

**NPOESS**

Northrop Grumman  
Raytheon

DOC • DoD  
NASA

# National Polar-Orbiting Operational Environmental Satellite System (NPOESS)

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May 2008

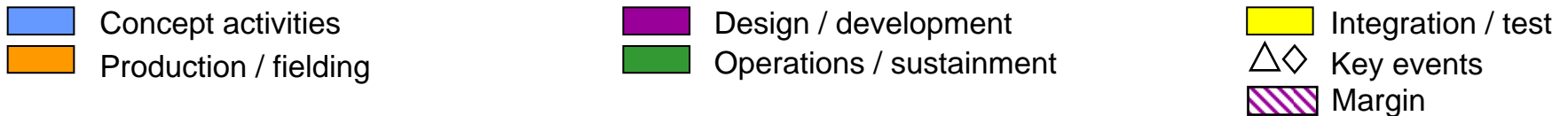
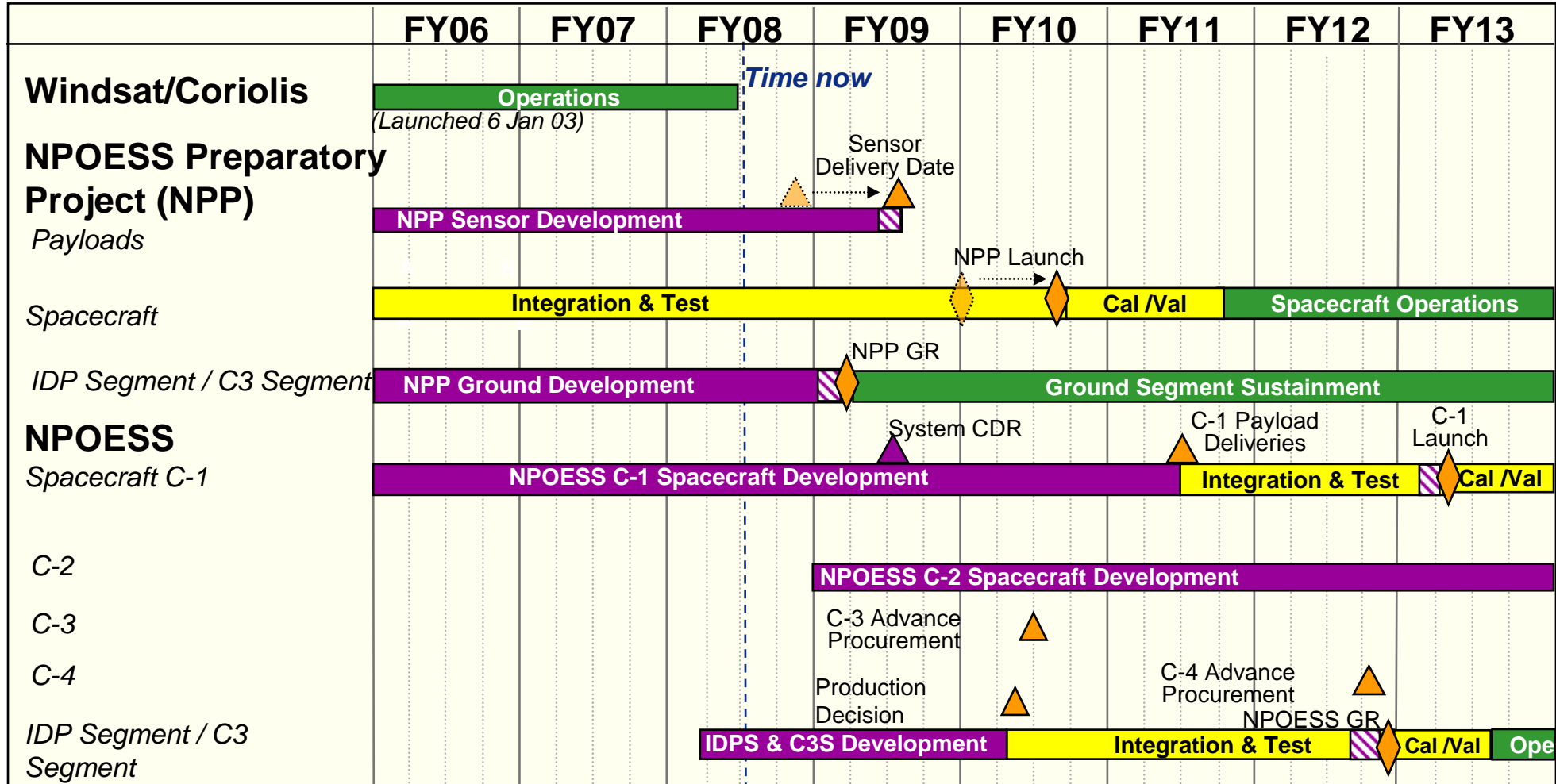
# NPOESS Program Status

- NPOESS has completed restructure and is executing to re-baseline contract
- Performance on NPOESS Engineering, Manufacturing & Development program
  - **On schedule and budget for last two years**
  - **Contract modification signed in July 2007**
  - **On track to deliver essential weather measurements and 14 of 26 essential climate variables**
  - **System capacity to accommodate de-manifested sensors and other sensors to provide additional monitoring**
    - **Currently re-manifesting OMPS-Limb and CERES on NPP**

*NPOESS remains on track for Jan 2013 launch of C1 spacecraft*

# Program Schedule

As of March 2008



C3: Command, Control, Communications  
 I&T: Integration & Test  
 NPOESS C-3 and C-4: Production units to be incrementally funded

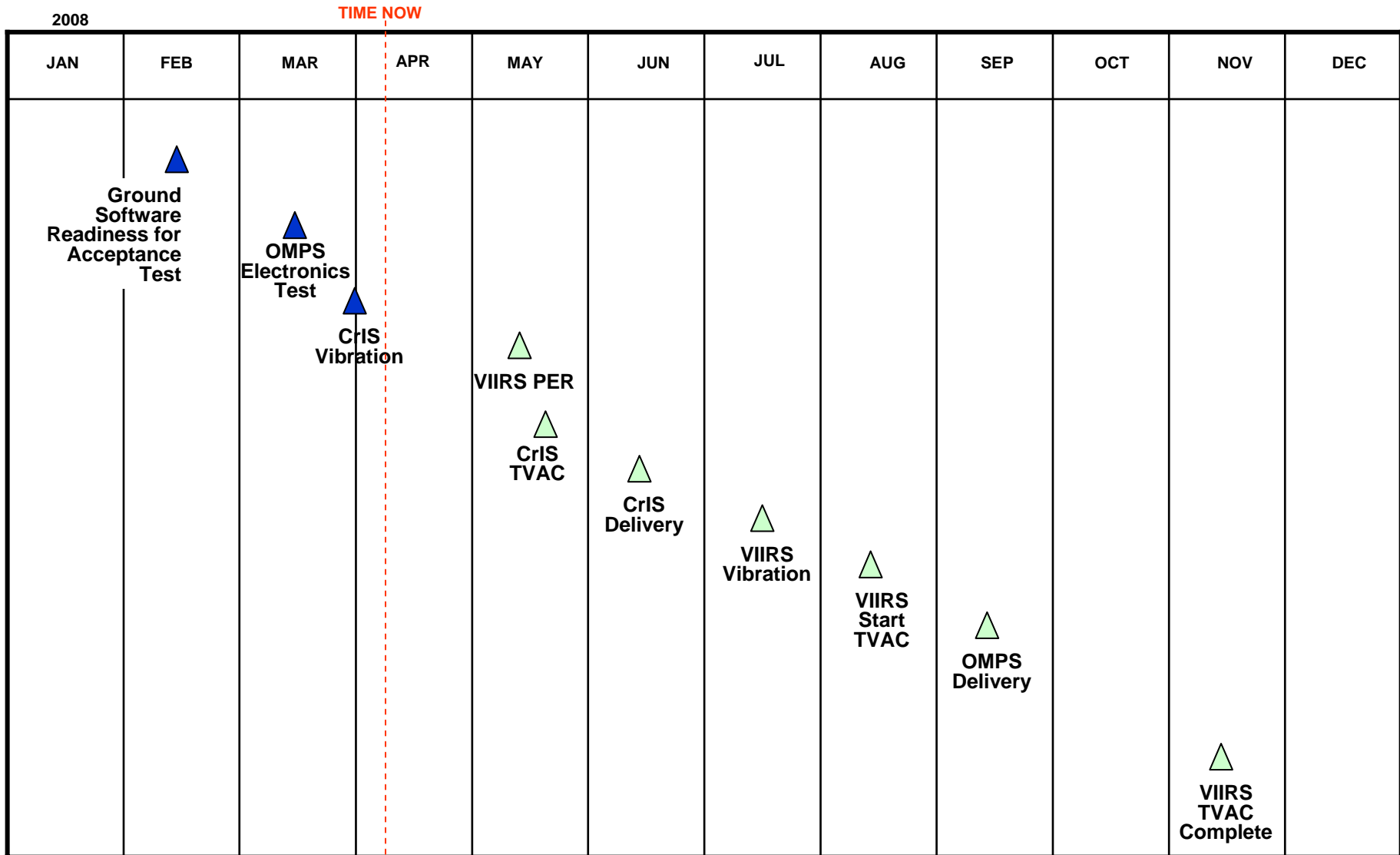
Cal/Val: Calibration/Validation  
 IDP: Interface Data Processing

CDR: Critical Design Review  
 PDR: Preliminary Design Review

GR: Ground Readiness

# NPOESS 12 Month Schedule

As of March 2008

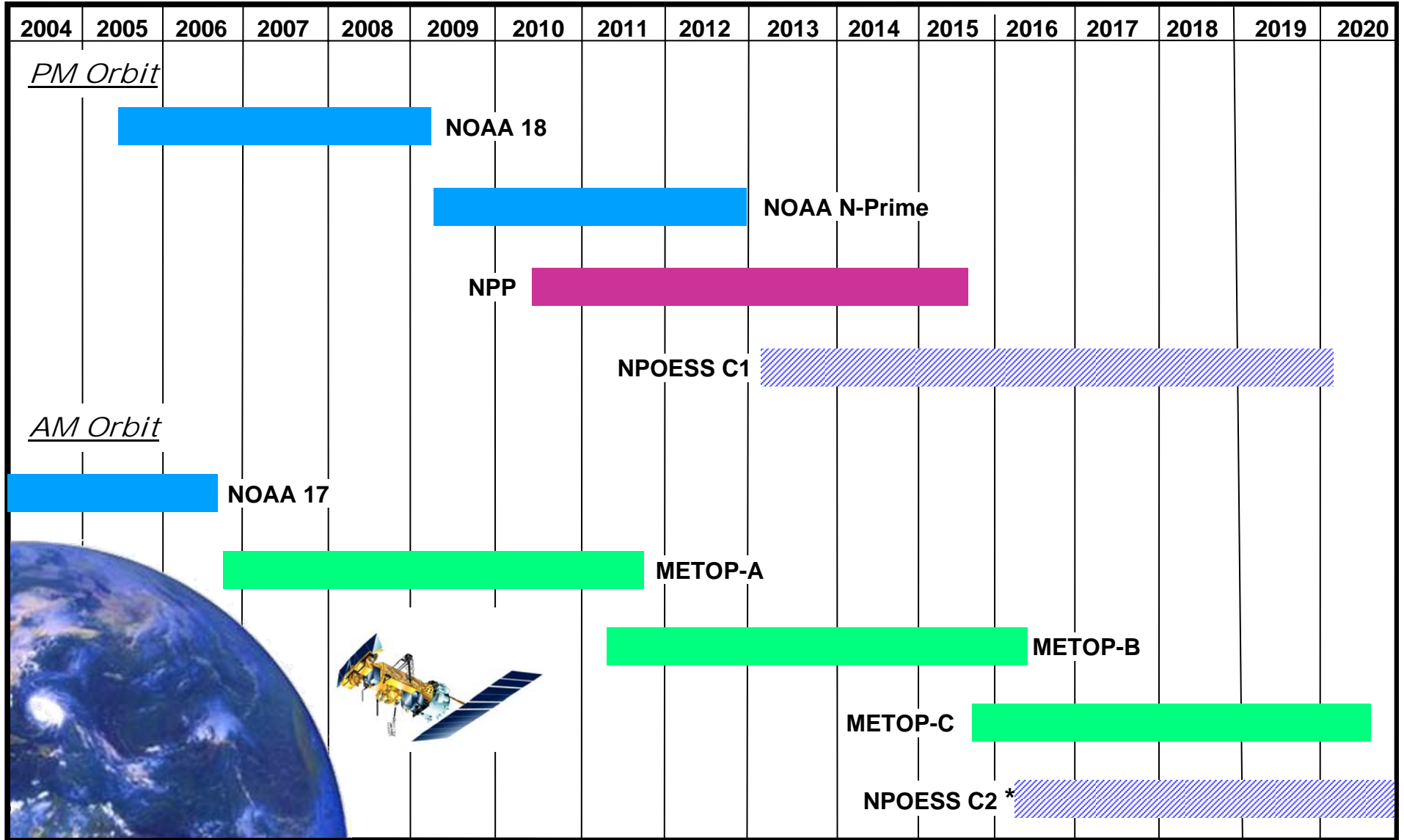


▲ Completed Milestone    ▲ Current Milestone    ▲ Slipped Milestone

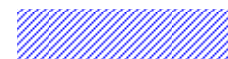
TVAC - Thermal Vacuum  
PER - Pre-Environmental Review

# Continuity of Polar Operational Satellite Programs

Calendar Year



\* Early AM Orbit



Projected launch & mission life



# **NPOESS International Initiatives**

## **With Eumetsat & JAXA**

# Why?

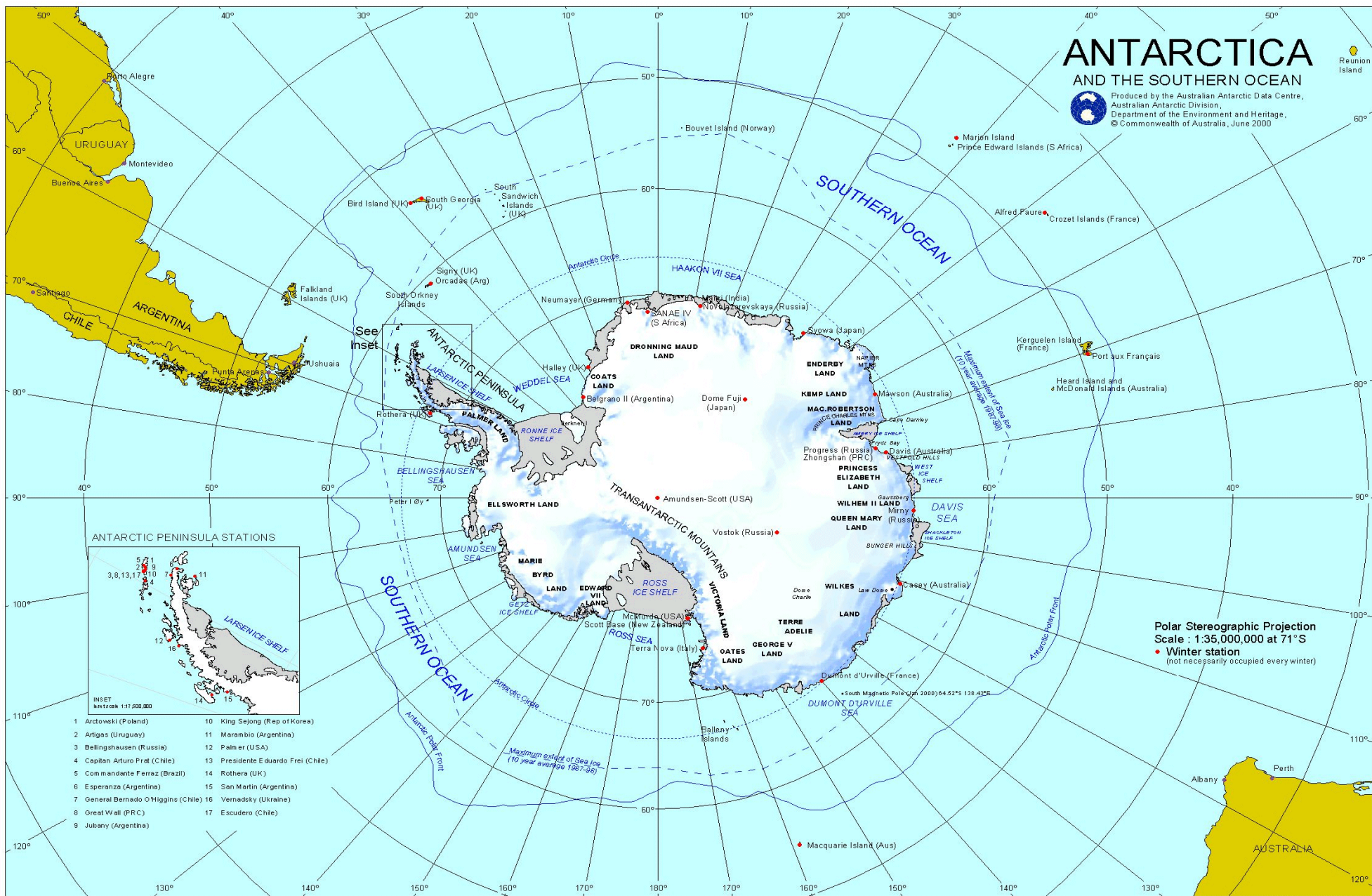
## Overview of Nunn-McCurdy Changes to NPOESS Program

	<b><i>Pre</i></b> <b>Nunn-McCurdy</b>	<b><i>Post</i></b> <b>Nunn-McCurdy *</b>
Number of Satellites	6	4
Number of Sensors	16	9
Number of Orbits	3	2
First Launch	2010	2013
Satellite Life Expectancy	7 Years	7 Years
Final Satellite on Orbit	2024	2026

- Restructured program provides for continuity of weather measurements
- Restructured program does not include the following climate measurements:
  - Atmospheric aerosols and ozone
  - Solar environment
  - Sea surface height (via altimetry)

\* As documented in the DoD Acquisition Decision Memorandum dated June 5, 2006

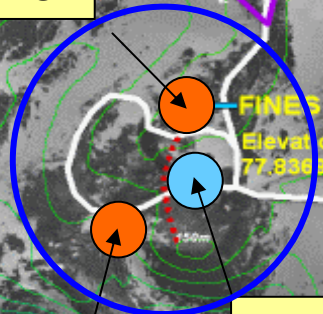
# McMurdo Overview for MetOp Data Recovery





# NPOESS & EUM Solution

MG2

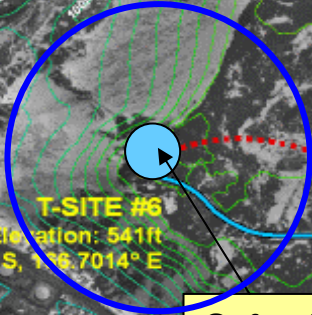


SafetyNet 2

MG1



JSOC

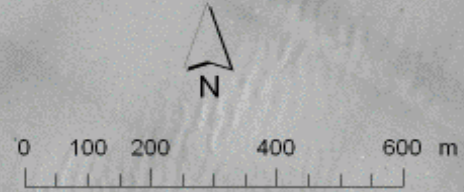


SafetyNet 1

**Legend**

- 360° Look Site
- ASPA Boundary
- Road
- Proposed Road
- Proposed Utilities

290m  
Contour interval: 10m  
0m





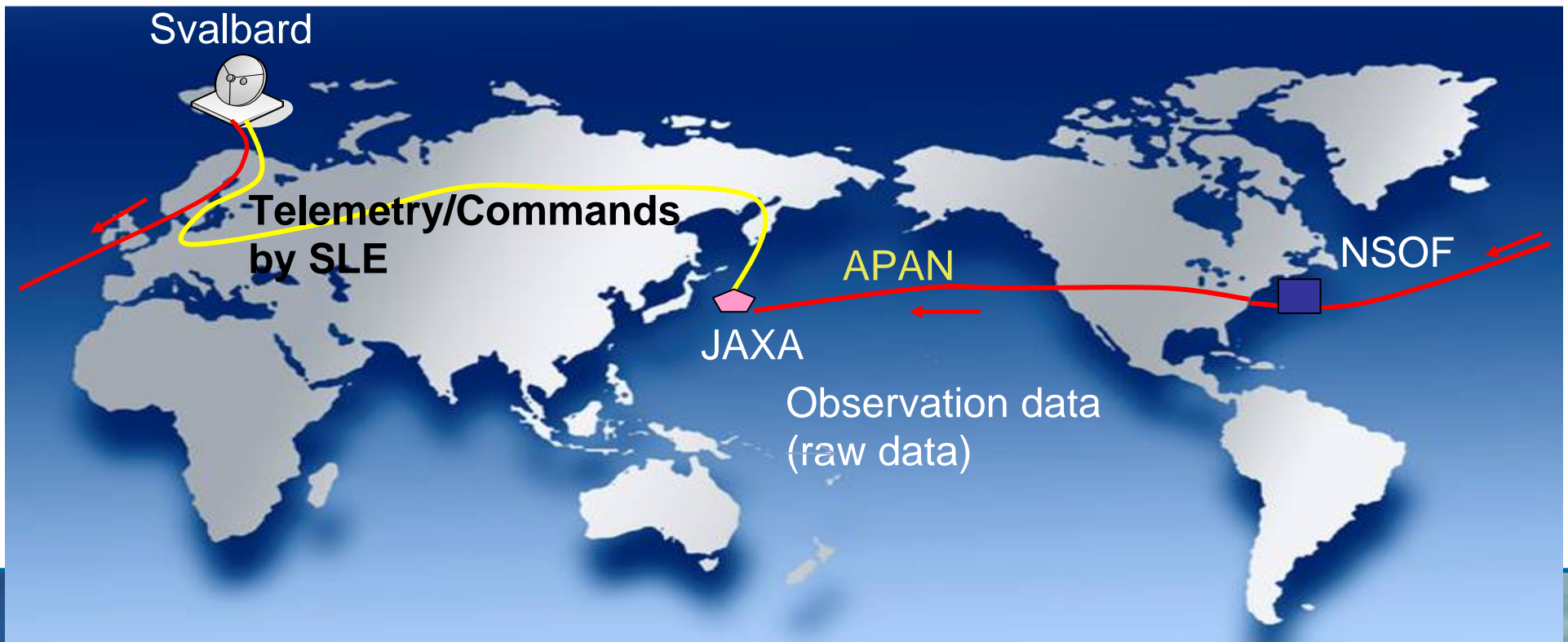
# High Level Responsibilities

- IPO – Project Sponsor/Coordinator
  - SafetyNet™ receptor procurement, installation, test, and operations via NGST/Raytheon
  - Off-ice communications via NGST/Raytheon/Optus/AT&T
- NASA – McMurdo Ground Station owner/operator
  - MGS (MG1 and MG2) procurement, installation, test, operations and scheduling, maintenance, and sustainment
    - Will eventually includes maintenance of NPOESS' McMurdo receptors
- US National Science Foundation (NSF) – On-ice logistics, facilities and infrastructure (including on-ice comm services)

# NPOESS/NOAA & JAXA Cooperation

Svalbard to Provide C3S Support to JAXA for GCOM-W1 and C1

- **Proposed GCOM W-1 C3 Architecture:**
  - **NOAA provides Ground Station Services at Svalbard**
    - **Communication link for mission data to NSOF**
    - **Interface to Asian-Pacific Advanced Network (APAN)**
  - **JAXA provides T&C thru own communication link**



# What are the User Benefits?

- Mary M. Glackin's Letter on *User Interest in data from JAXA's GCOM - Oct 22, 2007*
  - "...Due to program restructure of NPOESS, some requirements will not be provided by NPOESS..."
  - "Research and foreign sources could provide very useful data to supplement our critical data needs provided by NPOESS."
  - "...This interest in GCOM data does not constitute a commitment to use the data nor does it imply planning, programming, or funding actions to receive, process, exploit, or disseminate these data."



# User Benefits (cont.)

- **AMSR-2 Benefits:**
  - AMSR-2 will provide continuity of oceanographic and maritime meteorological data currently provided by NASA's Aqua satellite.
  - These measurements have proven valuable for numerical weather prediction in areas over the open oceans which subsequently impact medium to long range weather forecasting in coastal regions.
  - Precipitation data from this instrument will aid tropical and extratropical forecasting of major storm systems threatening human safety, and damage to coastal infrastructures
  - These global microwave imaging and sounding data have also been identified by the National Academies of Science Decadal Survey as critical to our understanding of the ocean-atmosphere interactions driving global climate change.
  - AMSR-2 will provide intercalibration opportunities with other microwave imagers to develop consistent microwave measurements needed for weather and climate applications
- **ATMS AMSR-2 Blended Products Benefits:**
  - Improved microwave surface products by using ATMS to correct for atmospheric effects
  - Improved ATMS sounding products by better characterizing surface emission.
- **SGLI Benefits:**
  - As a complement to NPP and NPOESS advanced Visible and IR imaging capability, SGLI will complete a balanced nominal coverage of the earth every 4-hours
  - High resolution data requires both low data latencies and high data refresh in order to be most useful for weather forecasting.
  - The benefits of such fine scale, high temporal weather forecasting include cloud and precipitation forecasting, faster identification of hazardous weather conditions, smoke, and volcanic ash.
  - Oceanographic benefits include improved ocean current analysis and forecast, fine scale ocean color, turbidity, and sea state.
  - These global high resolution Vis/IR imaging capabilities have also been identified by the National Academies of Science Decadal Survey as critical to our understanding of the ocean-atmosphere interactions driving global climate change.
- **GCOM Direct Readout Data Interest:**
  - US Users are interested in receiving regional data directly from the GCOM spacecraft as they pass over receiving sites within the US territory and abroad.
  - Direct data receipt from NASA's EOS missions has proven to be useful

# NOAA's Conclusion

- Users recognize benefits of GCOM as a supplement to NPOESS and an opportunity to achieve some important objectives from the Decadal Survey
- NOAA and JAXA will gain capability without a formidable financial investment
  - This includes long-term mission collaboration (i.e., satellite phasing decisions, satellite sensor co-registration, etc) and data sharing
  - Operationalize a new “A” train in the 1330 orbit, Ocean color and improved aerosols in 10:30 orbit
  - This partnership could be used as an example for future international cooperation
- Working together with JAXA to establish optimal satellite phasing for NPP, GCOM W-1 and NPOESS C1
- NESDIS STAR, JAXA, NPOESS and JMA to form science team

# Summary

- **Program restructured in July to complete EMD**
  - **Integrated Master Schedule out through 2016**
- **Substantial progress – real hardware delivered**
  - **Command and Control System complete & installed at NOAA Satellite Operations facility**
  - **Data Processing System completed 4 of 5 software builds; ready to handle weather and climate data**
  - **NPOESS Sensor EDU integration onto NPP spacecraft on plan to support launch**
  - **Sensor Flight Hardware completing rigorous testing**
  - **Operational Space Segment development on track for implementing Nation's next generation environmental monitoring system**
- **International cooperation and collaboration is essential**
  - **MetOp data recovery from McMurdo will significantly improve data timeliness**
  - **NPOESS/NOAA & GCOM cooperation is occurring at many levels**

