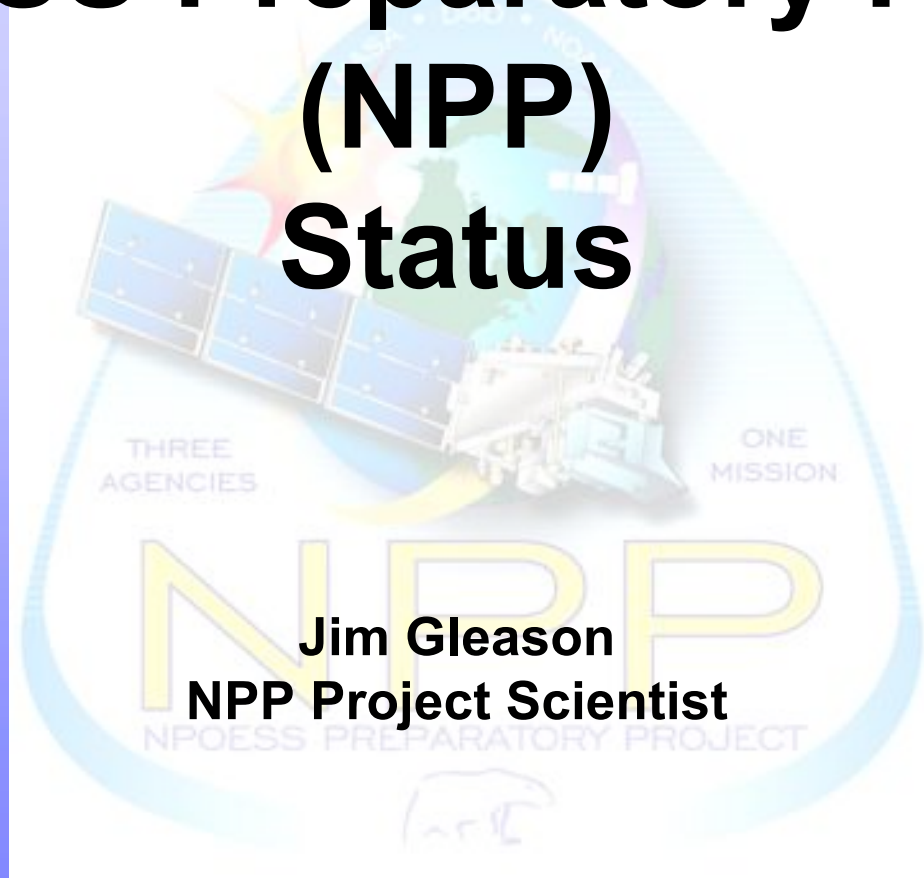
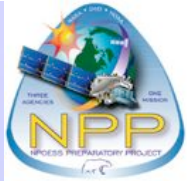


NPOESS Preparatory Project (NPP) Status



Jim Gleason
NPP Project Scientist



Nunn-McCurdy Certification of NPOESS



NPOESS Program was certified by DoD

- Number of spacecraft reduced from 6 to 2+2
- EUMETSAT will provide mid-morning coverage
- Operational Data Continuity was Primary Requirement
- Instruments cancelled and de-scoped
- Instruments removed from program “De-manifested”
 - Spacecraft resources maintained should instruments be provided
- Launch schedules shifted
 - NPP September 30, 2009
 - C1 January 2013
 - C2 January 2016

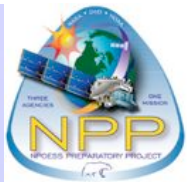


Orbit Configuration Changes



Crossing Time

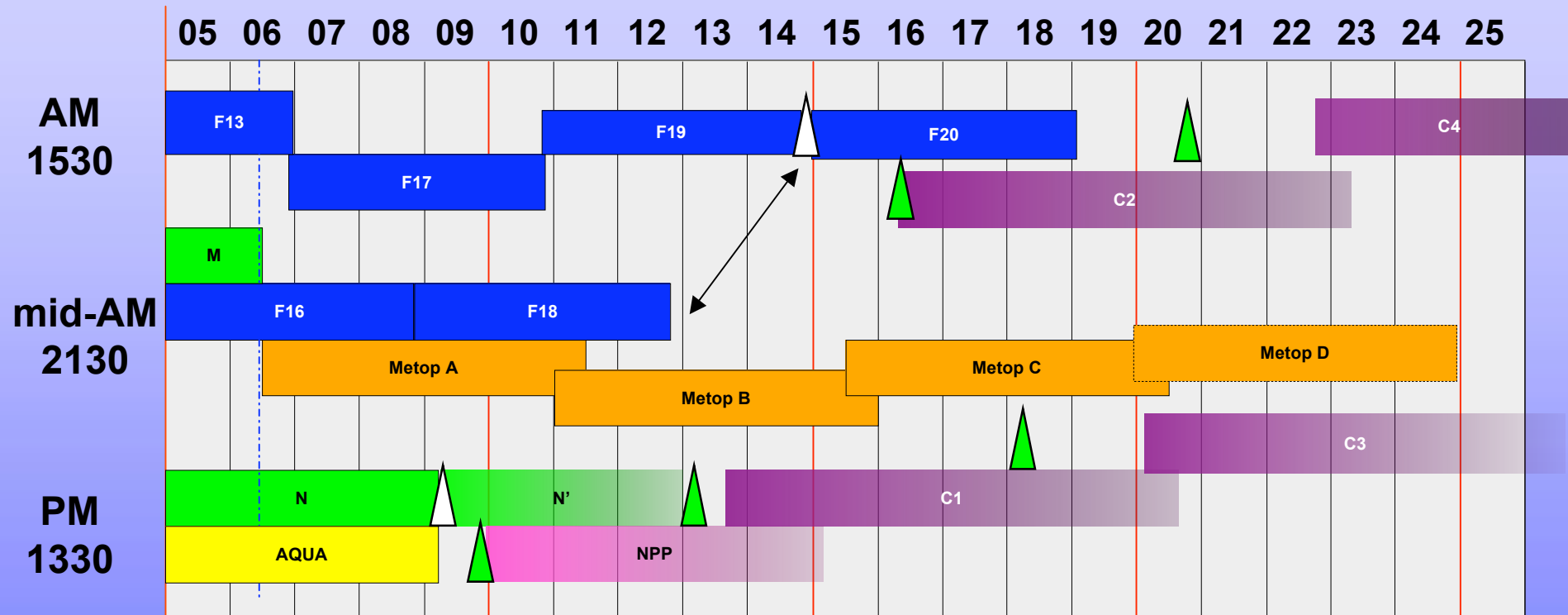
Old NPOESS	0530	2 satellites
	2130	2 satellites
	1330	2 satellites
New NPOESS	0530	1 satellite + 1 option
	2130	EUMETSAT METOP
	1330	1 satellite + 1 option



NPOESS Schedule



CALENDAR YEAR





Instruments Changes



Instrument Descopes

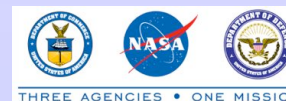
- CMIS Conical-scanning Microwave Imaging/Sounding
Imaging: SST, Soil Moisture, Ice/Snow Cover
Polarimetric Ocean Wind speed
Atmospheric Temperature/Moisture Sounding
- SESS Space Environment: Electron/Particle energy spectrometers,
UV imagery, Fly SEM

De-Manifested Instruments, could be provided GFE

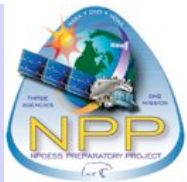
- TSIS - Total and Spectral Solar Irradiance
- ERBS - Earth Radiation Budget (looking at putting CERES on NPP)
- Alt - Sea Surface Altimetry
- APS - Aerosol Polarimetry Sensor
- Full SESS - Descoped SESS
- OMPS Limb - Ozone Profile (maybe restored)



Sensors and Platforms



	NPP	C1	C2	C3	C4
Launch	Oct 2009	2013	2016	2020	2022
Nodal Time	1330	1330	530	1330	530
VIIRS**	X	X	X	X	X
CrIS**	X	X		X	
ATMS**	X	X		X	
OMPS Nadir	X	X		X	
New Microwave Imager			X	X	X
SEM		X		X	
CERES	?	X			
SARSAT		X	X	X	X
ADCS		X		X	
OMPS Limb	?				
ERBS					
ALT					
TSIS					
APS					

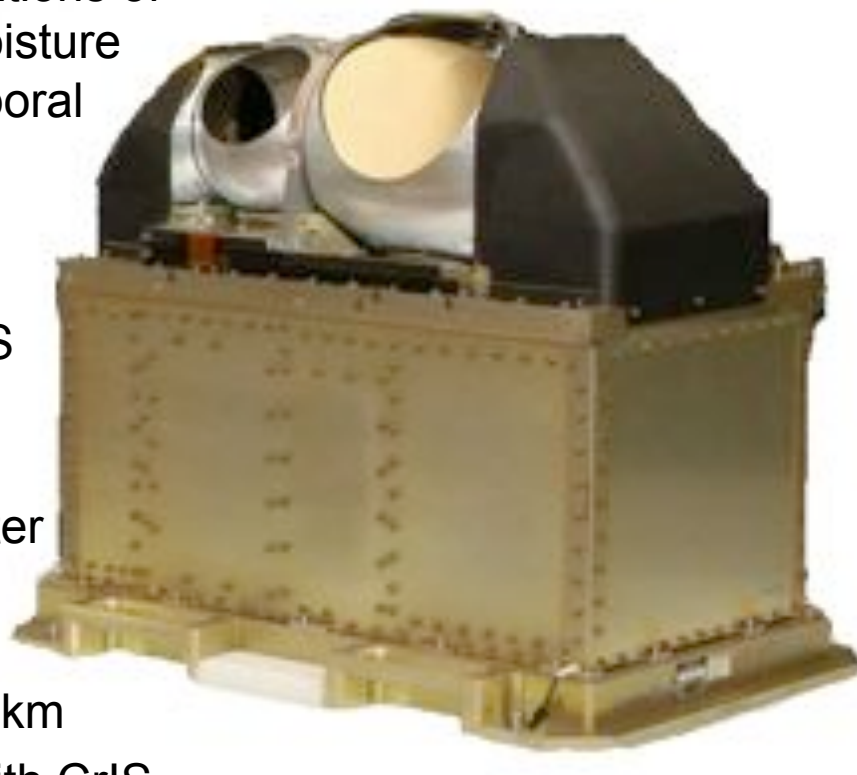


Advanced Technology Microwave Sounder (NASA / Northrop Grumman Electronic Systems)



Description

- **Purpose:** In conjunction with CrIS, global observations of temperature and moisture profiles at high temporal resolution (~ daily).
- **Predecessor**
- **Instruments:**
AMSU A1 / A2, MHS
- **Approach:**
Scanning passive microwave radiometer
(22 channels
(23GHz - 183GHz))
- **Swath width:** 2300 km
- **Co-registration:** with CrIS



Status

- **Flight Unit on Spacecraft**



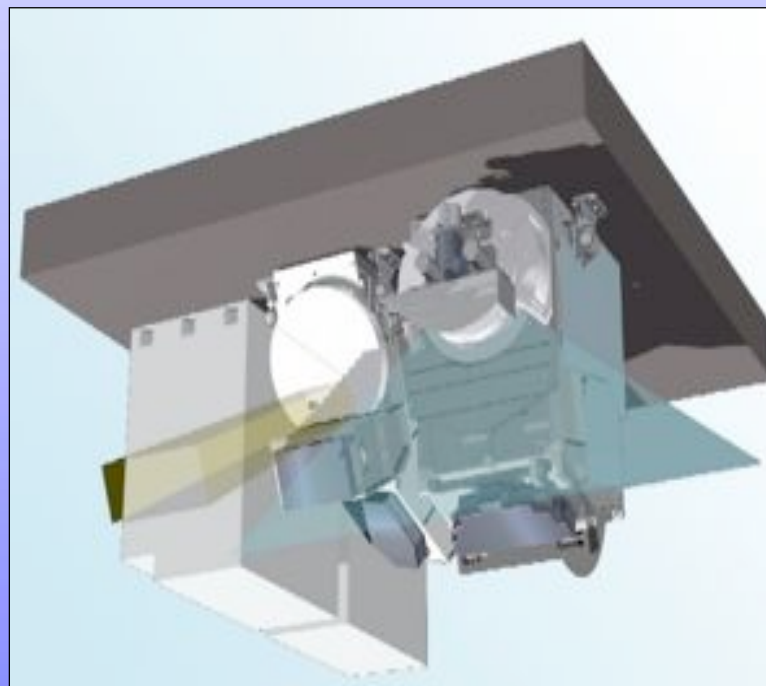
Ozone Mapping Profiler Suite



IPO / NGST / Ball Aerospace and Technologies Corp.

Description

- Purpose: Monitors the total column and vertical profile of ozone
- Predecessor Instruments: TOMS, SBUV, GOME, OSIRIS, SCIAMACHY
- Approach: Nadir and limb push broom CCD spectrometers
- Swath width: 2600 km



Status

- Flight Unit #1 in test and calibration

- Limb de-manifested

**Limb status: IPO directed to study restoring limb.
Instrument 50/50 cost share NOAA and NASA
NASA to develop algorithm
NOAA to support operational users**

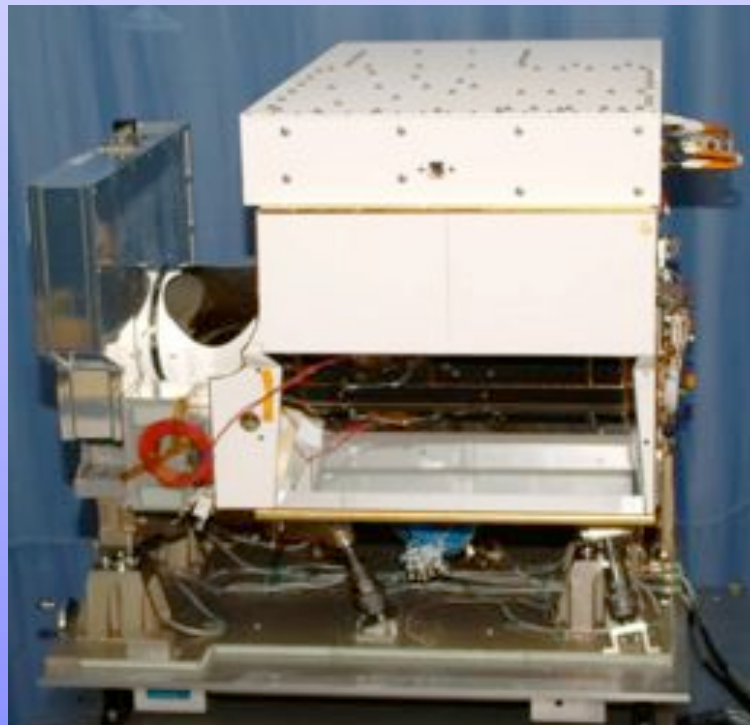


Cross-Track Infrared Sounder IPO / NGST / ITT Industries



Description

- **Purpose:** In conjunction with ATMS, global observations of temperature and moisture profiles at high temporal resolution (~ daily)
- **Predecessor Instruments:** HIRS, AIRS, IASI
- **Approach:** Michelson Interferometer (1142 channels in 3 bands (3.5 μm - 16 μm))
- **Swath width:** 2300 km
- **Co-registration:** with ATMS



Status

- EDU qualification complete and has been delivered to Ball
- Flight Unit #1 Assembly underway
- Flight Unit #1 failed during vibe test
- Braze joints in instrument frame cracked
- Assessment is on-going



Visible Infrared Imaging Radiometer Suite IPO /NGST/ Raytheon Santa Barbara Remote Sensing



Description

- Purpose: Global observations of land, ocean, & atmosphere parameters at high temporal resolution (~ daily)
- Predecessor Instruments: AVHRR, OLS, MODIS, SeaWiFS
- Approach: Multi-spectral scanning radiometer (22 bands between 0.4 μm and 12 μm) 12-bit quantization
- Swath width: 3000 km

Status

- EDU Finished T/Vac testing
- Flight Unit #1 Development continues
- Getting ready for Test Readiness Review





Visible Infrared Imaging Radiometer Suite IPO /NGST/ Raytheon Santa Barbara Remote Sensing



VIIRS Status

Optical cross talk

Filter assembly identified as major cause of cross talk

Filter was reworked to seal light leaks

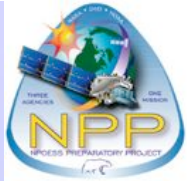
Filter was lowered to reduce scatter

Questions remain on M4 555nm band.

Sub-system test results show some improved performance.

Cyro-radiator re-design and testing is moving forward.

Electronics module reassembly and cable rework is progressing.

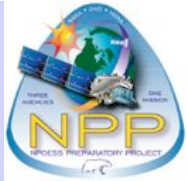


GSFC OCRT Participation in NPP efforts



GSFC ocean team is intensively involved in the on-going dialogue between IPO and NGST regarding VIIRS performance, product quality, and SDS system issues.

- There is considerable focus on
 - VIIRS instrument issues.
 - Science Data System development, funding, and other issues.
 - Program issues: changes to specs, cal/val planning, reprocessing, and funding.



Key VIIRS Instrument Issues



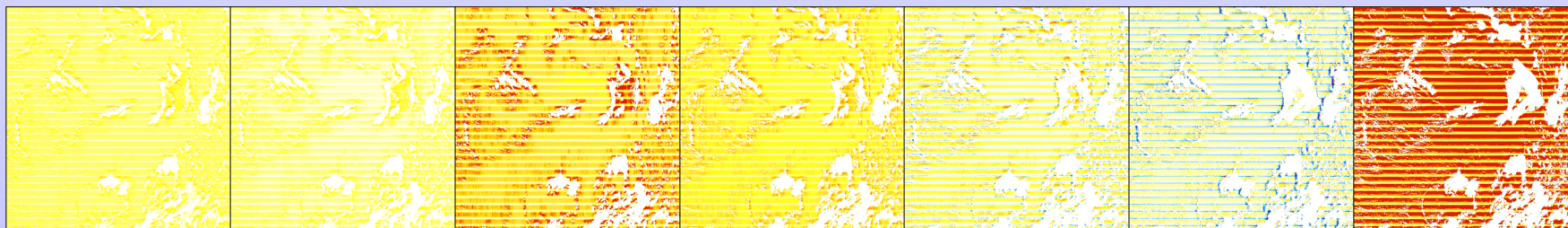
- **VIS/NIR crosstalk effects and mitigation:** Crosstalk effects may have a significant impact on ocean color. NGST reports that planned hardware repairs will not completely eliminate the effect and that software corrections may be necessary.
- **Characterization of polarization response knowledge:** SBRS reports that problems with testing equipment have been fixed.
- **Characterization of relative spectral response (RSR):** EDU characterization show some challenges ahead, however that data was contaminated by optical crosstalk. *The fact that SBRS is not under contract to characterize RSR also presents a risk.*
- SBRS is requesting a Waiver on M2 bandwidth, which was measured to be **15nm** instead of the spec of **20nm**. SBRS is also requesting a Waiver for the VIS/NIR dual gain switch points, which are now higher than heritage missions.
- SNR margin on M2 has dropped from from predicted **38%** to **10-20%**. Analysis of the impact to ocean color of the higher noise floor will need to be done.



Simulating crosstalk impact to Ocean Color

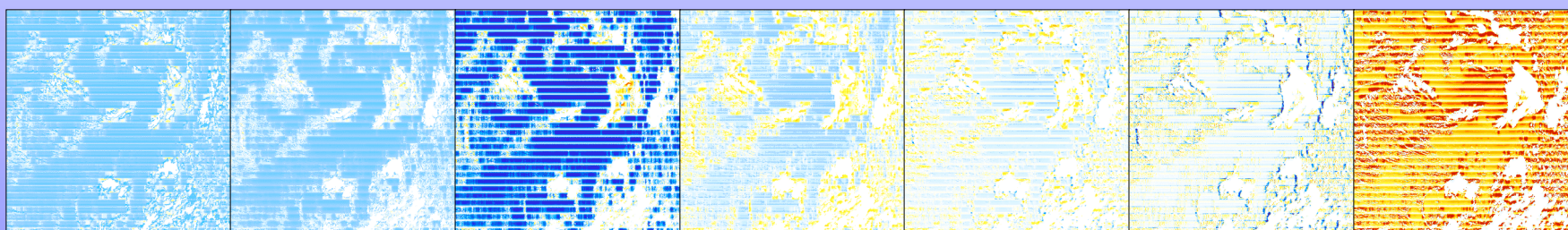


M1 M2 M3 M4 M5 M6 M7



Crosstalk changes dn, cause an extraneous response in the Earth view measurements.

412 445 488 640 672 746 865



However, to get radiance from Earthview dn, crosstalk contaminated measurements from the Solar Diffuser must be used.

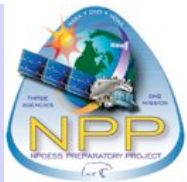
$\Delta L/L$ (%)



-2.5 -2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0 2.5

Analysis by Kevin Turpie (VOST). Solar diffuser spectrum used is from analysis by Bob Barnes (VOST), based on VIIRS total band relative spectral responses developed by David Moyer (NICST)

Ocean Color Research Team Meeting April 11, 2007



Program Issues



- **Calibration/Validation:** Cal/Val activities (inc. Vicarious Calibration) are not funded or fully planned.
- **Reprocessing:** No reprocessing supported by program.
- **Specification Changes:** Governing documents defining product quality and assessment and instrument performance are being heavily modified by IPO and NGST:
 - Changes to metrics for accuracy, precision, and uncertainty have been loosened, weakening the governing document.
 - Those metrics are also now dependent on documents that do not yet exist and will be written by the SSPR contractor.
 - IPO is proposing changes to the instrument performance specifications for crosstalk, which could present issues for ocean color and needs to be discussed in terms of scientific impact.
 - Science community has been given extremely limited access to the specifications change process.



General Program Status



Science Team waiting for announcements

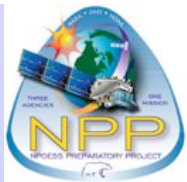
Last panel to be held mid-April 2007

Working with HQ to integrating NPP and EOS science teams.

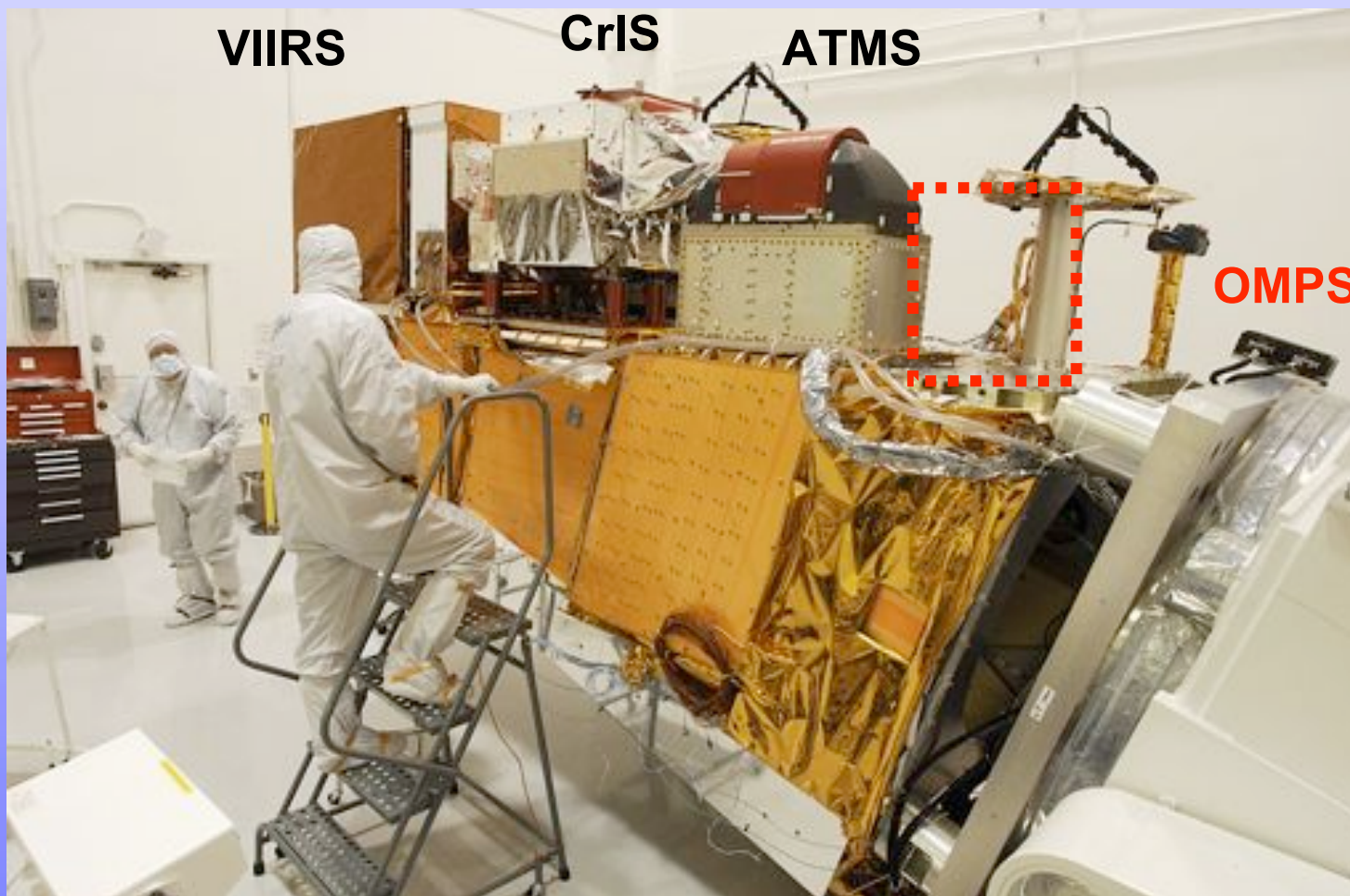
Nunn-McCurdy/Decadal survey follow-on

OMPS limb maybe restored

NPP Project studying CERES on NPP



NPP in Ball Clean Room





NPP Status



Questions?

NPP Science Team Meeting

August 22-24, 2007

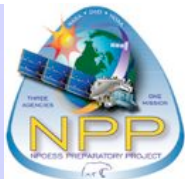
Annapolis, MD



Nunn-McCurdy Statute

(Title 10, Section 2433, USC)

- If unit costs of a Major Defense Acquisition Program increase >25%, then DoD (as delegated to USD(AT&L)) must certify that all of the following four criteria are met, or no further appropriated funding can be obligated on major contracts:
 - **Such acquisition program is essential to national security**
 - **There are no alternatives to such acquisition program which will provide equal or greater military capability at less cost**
 - **The new estimates of the program acquisition unit cost or procurement unit costs are reasonable**
 - **The management structure for the acquisition program is adequate to manage and control program acquisition unit cost or procurement unit cost**
- Certificate must apply to whatever program goes forward, which is not necessarily the program of record
- If program going forward differs too much from program of record, then cannot certify; such a program must instead be proposed as a “new start”
- Even if a program is certifiable, USD(AT&L) can choose not to certify



CMIS Overview



CMIS contributes to all KPP EDRs

- Primary: Soil Moisture, SSW
- Supports: AVMP, AVTP, SST, Imagery

CMIS flies on all NPOESS Configurations

- Produces 16 EDRs total
- Spins at 31.6 RPM
- 83 primary channels, plus redundancy
- Surface measurements at 6,10,18,36,89,166 GHz
- Profiling at 23, 50/60, 183 GHz
- Polarimetry at 10, 18, 36 GHz
- Two main parabolic reflectors:
 - > Low Freq.: 2.2 m (12-horn feed farm)
 - > High Freq: 0.7 m (4-horn feed farm)
- Passive 2-point calibration every scan:
 - > Warm Load, Cold Space Reflector

CMIS has heritage to TMI and SSM/I

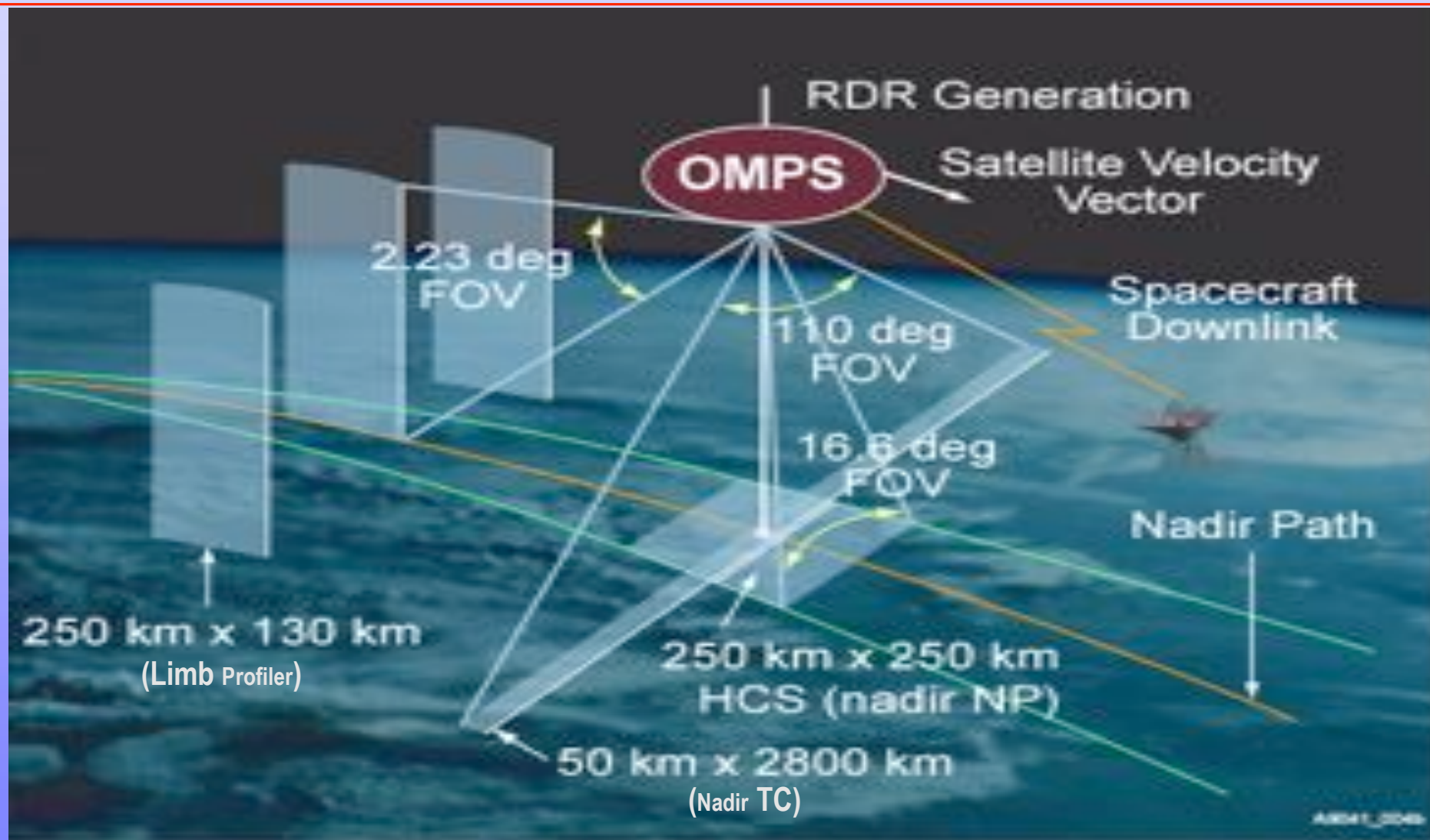
Mass, kg	458
Momentum, N-m-s	348
Average power, W	393
Average data rate, kbps	500

Supplier: Boeing Satellite Systems, El Segundo, CA

- Key Subcontractors:
 - > Atmospheric Environmental Research (AER), algorithms
 - > Remote Sensing Systems (RSS), ocean algorithms
 - > Millitech, High Frequency receivers



OMPS Scanning Track





Questions?



Backup