Space Weather Operations and Research Infrastructure Workshop Phase 1

Project website:

https://www.nationalacademies.org/our-work/space-weather-operations-and-research-infrastructure-workshop

June 16-17, 2020 workshop (including presentations)

https://www.nationalacademies.org/event/06-16-2020/space-weather-operations-and-research-infrastructure-workshop-part-1

Sept. 9-11,2020 workshop (including presentations)

https://www.nationalacademies.org/event/09-09-2020/space-weather-operations-and-research-infrastructure-workshop-part-2

Statement of Task

- The National Academies of Sciences, Engineering, and Medicine will appoint an ad hoc committee to organize a workshop that will consider options for continuity and future enhancements of the U.S. space weather operational and research infrastructure. A report of the workshop proceedings will follow. The workshop will:
- Review current and planned U.S. and international space weather-related observational capabilities;
- Discuss baseline space weather observational needs;
- Identify programmatic and technological options to ensure continuity of the baseline, giving particular attention to options to extend the Space Weather Follow On (SWFO) 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, GEO, and LEO.

Workshop Organizing Committee

Mary K. Hudson, co-chair
NCAR and Dartmouth College

Janet G. Luhmann, co-chair
UC Berkeley

Daniel N. Baker
Univ. of Colorado/LASP

Anthea J. Coster
MIT Haystack Observatory

Tamara L. Dickinson
Science Matters, Inc.

Mark Gibbs
UK Met Office

Janelle V. Jenniges
US Air Force

Conrad C. Lautenbacher
GeoOptics, Inc

William Murtagh
NOAA SWPC

Mark A. Olson
NERC

Larry Paxton
JHUAPL

Tuija Pulkkinen
Univ. of Michigan

Peter Riley
PSI, Inc.

Ronald E. Turner
ANSER, Inc.

Project Context and Issues

- Objective II of the March 2019 National Space Weather Strategy and Action Plan: “Develop and Disseminate Accurate and Timely Space Weather Characterization and Forecasts.”
  - Requires the U.S. government to identify and ensure baseline observational capabilities, as well as to improve observations, research and modeling for characterizing and forecasting space weather events.
- The sponsors of the workshop are requesting a review of the current space weather capabilities in order to identify gaps and future needs for space weather products and services.
- The workshop's lead sponsor, NOAA, has asked that the workshop include a thorough examination of its Space Weather Follow On program (SWFO). This program seeks to establish the continuity of operational space weather observations beyond the currently operating DSCOVR mission and the joint ESA/NASA Solar and Heliophysics Observatory (SOHO) mission.
- NOAA and other workshop sponsors have requested an examination of potential improvements beyond the baseline capabilities SWFO is expected to provide, as well as an examination of future ground-based instruments relevant to space weather.
- The sponsors are also interested in examining emerging opportunities offered by smaller and more capable small satellites and smallsat constellations, as well as emerging capabilities in the commercial sector.

Phase II Workshop-Context

- While the Phase I workshop was oriented towards the identification of observations needed to advance space weather forecasts (“operational needs”), the Phase II workshop will be more focused on the research agenda and observations needed to improve understanding of the Sun-Earth system that generates space weather consequences.
- In addition to revisiting items from the Phase I workshop in need of further exploration, Phase II would, at the highest level – and taking into account the results of NASA’s space weather current science gap analysis and other relevant studies – seek to identify the key elements needed to establish a robust “research” infrastructure. Specifically, the workshop would:

Phase II Workshop-Draft SOT

- Review existing and developing procedures that will increase the accuracy and timeliness of forecasts and address the needs of large user groups and SWPC (NOAA Space Weather Prediction Center) forecasters;
- Examine trends in available and anticipated observations, including the use of constellations of small satellites, hosted payloads, international collaborations and data buys that are likely to drive future space weather architectures;
- Consider the adequacy and uses of existing relevant programs across the agencies, including NASA's LWS Program, NSF's Solar Terrestrial Research Program, and NOAA's Research to Operations (R2O) and Operations to Research (O2R) programs for reaching the goals described above;
- Consider needs, gaps, and opportunities in space weather modeling and validation, including a review of the status of data assimilation and ensemble approaches;
- Consider how to incorporate data from NASA missions that are "one-off" (e.g., Parker Solar Probe) or otherwise non-operational; and
- Take into account the results of NASA's space weather science gap analysis and other relevant studies, identifying the key elements needed to establish a robust "research" infrastructure.

Space Weather Operations and Research Infrastructure Workshop Phase 1

Project website:

https://www.nationalacademies.org/our-work/space-weather-operations-and-research-infrastructure-workshop

June 16-17, 2020 workshop (including presentations)

https://www.nationalacademies.org/event/06-16-2020/space-weather-operations-and-research-infrastructure-workshop-part-1

Sept. 9-11,2020 workshop (including presentations)

https://www.nationalacademies.org/event/09-09-2020/space-weather-operations-and-research-infrastructure-workshop-part-2