Outside Witness Testimony for the Alliance for Earth Observations
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U.S. Senate Committee on Appropriations
FY15 Hearing: Driving Innovation through Federal Investments

Chairwoman Mikulski and members of the Senate Appropriations Committee, the Alliance for Earth Observations (The Alliance) is honored to present you with the following testimony as an outside witness. The Alliance is a publicly and privately-funded initiative of the Institute of Global Environmental Strategies to promote the understanding and use of land, air and sea observations for societal and economic benefit. Our unique membership represents entire environmental information supply chain—from satellite and ground instrument providers to academic research organizations to end users such as small business owners and global media companies, who use this data and information to make decisions each and every day.

This testimony delivers three key messages to the Committee:

1. Continued and consistent Federal investment in Earth science and observations is essential to spurring innovation inside and outside the government.
2. Policies that call for new approaches and efficiencies, recognize private sector contributions, and promote economic competitiveness are as essential to innovation as funding.
3. A comprehensive, long-term Earth observations national plan is needed and should address whether current and planned systems are adequate to address challenges such as climate change, and whether the Federal investment and plans are clearly articulated so as to spur additional private sector investment and innovation.

One does not need to look far to understand how this precious investment in Earth science and observations is leveraged for economic, environmental, and national security purposes. Take for example, the multi-billion dollar weather enterprise. Federal investment in satellites, ground-based sensors, supercomputers, and modeling and analysis has enabled the United States to provide its citizens the best weather forecasting and predictive capabilities in the world.

Although numerous studies have been conducted and have examined various aspects of U.S. Earth observation capabilities, a clearly articulated, long-term roadmap remains to be developed. The Office of Science and Technology Policy issued a National Strategy for U.S. Civil Earth Observations in April 2013, but the strategy is only a starting-point and does not present a long-term plan for Federal investment. Congress should utilize its prerogative where appropriate to direct the development of such a plan.

The comprehensive national plan should consider and examine:

- Future capabilities that are balanced across disciplines and robust;
- Leadership and governance;
- Areas of future investment and innovation, which would enable the private sector to better position its capabilities and investments;
- The important role and capabilities of non-Federal partners whether they be academic, business, or non-governmental organizations;

- National requirements to meet the needs of the rapidly-growing and highly-diverse user community;
- Current capabilities (Federal and private sector) to obtain a more comprehensive examination and allow stakeholders to match up national needs with federal requirements for more robust systems;
- Support for the Administration's Open Data Policy initiative, which allows greater access to data enabling private sector innovation;
- Policies that promote and reward an environment of active collaboration between the U.S. public, private and academic sectors, in order to spur technological innovation, as well as to increase efficiencies in the weather enterprise – particularly where those efficiencies improve quality, accuracy and timeliness; and
- Policies that encourage the implementation of alternative data sources and operational constructs to acquire or augment key measurements for improved forecasting research and operations – thereby, building resiliency and redundancy within the weather enterprise and other areas.

It is important to recognize that a strong and resilient system must be an entire network of space, air, ground and sea-based measurements to produce a complete picture of the Earth and its complicated systems. Rather than dealing with each program individually and based on the latest crisis, a comprehensive national review of all earth observation tools and an assessment of what national needs – both federal and private – will be required to ensure this system is indeed robust.

Recommendations

The Alliance for Earth Observations would like to thank Congress for its recent budgetary support for critical weather and environmental satellites. The recommendations outlined in this testimony do not cost additional money but rather request an ongoing commitment to maintain programs already approved through stable and consistent funding and a recognition of their importance to the overall Earth observation network. The recommendations cover space-based observations focused on the satellite infrastructure and in situ measurements, acknowledging the fundamental role these observations play in the entire Earth observation network. Furthermore, these recommendations represent the priorities for Earth observations in FY2015 and are not exhaustive of the entire U.S. civil Earth observation enterprise.

Weather and Environmental Monitoring Systems: As you are aware, the U.S. currently faces a weather satellite data gap potentially lasting 15-40 months beginning as early as 2017. The Joint Polar Satellite System (JPSS) will provide global environmental data critical to weather forecasting. The data and imagery to be collected by JPSS aids NOAA and the U.S. government in developing timely and accurate public warnings and forecasts.

NASA also maintains a fleet of Earth science research satellites, many of which are operating well beyond their designed lifespan. The fleet of satellite as well as airborne platforms provide integrated and long-term global observations meant to provide a coordinated and improved understanding of Earth's environment as one system.

By enlisting the support of commercial providers the government can mitigate this gap and use the speed and innovation of the commercial sector to bring new technologies to bear in a fraction of the time government systems can be operational. Therefore, the Alliance recommends the Senate Appropriations Committee:

- *Support FY2015 budget request for Weather and Climate Satellites such as JPSS, GOES-R, NASA's Earth Science Research missions and the Defense Weather System Follow-on.*
- *To most effectively mitigate a possible data gap, immediately begin and accelerate acquisition of JPSS-2.*
- *Direct Federal agencies to pursue public-private partnership business models where feasible to augment national systems with commercial sources, hosted payloads for dedicated sensors, data buys and new innovative measurement capabilities. This includes continued budgetary support of the National Mesonet Program.*

Landsat satellite program: For over 40 years, the Landsat Program has continuously provided an objective, efficient and accurate source of highly-calibrated data to catalog natural and man-made changes on the Earth's surface. The latest satellite of the series, Landsat 8, was launched in February 2013 and is estimated to provide continued coverage until at least 2018. Despite the overwhelming government and private sector use of this data and the legacy of this program, the future of Landsat is uncertain. The President's FY2014 budget request recognized that Landsat is a critical piece of our Nation's infrastructure by establishing, for the first time, an operational land imaging budget line. Additionally, the 2014 Budget Act provides resources to begin acquisition of Landsat 9 and requires NASA to provide a plan to acquire a Landsat 9. It is imperative that NASA begin acquisition as quickly as possible, while also producing an acquisition plan for a long-term, continuous governmental land imaging program. The Alliance recommends Congress:

- *Provide consistent funding for Landsat 9 and require the Administration to develop a long-term budget and acquisition strategy for uninterrupted measurements in the future.*

Sea Ice Measurements and Modeling: The ability to accurately portray sea ice is of critical importance to economic activity in the region. A U.S. all-weather capability to monitor sea ice extent and concentration to support safety of navigation due to increased shipping, tourism, fishing, and U.S. companies extracting natural resources from the Arctic region is of utmost importance. The successful launch of NASA's Ice, Cloud, and land Elevation Satellite 2 (ICESat-2) and the follow-on to the Gravity Recovery and Climate Experiment (GRACE FO) by the end of 2017 are necessary to ensure improved sea ice measurements and modeling. The mapping gravity data from GRACE FO, for example, will support U.S. Navy and U.S. Coast Guard operations and help ensure the safety and security in the Arctic.[1] The Alliance recommends Congress:

- *Maintain launch dates for NASA's IceSat-2 and GRACE Follow-on missions to ensure expanded and new arctic sea ice observations by providing NASA with funding as requested.*

Arctic Communications System: According to the National Ocean Policy Implementation Plan, increased maritime activity in the Arctic also demands an improved communications system to "prevent and respond to maritime incidents and environmental impacts." U.S. national security policies also point to the need for improved communication systems. In November 2013 the U.S. Department of Defense released a new Arctic Strategy that explicitly emphasizes the near-term challenges of ice and weather reporting and forecasting and limitations in communications and surveillance in the region. More recently in February 2014, the U.S. Navy released its Arctic Roadmap stating strong support for a potential U.S. and

[1] Implementation Plan for the National Strategy for the Arctic Region, pg. 15-16; retrieved from http://www.whitehouse.gov/sites/default/files/docs/implementation_plan_for_the_national_strategy_for_the_arctic_region_-_fi....pdf on April 2, 2014

Canadian partnership on a communications and weather satellite to improve monitoring and communications capability in the Arctic. The Alliance further recommends Congress:

- *Support a U.S./Canadian agreement regarding Arctic communications and weather satellite capability.*

National Integrated Drought Information System (NIDIS). The NIDIS provides forecasts, research and data dissemination for individual localities to use. Adequate funding for this program is essential for decision-makers to get real-time data available for use in land-planning, wildfire mitigation strategies and more. Since its inception, NIDIS has not been funded at the levels as originally authorized in FY2007. Therefore, the Committee should:

- *Provide funding as authorized to maintain and improve the National Integrated Drought Information System.*

National Streamflow Information Program. The majority of the nation's water comes from surface and ground water. The National Streamflow Information Program (NSIP) within the U.S. Geological Survey (USGS) and in coordination with more than 800 other Federal, state, local and tribal agencies, operates over 7,400 streamgages nationwide. The National Weather Service uses this vital information in the prediction of floods. Water resource managers analyze the data to determine how to allocate scarce resources for disparate interests such as power production, crop irrigation, fisheries and habitat assessments, and even for recreational users. NSIP is intended to provide stability to the network and provide constant funding to the most critical of streamgages nationwide to ensure at least 30 years of continuous data is maintained. However, NSIP operates at levels much lower than optimal for data collection and analytics. The FY2015 budget request for NSIP is $34.9 million; a fully-funded program would require approximately $122 million annually in order to put in place and operate a "backbone network." Therefore, the Committee should:

- *Provide the National Streamflow Information Program with $34.9 million as requested with a goal of fully funding the program by FY2020.*

Ocean Observations. Researching our ocean environment provides a powerful and critical piece of the entire Earth observation puzzle. Changes to the ocean affect global weather and climate patterns worldwide. The Ocean Observatory Initiative (OOI) funded by the National Science Foundation, will be a networked infrastructure of science-driven sensor systems to measure the physical, chemical, geological and biological variables in the ocean and seafloor. Additionally, the U.S. Integrated Ocean Observing System (IOOS), operated by NOAA, incorporates contributions from both Federal and non-Federal assets and capabilities by developing a system to quickly and systematically obtain and disseminate ocean, coastal, and Great Lakes data and data products to meet essential societal needs. Goals are achieved by competitively funding organizations. Therefore, the Alliance recommends Congress:

- *Provide continued support to the National Science Foundation OOI by providing annual funding as requested.*
- *Continue offering grant opportunities and integrating capabilities by providing on-going funding of the U.S. IOOS.*

The Alliance for Earth Observations appreciates the opportunity to provide written testimony for this hearing. The economic value of Federal investment in our nation's Earth observation enterprise is demonstrated daily. An overarching framework for such federal investment will only serve to foster innovation in the future.

Thank you.