



Update of NOAA Plans for Climate Sensors and Climate Data Records

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Executive Summary



- **The White House Science Office requested NOAA and NASA to provide:**
 - An analysis of possible mitigation options of the climate impacts of the NPOESS Nunn-McCurdy Certification through 2026
 - An assessment of the potential costs of these options
 - All options are contingent on getting new funding
- **Primary goal: Ensure continuity of long-term climate records**
- **NOAA and NASA analyzed the following options:**
 - Remanifesting the climate sensors on NPOESS spacecraft
 - Placing sensors on currently planned non-NPOESS spacecraft
 - Developing new gap-filling climate satellite missions
 - Partnering opportunities (commercial and international)
- **Key results:**
 - OMPS-Limb restored to NPP but not to NPOESS
 - CERES added to NPP
 - \$74M funding in President's FY09-FY14 budget for CERES and TSIS on NPOESS C1 and for start of Climate Data Record (CDR) Project



NPOESS Nunn-McCurdy Certification



Reductions of Climate-Relevant Sensors

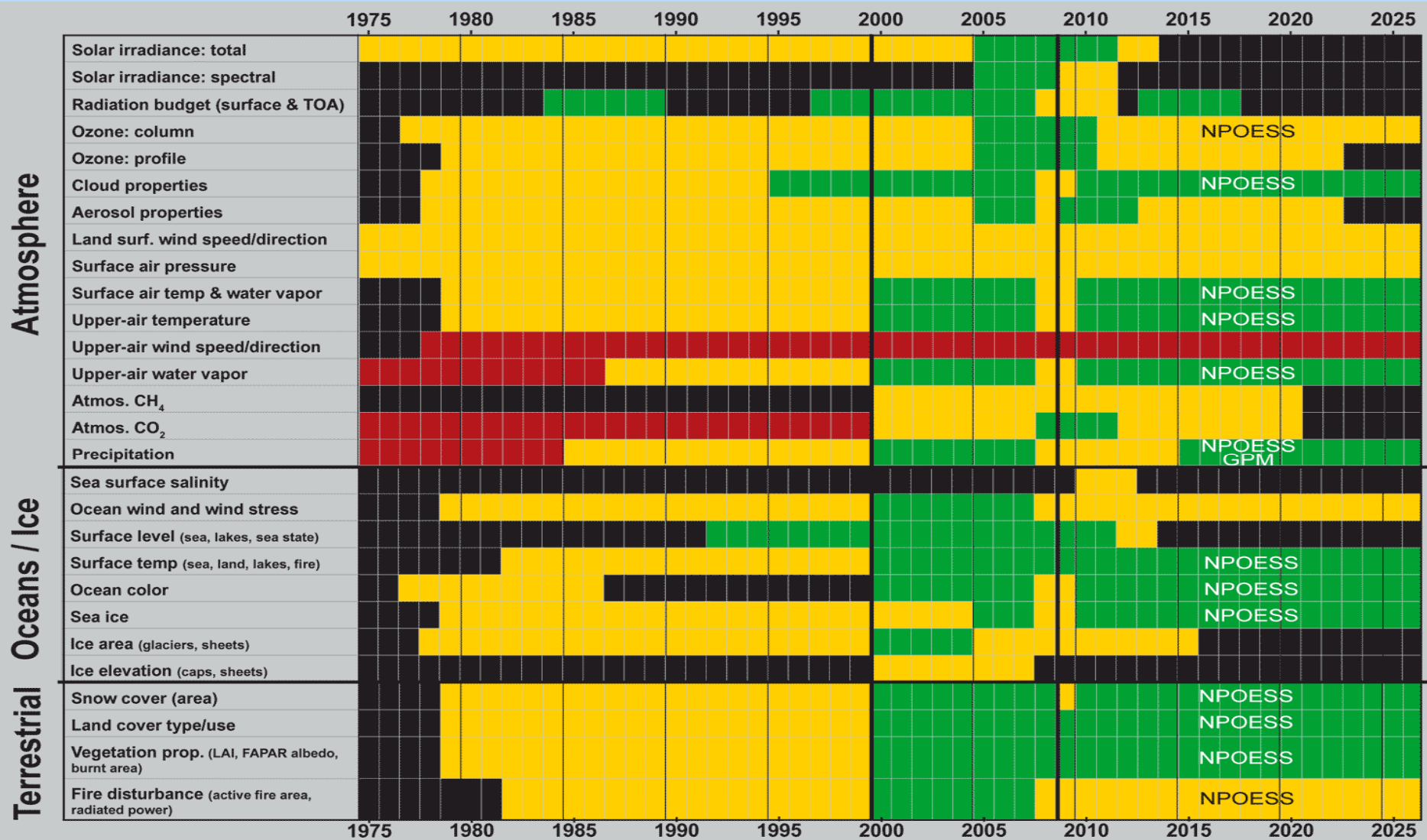
NPOESS Instruments	NPP	EARLY-AM		MID-AM			PM	
		New C2 (2016)	New C4 (2020)	Old (C3) (2013)	MetOp	Old (C6) (2016)	New C1 (2013)	New C3 (2018)
		Old (C2) (2011)	Old (C5) (2015)				Old (C1) (2009)	Old (C4) (2014)
<i>Reduced Capability Sensors</i>								
CMIS*		✓	✓					✓
<i>Reduced Coverage Sensors</i>								
CrIS/ATMS	✓				IASI/AMSU		✓	✓
VIIRS	✓	✓	✓		AVHRR		✓	✓
<i>De-manifested Sensors</i>								
TSIS								
CERES/ERBS							CERES	
ALT								
OMPS**	✓						✓	✓
APS								

- Remains Intact No Change/Not Relevant
- Reduced Capability Related Missions
- Deleted ✓ Implies Sensor Present

*CMIS to be redefined as a less capable, less expensive sensor
 **OMPS Limb Subsystem is cancelled and only the Nadir capability is maintained



Global Essential Climate Variables (ECVs - Groups of CDRs) with Heritage Records



■ Generally considered adequate for developing CDRs
 ■ Usefulness is unknown, application-dependent, or access-dependent
 ■ Generally considered inadequate for developing CDRs
 ■ No viable observations available



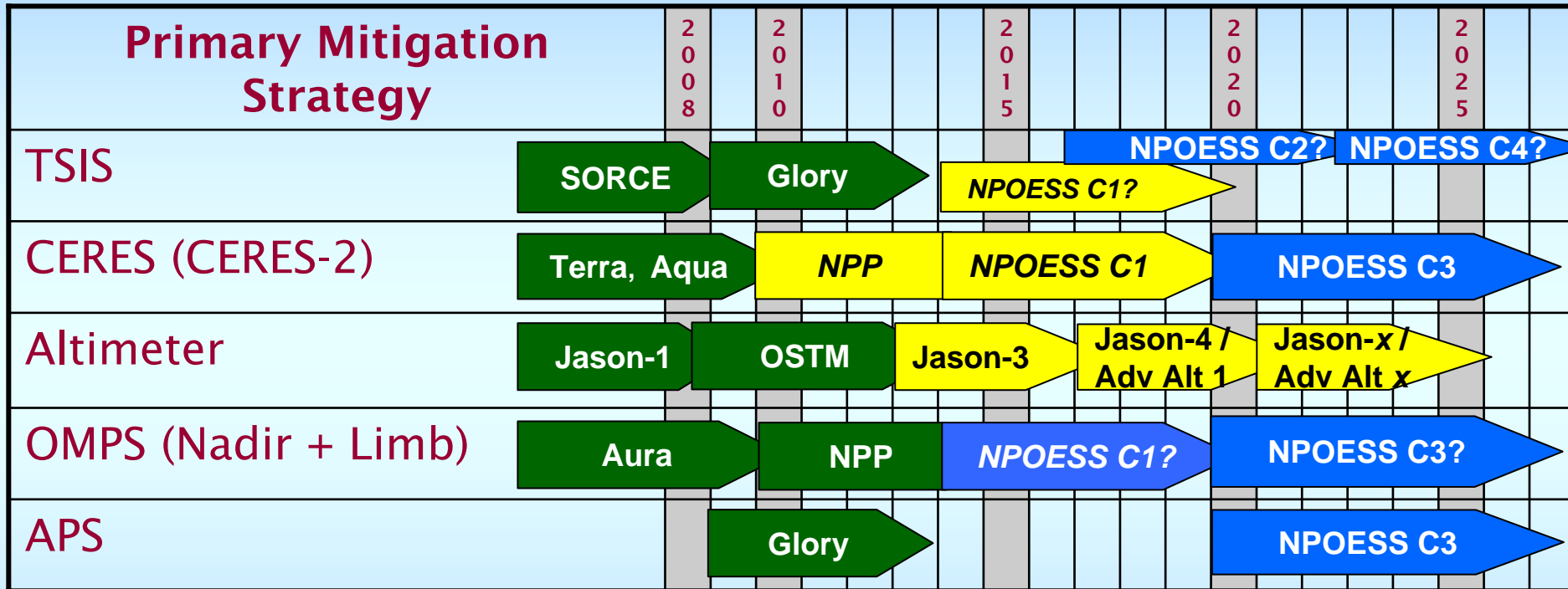
Development of Mitigation Options



- Multiple options exist to mitigate the loss of sensors from NPOESS
- Developed options using following criteria:
 - Minimize risk to measurement continuity
 - First priority for existing climate data records
 - Minimize risk to existing programs
 - Cost effectiveness
 - Economies of scale
 - Leverage planned missions and sensors **including partnerships with other space agencies**



Range of Options* Examined for Climate Data Continuity



- Current and Planned Missions
- NASA-NOAA Mitigation Flight
- NPOESS Mitigation Flight

*Final option still under discussion



Current Status – De-manifested Sensors



- **Total Solar Irradiance Sensor (TSIS)**
 - President's FY2009 budget request includes support for instrument development and ongoing analyses to identify a suitable satellite platform for hosting the sensor
- **Clouds and Earth Radiant Energy System (CERES)**
 - A CERES instrument is approved for flight on the NPOESS Preparatory Project (NPP) in 2010
 - President's FY2009 budget request includes funds to build another CERES instrument to fly on the first NPOESS planned for 2013 launch
- **Ocean Altimetry (ALT)**
 - NOAA plans to provide operational continuity for satellite altimetry data with a Jason-3 mission
 - Jason-3 is a NOAA-EUMETSAT partnership mission, planned for launch in 2013
- **Ozone Mapping and Profiler Suite (OMPS) Limb sensor**
 - Approved for flight on NPP
 - Resources not identified for NPOESS OMPS-Limb
- **Aerosol Polarimeter Sensor (APS)**
 - NOAA is monitoring NASA's development of APS scheduled to launch in March 2009 on the GLORY mission and will evaluate it before making a decision



Current Status – Reduced Capability Sensors



- Re-scoped MIS to fly on NPOESS C2, C3, and C4
- NOAA and the Japanese Aerospace Exploration Agency (JAXA) are actively exploring prospects for cooperation in NPOESS and the Japanese Global Change Observation Mission (GCOM) series of satellites
 - GCOM-W (Water Cycle observation) – series of 3 satellites, beginning in 2012 (AMSR-2 in particular)
 - GCOM-C (Climate observation) – series of 3 satellites, launch TBD
 - NOAA and JAXA are drafting Joint Letter of Intent for GCOM / NPOESS cooperation.
 - Formal agreement contingent on both sides obtaining budget support for their part in the cooperation
 - Data exchange, cal/val, data relay support



Current Status – Reduced Coverage Sensors



- CrIS/ATMS – No climate mitigation recommended
- VIIRS – Concerns remain that VIIRS on NPP will not provide sensitivity required for ocean color
 - VIIRS work ongoing
 - Explore possible International partnerships for ocean color