

NEWS

White House and Agencies Focus on Space Weather Concerns

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"Space weather is a serious matter that can affect human economies around the world," Tamara Dickinson, a senior policy analyst with the White House Office of Science and Technology Policy (OSTP), told attendees at the 2012 Space Weather Enterprise Forum, held 5 June in Washington, D. C. With the 2013 solar maximum nearing, researchers and government agencies are focusing on how the greater solar activity could affect our increasingly technological society and what measures can be taken to help prevent or mitigate any threats to the electricity grid, GPS, and other potentially vulnerable technologies.

Dickenson said that there has been an increased awareness about space weather in the White House and that President Barack Obama recently has requested briefing memos on the topic. She highlighted several efforts the administration is taking related to space weather, including a forthcoming national Earth observation strategy, which could be released in July and will include an assessment of space weather. She explained that the strategy document will be part of the fiscal year 2014 presidential budget request and that it will be updated every 3 years.

Dickinson added that the administration also is acting on earlier federal inter-agency recommendations to ready the Deep Space Climate Observatory (DSCOVR) mission for launch in 2014 as a near-term risk reduction measure to provide space weather data; there is concern about the continued healthy operation of the Advanced Composition Explorer (ACE), which has gone well beyond its expected mission life.

Earlier this year, Obama directed OSTP and the national security staff "to aggressively move forward with space weather mitigation efforts," Dickinson said. Based on the president's direction, she restructured OSTP's Geomagnetic Interagency Working Group. "We are focusing on achievable, strategic implementation actions, at least initially focused on the [electricity] grid," she said. Dickinson noted that she has included

additional federal agencies in the working group. However, she also said that OSTP itself now has only one staff member working on space weather. With the departure of two OSTP staff in March, "it was determined that OSTP should consolidate all the space weather activities under one person," she said.

Another document expected in July is the U.S. National Research Council's (NRC) decadal survey for solar and space physics. At the Space Weather Enterprise Forum, Arthur Charo, senior program officer for NRC's Space Studies Board, said the survey will take a long-term look at the field, recommend top priority scientific goals and directions for the future, and also recommend programmatic directions and priorities for government investments. The report is in review prior to its release.

Noting that the decadal survey is taken very seriously by Congress, the White House Office of Budget and Management, and federal agencies, Charo said that differences between this survey and its 2003 predecessor include much more emphasis on evaluating the technical maturity and probable costs of candidate "reference" missions as well as an attempt to avoid having outdated cost estimates. "We're really trying hard this time to produce an executable plan," Charo said. "What we turn over to NASA and [the National Oceanic and Atmospheric Administration and the National Science Foundation] will actually be something that fits within the reasonable expectation for the future budget."

Charo called space weather "a vibrant field." He said there has been "remarkable progress" in space weather research over the past decade—including a number of advances such as improvements in forecasting the arrival of coronal mass ejections (CMEs) to the Earth and successful satellite missions—and that the NRC decadal survey committee has "struggled to actually convey just how exciting progress has been over recent years."

However, he said there has been disappointment about the impact of the restructuring of the National Polar-orbiting

Operational Environmental Satellite System (NPOESS) on space environment monitoring. Also, although a number of other forum speakers called space weather a "team sport" that relies on many agencies working together, Charo expressed concern that U.S. federal agencies are "still operating largely ad hoc vis-à-vis [transitioning] space weather research to ops [operation]." He added that agencies will need to do more with less and learn how to maximize resource through international partnerships, missions of opportunity, and other measures. "Looking at future budgets, you can't help but think that budgets will not support future needs," he noted.

Researchers and government agency representatives also discussed advances related to space weather research at the Space Weather Enterprise Forum. Among the federal agency representatives, Charles Gay, deputy associate administrator of NASA's Science Mission Directorate, provided overviews of the agency's Heliophysics System Observatory, which consists of 17 operating missions. He noted new heliophysics missions planned for launch between 2012 and 2018—including the Radiation Belt Storm Probes, scheduled to launch on 23 August, and the Solar Probe Plus, slated to launch in 2018, which will fly as close as 9.5 solar radii to the Sun.

Other speakers at the forum also discussed key challenges for space weather research, and they expressed concern about damage that could occur from a future space weather event that might conceivably be as large as the 1859 "Carrington" event (named for British astronomer Richard Carrington and the strongest geomagnetic storm on record) or even from less powerful events.

Louis J. Lanzerotti, distinguished research professor of physics at the New Jersey Institute of Technology's Center for Solar-Terrestrial Research, provided a history of the impacts of space weather on electrical technology. "We have a vast array of unseen physical processes in the space around the Earth that can affect our technologies as we go forward. As the complexity of systems increases, including their interconnectedness and their interoperability, they become more susceptible to space weather effects," said Lanzerotti, editor of *Space Weather: The International Journal of Research and Applications*, which is published by AGU. He added that it is not a matter of whether space weather affects the Earth but rather when solar events might occur and how big they might be.

Lanzerotti said large solar disturbances can also occur during or near solar minimums, not only during solar maximums. He also expressed concern regarding how to predict some solar events. Lanzerotti said that modeling for CMEs is getting better, “but we have absolutely no clue as to how to predict the intensity of a solar X-ray event that can modify the ionosphere, or a solar radio event.”

Karel Schrijver, senior fellow in solar and space science at Lockheed Martin Space Systems Company’s Advanced Technology

Center in Palo Alto, Calif., agreed that it is very difficult to predict the magnitude and precise timing of many events. Noting that the Sun is “an incredibly complicated system of which we have only very limited access,” Schrijver said that solar seismic studies, computer modeling, and the observation of other stars can help scientists to understand the Sun to some extent.

While some researchers speculate that potential economic damage from severe solar weather could be enormous, Schrijver said that even relatively small solar events

can cause economic damage. He said that a study of 1216 reports of power grid disturbances between 1992 and 2010 found a pattern in disturbances following severe solar and geospace activity and that there could be several billion dollars of economic impact per year “that have flown under the radar because in part we focus on extreme [space weather] events.”

For more information, see <http://www.ofcm.gov/swef/2012/>.

—RANDY SHOWSTACK, Staff Writer