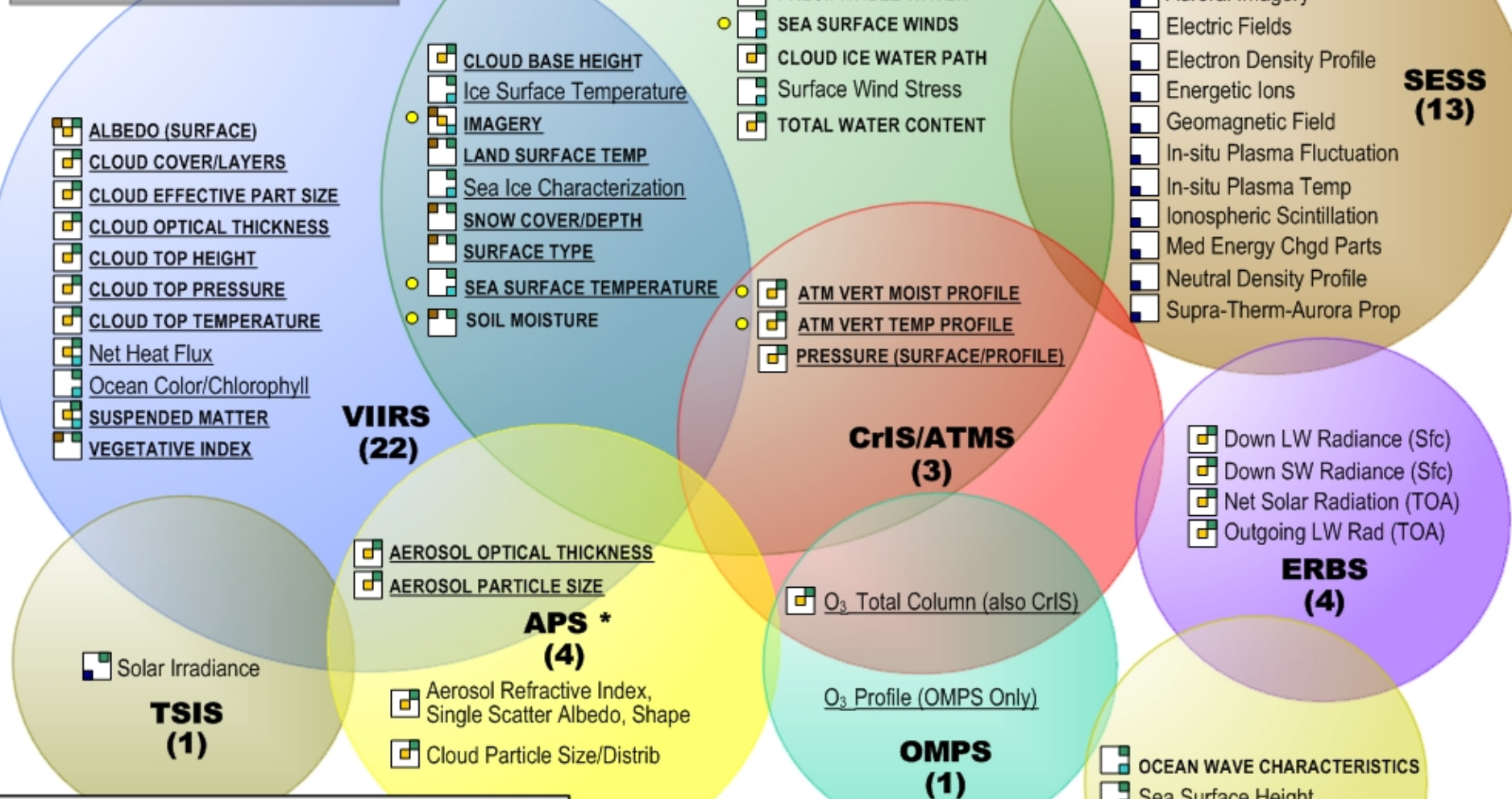













NPOESS EDR-to-Sensor Mapping










(55 EDRs, 9 Sensors)








MISSION AREAS




 Atmosphere	 Climate
 Land	 Ocean
 Space Environment	



















-  ALBEDO (SURFACE)
-  CLOUD COVER/LAYERS
-  CLOUD EFFECTIVE PART SIZE
-  CLOUD OPTICAL THICKNESS
-  CLOUD TOP HEIGHT
-  CLOUD TOP PRESSURE
-  CLOUD TOP TEMPERATURE
-  Net Heat Flux
-  Ocean Color/Chlorophyll
-  SUSPENDED MATTER
-  VEGETATIVE INDEX


-  CLOUD BASE HEIGHT
-  Ice Surface Temperature
-  IMAGERY
-  LAND SURFACE TEMP
-  Sea Ice Characterization
-  SNOW COVER/DEPTH
-  SURFACE TYPE
-  SEA SURFACE TEMPERATURE
-  SOIL MOISTURE

-  CLOUD LIQUID WATER
-  PRECIPITATION TYPE/RATE
-  PRECIPITABLE WATER
-  SEA SURFACE WINDS
-  CLOUD ICE WATER PATH
-  Surface Wind Stress
-  TOTAL WATER CONTENT



-  ATM VERT MOIST PROFILE
-  ATM VERT TEMP PROFILE
-  PRESSURE (SURFACE/PROFILE)

-  Auroral Boundary
-  Auroral Energy Deposition
-  Auroral Imagery
-  Electric Fields
-  Electron Density Profile
-  Energetic Ions
-  Geomagnetic Field
-  In-situ Plasma Fluctuation
-  In-situ Plasma Temp
-  Ionospheric Scintillation
-  Med Energy Chgd Parts
-  Neutral Density Profile
-  Supra-Therm-Aurora Prop

-  Down LW Radiance (Sfc)
-  Down SW Radiance (Sfc)
-  Net Solar Radiation (TOA)
-  Outgoing LW Rad (TOA)


 O₃ Total Column (also CrIS)

O₃ Profile (OMPS Only)

-  OCEAN WAVE CHARACTERISTICS
-  Sea Surface Height

KEY

Underlined = NPP EDRs (25)

 = NPOESS Key Performance Parameters

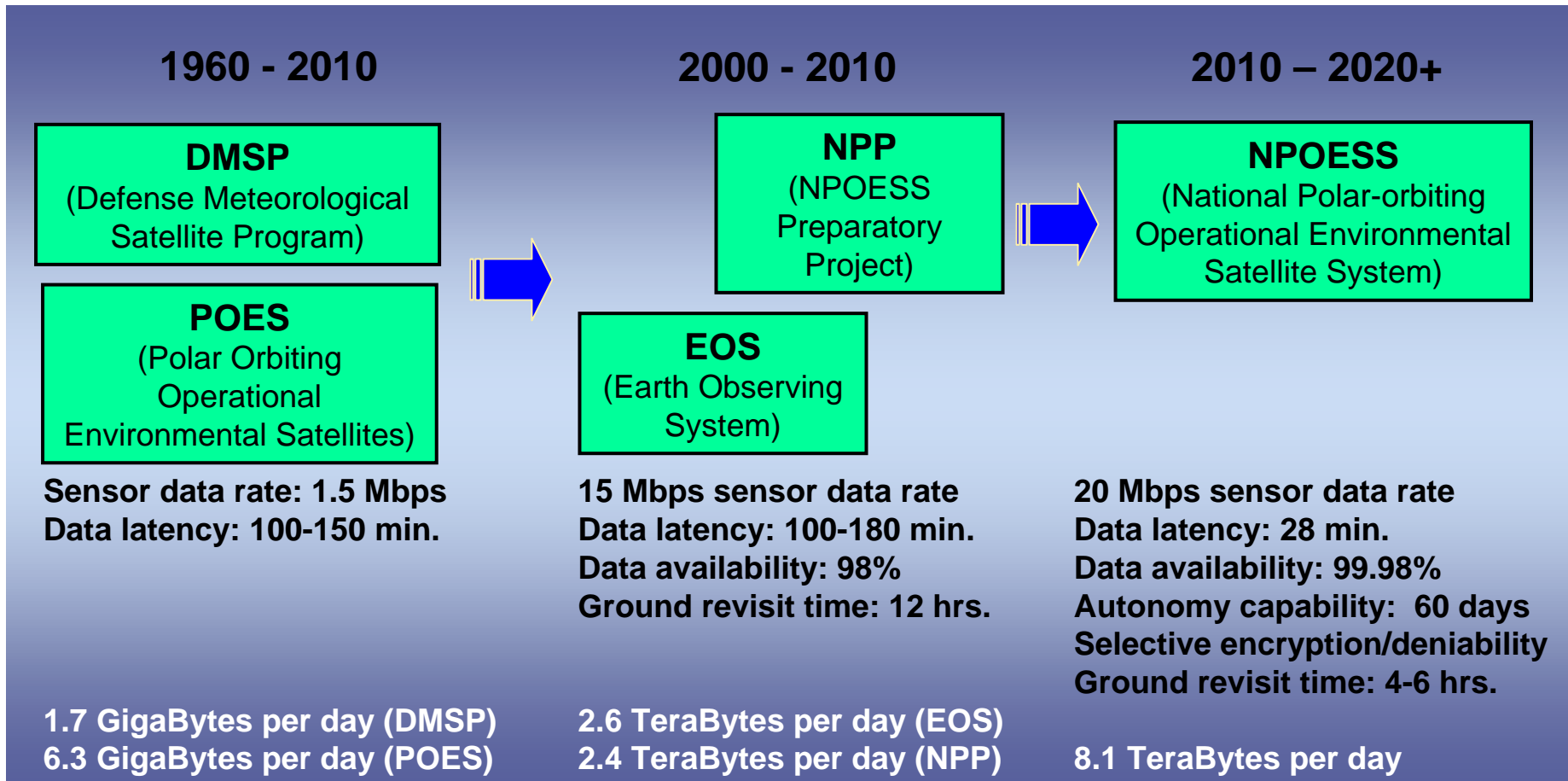
BOLD CAPS = LRD Environmental Data Records

* = not yet on contract

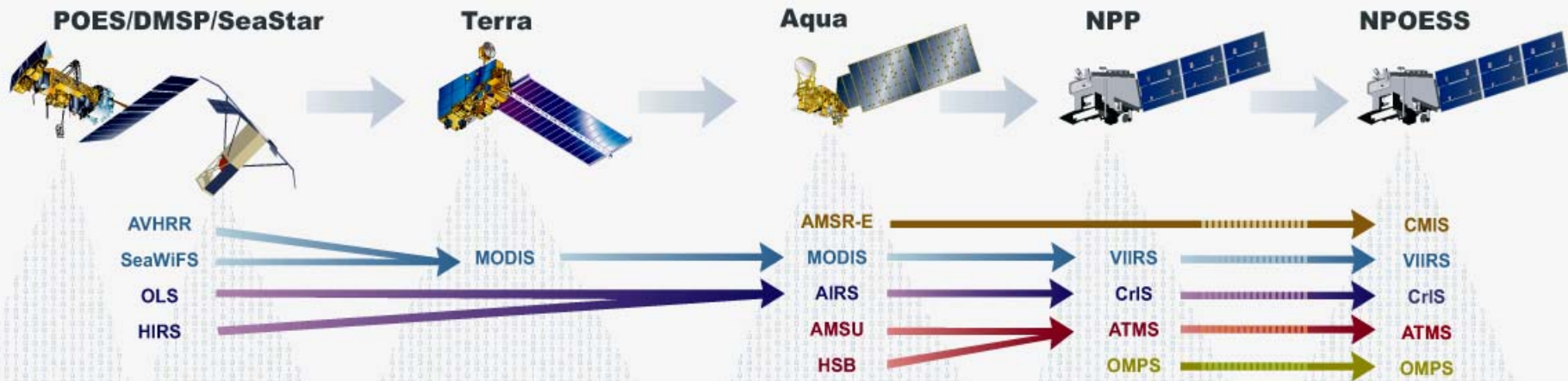
29 Dec 2004
 DOC, NOAA, NESDIS,
 Integrated Program Office
 D. Pierce, M. Haas, S. Mango,
 J. Schaeffer, J. Whitcomb



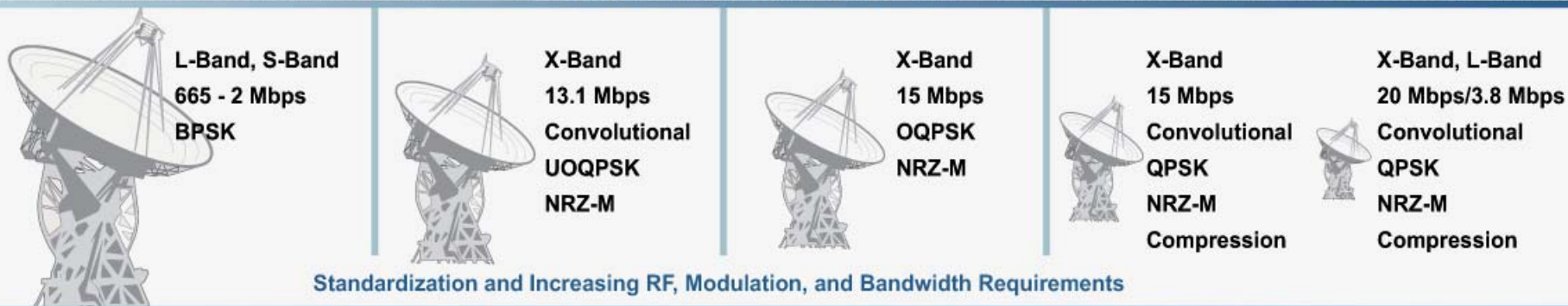
Growing Data Volume and Rate Could Stress Processing and Archive



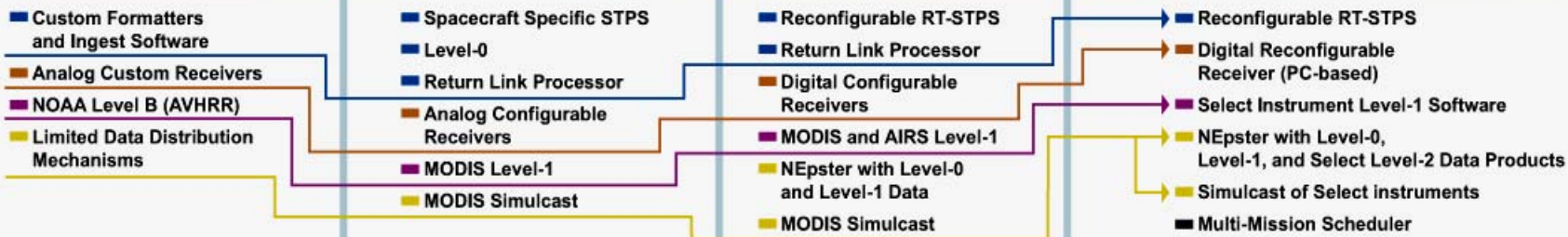
Ensuring Direct Broadcast Continuity



Spacecraft and Instrument Evolution



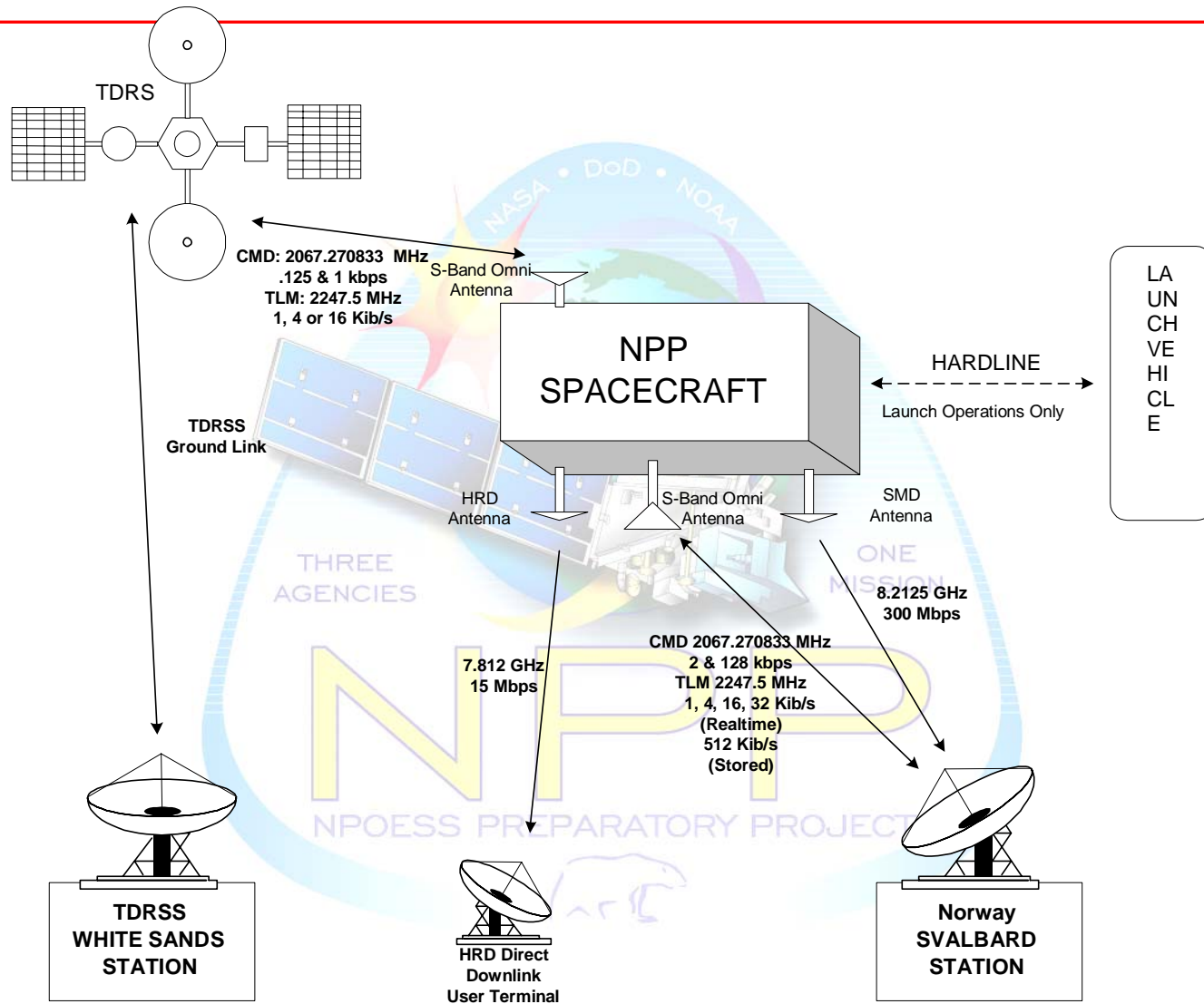
Standardization and Increasing RF, Modulation, and Bandwidth Requirements



Evolution of Concurrent Ground Systems Supporting Technologies and Algorithm Development



NPP's Communications





Risk Reduction & Mitigation

- For NPP, the NASA Direct Readout Laboratory (DRL) provides risk reduction and a roadmap for the NPOESS IDPS system in the Field Terminal Segment (FTS).
- The DRL has been, and will continue to do this by providing NPP packet processing and Level-0 algorithms, real-time NPP-specific visualization tools, lessons learned and an environment for testing and validating the FTS processing system.



NPP & NPOESS Realtime Data

- **Data will be available to all**
 - Real time data from direct downlink sent in the clear
 - Processing software will be available to all
 - No cost other than media and shipping
 - No cost if downloaded from the net
- **Domestic and International Users will be part of the development process**
- **IPO Realtime Data Contact**
 - Mr. John Overton, IPO Field Terminal Manager
 - Email : john.overton@noaa.gov



Summary

- **NPP and NPOESS will have HRD direct readout**
- **NPP most likely to launch in 2008**
 - Technical problems with the Raytheon VIIRS instrument have caused a delay of 14-16 months to NPP
- **For more information:**
 - <http://www.ipo.noaa.gov>
 - <http://jointmission.gsfc.nasa.gov>

International TOVS Study Conference, 14th, ITSC-14, Beijing, China, 25-31 May 2005.
Madison, WI, University of Wisconsin-Madison, Space Science and Engineering Center,
Cooperative Institute for Meteorological Satellite Studies, 2005.