Peter A. Wilczynski
Senior Technical Policy Advisor
to the
Program Executive Officer for Environmental Satellites
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**

<table>
<thead>
<tr>
<th>Activity</th>
<th>FY06</th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
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<tbody>
<tr>
<td>Windsat/Coriolis</td>
<td>Operations (Launched 6 Jan 03)</td>
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<tr>
<td>NPOESS Preparatory Project (NPP)</td>
<td>Payloads</td>
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<tr>
<td>Spacecraft</td>
<td>Integration &amp; Test</td>
<td>NPP GR</td>
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<td>IDP Segment / C3 Segment</td>
<td>NPP Ground Development</td>
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<td>NPOESS</td>
<td>Spacecraft C-1</td>
<td>Integration &amp; Test</td>
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<td>Spacecraft C-4</td>
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<tr>
<td>IDP Segment / C3 Segment</td>
<td>IDPS &amp; C3S Development</td>
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</table>

**Legend:**
- Concept activities
- Production / fielding
- Design / development
- Operations / sustainment
- Integration / test
- Key events
- NPOESS GR
- Margin

**Abbreviations:**
- C3: Command, Control, Communications
- IDPS: Interface Data Processing
- Cal/Val: Calibration/Validation
- NPOESS C-3 and C-4: Production units to be incrementally funded
# NPOESS 12 Month Schedule

As of March 2008

<table>
<thead>
<tr>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
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</table>

- **Completed Milestone**
- **Current Milestone**
- **Slipped Milestone**

TVAC - Thermal Vacuum
PER - Pre-Environmental Review

- **Ground Software Readiness for Acceptance Test**
- **OMPS Electronics Test**
- **CrIS Vibration**
- **VIIRS PER**
- **CrIS TVAC**
- **CrIS Delivery**
- **VIIRS Vibration**
- **VIIRS Start TVAC**
- **OMPS Delivery**
- **VIIRS TVAC Complete**
Continuity of Polar Operational Satellite Programs

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>PM Orbit</th>
<th>AM Orbit</th>
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</thead>
<tbody>
<tr>
<td>2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
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<tr>
<td>2006</td>
<td>NOAA 17</td>
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<tr>
<td>2007</td>
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<tr>
<td>2008</td>
<td>NOAA 18</td>
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<tr>
<td>2009</td>
<td></td>
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</tr>
<tr>
<td>2010</td>
<td>NPP</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td></td>
<td>METOP-A</td>
</tr>
<tr>
<td>2012</td>
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<td>METOP-B</td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td>METOP-C</td>
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<tr>
<td>2014</td>
<td>N-Prime</td>
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<tr>
<td>2015</td>
<td></td>
<td>NPOESS C1</td>
</tr>
<tr>
<td>2016</td>
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<td>NPOESS C2</td>
</tr>
<tr>
<td>2017</td>
<td></td>
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<tr>
<td>2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
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</tr>
<tr>
<td>2020</td>
<td>*Early AM Orbit</td>
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</tbody>
</table>

Projected launch & mission life
NPOESS International Initiatives
With Eumetsat & JAXA
## Why?

### Overview of Nunn-McCurdy Changes to NPOESS Program

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

- 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
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.”
• 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