NOAA Space Weather (SWX) Program: Academy Infrastructure Workshop

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NESDIS/OPPA

Community Meeting on NOAA Satellites
Informing the Future of NOAA Satellite Observations
September 30, 2020
September 2020 Status

- The National Academies of Science, Engineering and Medicine (NASEM) has conducted the *Space Weather Operations and Research Future Infrastructure* Workshop.
- Charter summary: maintain and improve critical observations as input to the space weather prediction and notification system.
- The NASEM ad hoc organizing committee developed the agenda and organized the space weather experts’ participation.
- The workshop was conducted in two parts (100+ participants in each part):
  - Part 1 – 16 -17 June 2020 (virtual, records and notes provided)
  - Part 2 – 9 -11 September (virtual, notes in progress)
- Report (only, no recommendations) is expected by the end of 2020.
- A follow-on workshop (NASA- and NSF-supported), planned to be held in Spring 2021, will be conducted to address out-of-scope issues encountered in the first workshop, as well as R2O2R and to address knowledge and research gaps with regard to the advanced understanding of the Sun-Earth system.
Start Point – 2025 Program of Record

3-Axis Stabilized ESPA Class Spacecraft

Compact Coronagraph (CCOR)

GOES-U Solar Pointing Platform (SPP)

CCOR + SUVI + EXIS

NOAA SpWx Observing Program of Record 2025: Starting point for the Infrastructure Workshop

SWFO – L1 platform
GOES – U
COSMIC-2
GOLD
Metop – C
ESA – L5

What’s next for 2030 and beyond?

Bill Murtagh
Space Weather Prediction Center
National Weather Service
National Oceanic and Atmospheric Administration

Space Weather Operations and Research Infrastructure Workshop
National Academies of Sciences, Engineering, and Medicine
16 June 2020
ARTEMIS: Landing Humans on the Moon in 2024

- **Lunar Reconnaissance Orbiter:** Continued surface and landing site investigation.
- **Artemis I:** First human spacecraft to the Moon in the 21st century.
- **Artemis II:** First humans to orbit the Moon and rendezvous in deep space in the 21st Century.
- **Gateway begins science operations in lunar orbit with launch of Power and Propulsion Element and Habitation and Logistics Outpost**
- **Initial human landing system delivered to lunar orbit**
- **Artemis III:** Orion and crew dock to human landing system for crew expedition to the surface.

**Early South Pole Robotic Landings**
Science and technology payloads delivered by
Commercial Lunar Payload Services providers

**Volatiles Investigating Polar Exploration Rover**
First mobility-enhanced lunar volatiles survey

**Humans on the Moon - 21st Century**
First crew leverages infrastructure left behind by previous missions

LUNAR SOUTH POLE TARGET SITE
National Space Weather Strategy and Action Plan - Actions for Observational Systems

Action 2.1 and 2.2: Identify and ensure baseline ground-based, sea-based, air-based, and space-based operational observation capabilities

- Sustain baseline observation capabilities and identify opportunities to increase their reliability
  - Utilize new technologies
  - Reduce cost through partnerships with the private sector academia, and international partners
23 July 2012 – Near miss!

“Using a well-proven geomagnetic storm forecast model, we find the 23-24 July event would have produced a geomagnetic storm that was comparable to the largest events of the 20th Century.” Baker et al. 2012
Possible Report Products

- The National Academies via an appointed ad hoc committee conducted a workshop that considered options for continuity and future enhancements of the space weather operational infrastructure. Example report chapters include:
  - Review current and planned U.S. and international space weather-related observational capabilities;
  - Review space weather observational needs;
  - Identify programmatic and technological options to ensure continuity of the baseline, the Program of Record (POR) 2025, giving particular attention to options to extend the NOAA Space Weather (SWX) Program; and
  - Consider options for technology, instrument, and mission development to support in situ and remote sensing space weather observations from either ground- or space-based vantage points, the latter including L-1, L-5, L-4, L-2, 1-AU coverage, sub-L1, Tundra, GEO, GEOtransfer, and LEO among others.