U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENVIRONMENT

HEARING CHARTER

Restoring U.S. Leadership in Weather Forecasting

Thursday, May 23, 2013
9:30 a.m. – 11:00 a.m.
2318 Rayburn House Office Building

PURPOSE

The Subcommittee on Environment will hold a hearing entitled *Restoring U.S. Leadership in Weather Forecasting* on Thursday, May 23, 2013, at 9:30 a.m. in Room 2318 of the Rayburn House Office Building. The purpose of the hearing is to examine ways to improve the National Oceanic and Atmospheric Administration (NOAA) weather forecasting, and to receive testimony on draft legislation to prioritize weather-related research.

WITNESS LIST

- **Mr. Barry Myers**, Chief Executive Officer, AccuWeather, Inc.
- **Mr. Jon Kirchner**, President, GeoOptics, Inc.

BACKGROUND

Recent extreme weather events in the United States have underscored the need for reliable, first-class weather forecasting by NOAA and the private sector. Within NOAA, the National Weather Service (NWS), the Office of Oceanic and Atmospheric Research (OAR), and the National Environmental Satellite, Data, and Information Service (NESDIS) play important roles in developing and deploying U.S. weather forecasting capabilities.[1] NOAA line offices are joined in this effort by an ever-evolving weather enterprise. The National Academy of Sciences recently emphasized the importance of this partnership, noting that "[p]rivate sector and other organizations provide sensor data, weather forecasts, and end-user services to a broad set of customers."[2]

[1] For more information on these responsibilities, see: "To Observe and Protect: How NOAA Procures Data for Weather Forecasting," March 28, 2012, http://science.house.gov/hearing/subcommittee-energy-and-environment-hearing-how-noaa-procures-data-weather-forecasting.

[2] http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/Weather-Services-Report-Brief.pdf.

Weather impacts American lives, and extreme weather poses significant risks to important parts of the U.S. economy. NOAA has traced a rise in weather disasters costing the economy at least $1 billion in damage, and a recent analysis found that substantial parts of the economy are sensitive to weather variability, representing more than three percent of Gross Domestic Product and nearly $500 billion a year.[3]

In a 2012 report on the National Weather Service, the National Academy of Sciences stated that "[a]s an outgrowth of public and private sector investment in weather, climate, and hydrological research, new observational, data assimilation, prediction, and other technology advancements are exceeding the capacity of the NWS to optimally acquire, integrate, and communicate critical forecast and warning information based on these technological achievements."[4] Similarly, a *USA Today* editorial last October following Superstorm Sandy highlighted concerns about American weather forecasting abilities, concluding that "[t]he American model is the basis for many forecasts, and its reliability problems beyond the short term suggest something major is amiss…. The European model's embarrassing superiority on Sandy ought to accelerate efforts to identify and fix what's wrong."[5]

In response to the destruction of property and loss of life associated with Superstorm Sandy, Congress approved the *Disaster Relief Appropriations Act of 2013* which included significant funds to improve forecasting equipment and supercomputer infrastructure. The *Washington Post* characterized this action as a "down payment" for "game-changing improvements" for U.S. weather prediction.[6]

Citing ongoing concerns about potential data gaps for NOAA's polar-orbiting and geostationary satellite programs, including a potential polar-orbiting gap of 17 to 53 months, the Government Accountability Office added NOAA's satellite programs to its High Risk List in 2013. This potential gap in weather satellite coverage and management problems with NOAA's satellite has been the subject of several Science, Space, and Technology Committee hearings over many years.[7] The GAO emphasized the potential effects of a gap:

> According to NOAA program officials, a satellite data gap would result in less accurate and timely weather forecasts and warnings of extreme events, such as hurricanes, storm surges and floods. Such degradation in forecasts and warnings would place lives, property, and our nation's critical infrastructures in danger. Given the criticality of satellite data to weather forecasts, the likelihood of significant gaps and the potential impact of such gaps on the health and safety of the U.S. population and economy, GAO

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[3] http://journals.ametsoc.org/doi/pdf/10.1175/2011BAMS2928.1.
[4] http://www.nap.edu/catalog.php?record_id=13429.
[5] http://www.usatoday.com/story/opinion/2012/10/30/sandy-forecasting-ecmwf-gfs/1670035/.
[6] Jason Samenow, "Game-changing improvements in the works for U.S. weather Prediction, The Washington Post, May 15, 2013, http://www.washingtonpost.com/blogs/capital-weather-gang/wp/2013/05/15/game-changing-improvements-in-the-works-for-u-s-weather-prediction/.
[7] http://science.house.gov/hearing/subcommittee-investigations-and-oversight-hearing-continuing-oversight-nation%E2%80%99s-weather; http://science.house.gov/hearing/joint-hearing-investigations-and-oversight-energy-and-environment-subcommittees-polar; http://science.house.gov/hearing/subcommittee-investigations-and-oversight-hearing-polar-weather-satellites.

has concluded that the potential gap in weather satellite data is a high-risk area and added it to the High Risk List in 2013.[8]

In addition, independent reviews of NOAA's weather research portfolio have also strongly recommended an emphasis on moving research-to-operations within NOAA's weather portfolio. In 2010, the National Academy of Public Administration stated that OAR "provides particularly important institutional glue to support innovation across NOAA."[9] In April 2013, NOAA's Science Advisory Board stated that "unless… science is transitioned into operations… NOAA will fail in its mission. NOAA must make certain that the intended end use of the scientific information is understood from the start by its researchers working on scientific questions and, ensure that internal as well as external end-user needs are incorporated explicitly into the problem formulation."[10]

NOAA plays an important role in making procurement decisions about observing systems that provide data for weather prediction in the U.S. NOAA currently uses information from over 100 observational networks, including space-based remote sensing, atmospheric observations, surface observations, and ocean observations. One method to analyze the value of weather data from observing systems is called an Observing System Simulation Experiment (OSSE). OSSEs employ computer modeling used to investigate the potential impact of planned observing systems or to test current observational and data assimilation systems. NOAA has stated that OSSEs "could play a critical role in…identifying future observation systems and data assimilation systems for improvement."[11]

ADDITIONAL READING

- National Academies of Science Report, *Weather Services for the Nation: Becoming Second to None*, *August 2012.*
- Dan Vergano, USA Today, *U.S. Forecast's Late Arrival Stirs Weather Tempest*, October 2012.
- NOAA Science Advisory Board Report, *In the Nation's Best Interest: Making the Most of NOAA's Science Enterprise*, April 2013.

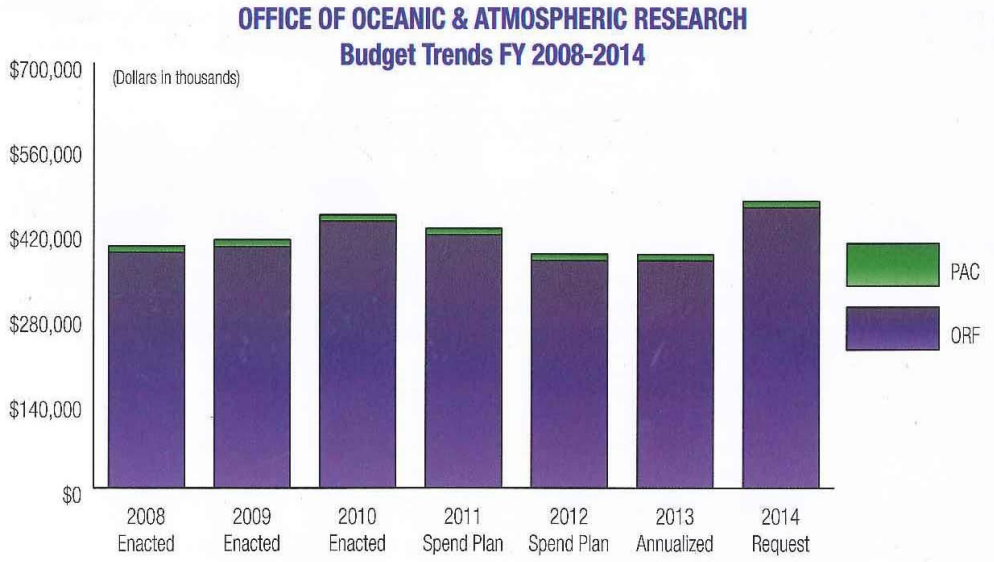
[8] http://www.gao.gov/highrisk/mitigating_gaps_in_weather_satellite_data.
[9] http://www.napawash.org/wp-content/uploads/2010/09/NAPA-Final-Report_NOAA-Climate-Service-Study_September-20101.pdf.
[10] http://www.sab.noaa.gov/Reports/2013/SAB%20R&D%20Portfolio%20Review%20Report%20to%20NOAA%20FINAL.pdf.
[11] http://laps.noaa.gov/met/osse.html.

Appendix 1: OFFICE OF OCEANIC & ATMOSPHERIC RESEARCH BUDGET[12]

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION FY 2014 BUDGET SUMMARY

OFFICE OF OCEANIC & ATMOSPHERIC RESEARCH

(DOLLARS IN THOUSANDS)	FY 2012 SPEND PLAN	FY 2013 ANNUALIZED CR	FY 2014 REQUEST	INCREASE (DECREASE)
OAR — ORF				
Climate Research	$181,044	$141,394	$188,840	$47,446
Weather and Air Chemistry Research	67,779	68,191	81,624	13,433
Ocean, Coastal, and Great Lakes Research	114,719	156,165	179,806	23,641
Information Technology, R&D & Science Education	8,946	9,000	11,786	2,786
Total, OAR - ORF	372,488	374,750	462,056	87,306
Total, OAR - PAC	10,296	10,350	10,379	29
GRAND TOTAL OAR (Direct Obligations)	**$382,784**	**$385,100**	**$472,435**	**$87,335**
Total FTE	**755**	**755**	**769**	**14**



ORF: Operations, Research, and Facilities

PAC: Procurement, Acquisition, & Construction

[12] http://www.corporateservices.noaa.gov/nbo/fy14_bluebook/FINALnoaaBlueBook_2014_Web_Full.pdf.

Discussion Draft
Section-by-Section Analysis

Section 1. Title. Weather Forecasting Improvement Act of 2013.

Section 2. Public Safety Priority. Directs Under Secretary to make weather forecasting to protect lives and property NOAA's top planning and management priority in relevant line offices.

Section 3. Weather Research and Forecasting Innovation.

(a) Establishes/codifies NOAA weather research program, directing agency to place "priority emphasis on development more accurate and timely warnings and forecasts of high impact weather events that endanger life and property."
(b) (b)(1) and (b)(2) describe specific program elements to be pursued—advanced radar, aerial systems, computing/modeling, and OSSEs.
(b)(3) codifies longstanding joint OAR-NWS tech transfer program, moving its funding from NWS.

Section 4. Weather Research and Development Planning. Directs NOAA to develop a prioritized weather research plan to guide activities authorized under the Act, and restore U.S. world leadership in weather modeling, prediction, and forecasting.

Section 5. Observing System Planning. Directs NOAA to maintain a list of observation data requirements and systematically evaluate the combination of systems necessary to meet such requirements, including as they related to potential data gaps. Directs NOAA to develop a range of options to address any identified gaps.

Section 6. Observing System Simulation Experiments. Directs NOAA to undertake Observing System Simulation Experiments (OSSEs) to quantitatively assess the relative value and benefits of observing capabilities and systems. Specifies under what conditions OSSEs should be performed.

Section 7. Computing Resources Prioritization Report. Directs the NOAA CIO to issue a plan to ensure that the Agency is pursing cutting-edge high performance computing power and providing a balance of models and computing resources to support enhanced weather prediction capabilities.

Section 8. Commercial Weather Data. Clarifies that restrictions in existing law prohibiting the sale of weather satellite systems to the private sector do not extend to the purchase of weather data through contracts with commercial providers or the placement of instruments on private payloads.

Section 9. Definitions.

Section 10. Authorization of Appropriations. Authorizes modest increases to NOAA's weather R&D activities, offsetting increased spending through cuts to non-weather R&D (climate and ocean research).