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REPORT
113–383

WEATHER FORECASTING IMPROVEMENT ACT OF 2013

MARCH 21, 2014.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. SMITH of Texas, from the Committee on Science, Space, and Technology, submitted the following

R E P O R T

[To accompany H.R. 2413]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (H.R. 2413) to prioritize and redirect NOAA resources to a focused program of investment on near-term, affordable, and attainable advances in observational, computing, and modeling capabilities to deliver substantial improvement in weather forecasting and prediction of high impact weather events, such as tornadoes and hurricanes, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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I. AMENDMENT

The amendment is as follows:

Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "Weather Forecasting Improvement Act of 2013".

SEC. 2. PUBLIC SAFETY PRIORITY.

In accordance with NOAA's critical mission to provide science, service, and stewardship, the Under Secretary shall prioritize weather-related activities, including the provision of weather data, forecasts, and warnings for the protection of life and property and the enhancement of the national economy, in all relevant line offices.

SEC. 3. WEATHER RESEARCH AND FORECASTING INNOVATION.

(a) PROGRAM.—The Assistant Administrator for OAR shall conduct a program to develop improved understanding of and forecast capabilities for atmospheric events and their impacts, placing priority on developing more accurate, timely, and effective warnings and forecasts of high impact weather events that endanger life and property.

(b) PROGRAM ELEMENTS.—The program described in subsection (a) shall focus on the following activities:

(1) Improving the fundamental understanding of weather consistent with section 2, including boundary layer and other atmospheric processes.

(2) Improving the understanding of how the public receives, interprets, and responds to warnings and forecasts of high impact weather events that endanger life and property.

(3) Research and development, and transfer of knowledge, technologies, and applications to the NWS and other appropriate agencies and entities, including the American weather industry and academic partners, related to—

(A) advanced radar, radar networking technologies, and other ground-based technologies, including those emphasizing rapid, fine-scale sensing of the boundary layer and the use of innovative, dual-polarization, phased-array technologies;

(B) aerial weather observing systems;

(C) high performance computing and information technology networks;

(D) advanced numerical weather prediction systems and forecasting tools and techniques that improve the forecasting of timing, track, intensity, and severity of high impact weather, including through—

(i) the development of more effective mesoscale models;

(ii) more effective use of existing, and the development of new, regional and national cloud-resolving models;

(iii) enhanced global models; and

(iv) integrated assessment models;

(E) quantitative assessment tools for measuring the value of data and observing systems, including OSSEs (as described in section 8), OSEs, and AOAs;

(F) atmospheric chemistry and interactions essential to accurately characterizing atmospheric composition and predicting meteorological processes, including cloud microphysical, precipitation, and atmospheric electrification processes, to more effectively understand their role in severe weather; and

(G) additional sources of weather data and information, including commercial observing systems.

(4) A technology transfer initiative, carried out jointly and in coordination with the Assistant Administrator for NWS, and in cooperation with the American weather industry and academic partners, to ensure continuous development and transition of the latest scientific and technological advances into NWS operations.

(c) EXTRAMURAL RESEARCH.—

(1) IN GENERAL.—In carrying out the program under this section, the Assistant Administrator for OAR shall collaborate with and support the non-Federal weather research community, which includes institutions of higher education, private entities, and nongovernmental organizations, by making funds available through competitive grants, contracts, and cooperative agreements.

(2) SENSE OF CONGRESS.—It is the sense of Congress that not less than 30 percent of the funds authorized for research and development at OAR by this Act should be made available for this purpose.

(3) REPORT.—The Under Secretary shall transmit to Congress annually, concurrently with NOAA's budget request, a description of current and planned activities under this section.

SEC. 4. TORNADO WARNING IMPROVEMENT AND EXTENSION PROGRAM.

(a) IN GENERAL.—The Under Secretary, in collaboration with the American weather industry and academic partners, shall establish a tornado warning improvement and extension program.

(b) GOAL.—The goal of such program shall be to reduce the loss of life and economic losses from tornadoes through the development and extension of accurate, effective, and timely tornado forecasts, predictions, and warnings, including the prediction of tornadoes beyond one hour in advance.

(c) PROGRAM PLAN.—Not later than 6 months after the date of enactment of this Act, the Assistant Administrator for OAR, in consultation with the Assistant Administrator for NWS, shall develop a program plan that details the specific research, development, and technology transfer activities, as well as corresponding resources and timelines, necessary to achieve the program goal.

(d) BUDGET FOR PLAN.—Following completion of the plan, the Assistant Administrator for OAR, in consultation with the Assistant Administrator for NWS, shall transmit annually to Congress a proposed budget corresponding to the activities identified in the plan.

SEC. 5. HURRICANE WARNING IMPROVEMENT PROGRAM.

(a) IN GENERAL.—The Under Secretary, in collaboration with the American weather industry and academic partners, shall establish a hurricane warning improvement program.

(b) GOAL.—The goal of such program shall be to develop and extend accurate hurricane forecasts and warnings in order to reduce loss of life, injury, and damage to the economy.

(c) PROGRAM PLAN.—Not later than 6 months after the date of enactment of this Act, the Assistant Administrator for OAR, in consultation with the Assistant Administrator for NWS, shall develop a program plan that details the specific research, development, and technology transfer activities, as well as corresponding resources and timelines, necessary to achieve the program goal.

(d) BUDGET FOR PLAN.—Following completion of the plan, the Assistant Administrator for OAR, in consultation with the Assistant Administrator for NWS, shall transmit annually to Congress a proposed budget corresponding to the activities identified in the plan.

SEC. 6. WEATHER RESEARCH AND DEVELOPMENT PLANNING.

Not later than 6 months after the date of enactment of this Act, and annually thereafter, the Assistant Administrator for OAR, in coordination with the Assistant Administrators for NWS and NESDIS, shall issue a research and development plan to restore and maintain United States leadership in numerical weather prediction and forecasting that—

(1) describes the forecasting skill and technology goals, objectives, and progress of NOAA in carrying out the program conducted under section 3;

(2) identifies and prioritizes specific research and development activities, and performance metrics, weighted to meet the operational weather mission of NWS;

(3) describes how the program will collaborate with stakeholders, including the American weather industry and academic partners; and

(4) identifies, through consultation with the National Science Foundation, American weather industry, and academic partners, research necessary to enhance the integration of social science knowledge into weather forecast and warning processes, including to improve the communication of threat information necessary to enable improved severe weather planning and decisionmaking on the part of individuals and communities.

SEC. 7. OBSERVING SYSTEM PLANNING.

The Under Secretary shall—

(1) develop and maintain a prioritized list of observation data requirements necessary to ensure weather forecasting capabilities to protect life and property to the maximum extent practicable;

(2) undertake, using OSSEs, OSEs, AOAs, and other appropriate assessment tools, ongoing systematic evaluations of the combination of observing systems, data, and information needed to meet the requirements developed under para-

graph (1), assessing various options to maximize observational capabilities and their cost-effectiveness;

(3) identify current and potential future data gaps in observing capabilities related to the requirements under paragraph (1); and

(4) determine a range of options to address gaps identified under paragraph (3).

SEC. 8. OBSERVING SYSTEM SIMULATION EXPERIMENTS.

(a) IN GENERAL.—In support of the requirements of section 7, the Assistant Administrator for OAR shall undertake OSSEs to quantitatively assess the relative value and benefits of observing capabilities and systems. Technical and scientific OSSE evaluations—

(1) may include assessments of the impact of observing capabilities on—

(A) global weather prediction;

(B) hurricane track and intensity forecasting;

(C) tornado warning lead times and accuracy; and

(D) prediction of mid-latitude severe local storm outbreaks; and

(2) shall be conducted in cooperation with other appropriate entities within NOAA, other Federal agencies, the American weather industry, and academic partners.

(b) REQUIREMENTS.—OSSEs shall quantitatively—

(1) determine the potential impact of proposed space-based, suborbital, and in situ observing systems on analyses and forecasts;

(2) evaluate and compare observing system design options; and

(3) assess the relative capabilities and costs of various observing systems and combinations of observing systems in providing data necessary to protect life and property.

(c) IMPLEMENTATION.—OSSEs—

(1) shall be conducted prior to the acquisition of major Government-owned or Government-leased operational observing systems, including polar-orbiting and geostationary satellite systems, with a lifecycle cost of more than $500,000,000; and

(2) shall be conducted prior to the purchase of any major new commercially provided data with a lifecycle cost of more than $500,000,000.

(d) PRIORITY OSSEs.—Not later than June 30, 2014, the Assistant Administrator for OAR shall complete OSSEs to assess the value of data from both Global Positioning System radio occultation and a geostationary hyperspectral sounder global constellation.

(e) RESULTS.—Upon completion of all OSSEs, results shall be publicly released and accompanied by an assessment of related private and public sector weather data sourcing options, including their availability, affordability, and cost effectiveness. Such assessments shall be developed in accordance with section 50503 of title 51, United States Code.

SEC. 9. COMPUTING RESOURCES PRIORITIZATION REPORT.

Not later than 12 months after the date of enactment of this Act, and annually thereafter, the NOAA Chief Information Officer, in coordination with the Assistant Administrator for OAR and the Assistant Administrator for NWS, shall produce a report that explains how NOAA intends to—

(1) aggressively pursue the newest, fastest, and most cost effective high performance computing technologies in support of its weather prediction mission;

(2) ensure a balance between the research requirements to develop the next generation of regional and global models and its highly reliable operational models;

(3) take advantage of advanced development concepts to, as appropriate, make its next generation weather prediction models available in beta-test mode to its operational forecasters, the American weather industry, and its partners in academic and government research;

(4) identify opportunities to reallocate existing advanced computing resources from lower priority uses to improve advanced research and operational weather prediction; and

(5) harness new computing power in OAR and NWS for immediate improvement in forecasting and experimentation.

SEC. 10. COMMERCIAL WEATHER DATA.

(a) AMENDMENT.—Section 60161 of title 51, United States Code, is amended by adding at the end the following: "This prohibition shall not extend to—

"(1) the purchase of weather data through contracts with commercial providers; or

"(2) the placement of weather satellite instruments on cohosted government or private payloads.".

(b) STRATEGY.—

(1) IN GENERAL.—Not later than 6 months after the date of enactment of this Act, the Secretary of Commerce, in consultation with the Under Secretary, shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a strategy to enable the procurement of quality commercial weather data. The strategy shall assess the range of commercial opportunities, including public-private partnerships, for obtaining both surface-based and space-based weather observations. The strategy shall include the cost effectiveness of these opportunities, as well as provide a plan for procuring data from these non-governmental sources, as appropriate.

(2) REQUIREMENTS.—The strategy shall include—

(A) an analysis of financial or other benefits to, and risks associated with, acquiring commercial weather data or services, including through multiyear acquisition approaches;

(B) an identification of methods to address planning, programming, budgeting, and execution challenges to such approaches, including—

(i) how standards will be set to ensure that data is reliable and effective;

(ii) how data may be acquired from commercial experimental or innovative techniques and then evaluated for integration into operational use;

(iii) how to guarantee public access to all forecast-critical data to ensure that the American weather industry and the public continue to have access to information critical to their work; and

(iv) in accordance with section 50503 of title 51, United States Code, methods to address potential termination liability or cancellation costs associated with weather data or service contracts; and

(C) an identification of any changes needed in the requirements development and approval processes of the Department of Commerce to facilitate effective and efficient implementation of such strategy.

SEC. 11. WEATHER RESEARCH AND INNOVATION ADVISORY COMMITTEE.

(a) ESTABLISHMENT.—The Under Secretary shall establish a Federal Advisory Committee to—

(1) provide advice for prioritizing weather research initiatives at NOAA to produce real improvement in weather forecasting;

(2) provide advice on existing or emerging technologies or techniques that can be found in private industry or the research community that could be incorporated into forecasting at NWS to improve forecasting;

(3) identify opportunities to improve communications between weather forecasters, emergency management personnel, and the public; and

(4) address such other matters as the Under Secretary or the Advisory Committee believes would improve innovation in weather forecasting.

(b) COMPOSITION.—

(1) IN GENERAL.—The Under Secretary shall appoint leading experts and innovators from all relevant fields of science and engineering that inform meteorology, including atmospheric chemistry, atmospheric physics, hydrology, social science, risk communications, electrical engineering, and computer modeling.

(2) NUMBER.—The Advisory Committee shall be composed of at least 12 members, with the chair of the Advisory Committee chosen from among the members.

(3) RESTRICTION.—The Under Secretary may not appoint a majority of members who are employees of NOAA-funded research centers.

(c) ANNUAL REPORT.—The Advisory Committee shall transmit annually to the Under Secretary a report on progress made by NOAA in adopting the Advisory Committee's recommendations. The Under Secretary shall transmit a copy of such report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

(d) DURATION.—Section 14 of the Federal Advisory Committee Act (5 U.S.C. App.) shall not apply to the Advisory Committee until the date that is 5 years after the date of enactment of this Act.

SEC. 12. INTERAGENCY WEATHER RESEARCH AND INNOVATION COORDINATION.

(a) ESTABLISHMENT.—The Director of the Office of Science and Technology Policy shall establish an Interagency Committee for Advancing Weather Services to im-

prove coordination of relevant weather research and forecast innovation activities across the Federal Government. The Interagency Committee shall—

(1) include participation by the National Aeronautics and Space Administration, the Federal Aviation Administration, NOAA and its constituent elements, the National Science Foundation, and such other agencies involved in weather forecasting research as the President determines are appropriate;

(2) identify and prioritize top forecast needs and coordinate those needs against budget requests and program initiatives across participating offices and agencies; and

(3) share information regarding operational needs and forecasting improvements across relevant agencies.

(b) CO-CHAIR.—The Federal Coordinator for Meteorology shall serve as a co-chair of this panel.

(c) FURTHER COORDINATION.—The Director shall take such other steps as are necessary to coordinate the activities of the Federal Government with those of the American weather industry, State governments, emergency managers, and academic researchers.

SEC. 13. VISITING OAR RESEARCHERS PROGRAM.

(a) IN GENERAL.—The Assistant Administrator for OAR, in collaboration with the Assistant Administrator for NWS, may establish a program to detail OAR researchers to the NWS.

(b) GOAL.—The goal of this program is to enhance forecasting innovation through regular, direct interaction between OAR's world-class scientists and NWS's operational staff.

(c) ELEMENTS.—The program shall allow no fewer than 5 and no more than 15 OAR staff to spend up to 1 year on detail to the NWS. Such detail shall be at any of the National Centers for Environmental Prediction or at any of the Regional Forecast Offices where such interaction could be productive in improving forecasting capabilities. Candidates shall be jointly selected by the Assistant Administrator for OAR and the Assistant Administrator for NWS.

(d) REPORT.—The Under Secretary shall report annually to the Committee on Science, Space, and Technology of the House of Representatives and to the Committee on Commerce, Science, and Transportation of the Senate on participation in such program and shall highlight any innovations that come from this interaction.

SEC. 14. VISITING FELLOWS AT NWS.

(a) IN GENERAL.—The Assistant Administrator for NWS may establish a program to host postdoctoral fellows and academic researchers at any of the National Centers for Environmental Prediction.

(b) GOAL.—This program shall be designed to provide direct interaction between forecasters and talented academic and private sector researchers in an effort to bring innovation to forecasting tools and techniques available to the NWS.

(c) SELECTION AND APPOINTMENT.—Such fellows shall be competitively selected and appointed for a term not to exceed 1 year.

SEC. 15. DEFINITIONS.

In this Act:

(1) AOA.—The term "AOA" means an Analysis of Alternatives.

(2) NESDIS.—The term "NESDIS" means the National Environmental Satellite, Data, and Information Service.

(3) NOAA.—The term "NOAA" means the National Oceanic and Atmospheric Administration.

(4) NWS.—The term "NWS" means the National Weather Service.

(5) OAR.—The term "OAR" means the Office of Oceanic and Atmospheric Research.

(6) OSE.—The term "OSE" means an Observing System Experiment.

(7) OSSE.—The term "OSSE" means an Observing System Simulation Experiment.

(8) UNDER SECRETARY.—The term "Under Secretary" means the Under Secretary of Commerce for Oceans and Atmosphere.

SEC. 16. AUTHORIZATION OF APPROPRIATIONS.

(a) FISCAL YEAR 2014.—There are authorized to be appropriated for fiscal year 2014—

(1) out of funds made available for operations, research, and facilities in OAR, $83,000,000 to carry out section 3, of which—

(A) $65,000,000 is authorized for weather laboratories and cooperative institutes; and

(B) $18,000,000 is authorized for weather and air chemistry research programs; and

(2) out of funds made available for research and development in NWS, an additional amount of $14,000,000 for OAR to carry out the joint technology transfer initiative described in section 3(b)(4).

(b) ALTERNATIVE FUNDING FOR FISCAL YEAR 2014.—If the Budget Control Act of 2011 (Public Law 112–25) is repealed or replaced with an Act that increases allocations, subsection (a) shall not apply, and there are authorized to be appropriated for fiscal year 2014—

(1) out of funds made available for operations, research, and facilities in OAR, $96,500,000 to carry out section 3, of which—

(A) $77,500,000 is authorized for weather laboratories and cooperative institutes; and

(B) $19,000,000 is authorized for weather and air chemistry research programs; and

(2) out of funds made available for research and development in NWS, an additional amount of $16,000,000 for OAR to carry out the joint technology transfer initiative described in section 3(b)(4).

(c) FISCAL YEARS 2015 THROUGH 2017.—Out of funds made available for operations, research, and facilities in OAR for each of fiscal years 2015 through 2017, there are authorized to be appropriated—

(1) $100,000,000 to carry out section 3, of which—

(A) $80,000,000 is authorized for weather laboratories and cooperative institutes; and

(B) $20,000,000 is authorized for weather and air chemistry research programs; and

(2) an additional amount of $20,000,000 for the joint technology transfer initiative described in section 3(b)(4).

II. PURPOSE AND SUMMARY

The purpose of H.R. 2413 is to prioritize and redirect National Oceanic and Atmospheric Administration resources to a focused program of investment on affordable and attainable advances in observational, computing, and modeling capabilities to deliver substantial improvement in weather forecasting and prediction of high impact weather events, such as those associated with hurricanes, tornadoes, droughts, floods, storm surges, and wildfires.

III. BACKGROUND AND NEED FOR THE LEGISLATION

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 up to $1 billion in damage per weather event, 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.[1]

Recent severe weather events in the United States have underscored the need for timely, accurate, and reliable weather forecasts. 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.[2] NOAA is joined in this effort by an ever-evolving private sector weather enterprise. The National Academy of Sciences recently emphasized the importance of this partnership, noting that "[p]rivate sector and other organizations provide sensor

[1] *http://journals.ametsoc.org/doi/pdf/10.1175/2011BAMS2928.1*

[2] 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*.

data, weather forecasts, and end-user services to a broad set of customers."[3]

Rapid technological advances in computing and other areas such as remote sensing and advanced radar hold great promise to improve severe weather prediction, but have yet to be fully exploited. This promise was detailed in NOAA's most recent *20 Year Research Vision*, which asserted that emphasis on weather research and technological development will result in significant benefits to public safety:

> Severe storm and event warnings will save more lives and property. The enhanced information delivery systems of the future will be well coordinated and able to quickly disseminate severe storm and event warnings. The warnings themselves will see dramatic improvements. For example, tornado warning lead times will be on the order of one hour, rather than minutes. Technology like phased array radar, significant improvements in our under-standing of meso-scale weather processes, and the development of models that embody this understanding will enable this accomplishment. Improvements in storm surge forecasting and increased tsunami monitoring/warning capacity will also greatly minimize loss of life and property damage from these hazards.[4]

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 satellites have been the subject of several Science, Space, and Technology Committee hearings over many years. 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 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.[5]

In addition, independent reviews of NOAA's weather research portfolio have also recommended a stronger 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 inno-

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

[4] *http://nrc.noaa.gov/sites/nrc/Documents/Reduced%20file%20size_20%20yr%20Research%20Vision.pdf*

[5] *http://www.gao.gov/assets/660/652133.pdf*

vation across NOAA."[6] 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."[7]

IV. Hearing Summary

The Environment Subcommittee held a hearing on May 23, 2013 entitled "Restoring U.S. Leadership in Weather Forecasting." The purpose of the hearing was to examine ways to improve NOAA weather forecasting, and to receive testimony on draft legislation to prioritize weather-related research.

The Committee received testimony from: Mr. Barry Myers, Chief Executive Officer of AccuWeather, Inc. and Mr. Jon Kirchner, President of GeoOptics, Inc.

Witnesses discussed the current weather forecasting systems in the U.S. and highlighted opportunities to improve weather forecasting through new technologies.

The Environment Subcommittee also held a hearing on June 26, 2013 entitled "Restoring U.S. Leadership in Weather Forecasting Part 2," with the purpose of continuing the discussion of improving NOAA's weather forecasting.

The Subcommittee received testimony from: The Honorable Kathryn Sullivan, Acting Administrator at the National Oceanic and Atmospheric Administration; Dr. Kelvin Droegemeier, Vice President for Research, Regents' Professor for Meteorology, Weathernews Chair Emeritus, University of Oklahoma; Dr. William Gail, Chief Technology Officer, Global Weather Corporation, President-Elect, American Meteorological Society; and Dr. Shuyi Chen, Professor, Meteorology and Physical Oceanography, Rosentiel School of Marine and Atmospheric Sciences, University of Miami.

In the 112th Congress, the Committee on Science, Space, and Technology held a hearing on March 28, 2012, entitled, "To Observe and Protect: How NOAA Procures Data for Weather Forecasting." The purpose of the hearing was to examine how NOAA develops, evaluates, and executes plans to deliver the best and most cost effective data necessary to meet requirements for severe weather prediction and other observational needs.

The Subcommittee received testimony from: Ms. Mary Kicza, Assistant Administrator, National Environmental Satellite, Data, and Information Service, NOAA; Dr. Alexander MacDonald, Deputy Assistant Administrator for Research Laboratories and Cooperative Institutes, Office of Oceanic and Atmospheric Research, NOAA; Mr. John Murphy, Chief, Programs and Plans Division, National Weather Service, NOAA; Mr. Eric Webster, Vice President and Director, Weather Systems, ITT Exelis; Dr. David Crain, Chief Executive Officer, GeoMetWatch; Mr. Bruce Lev, Vice Chairman, AirDat LLC; and Dr. Berrien Moore, Dean, University of Oklahoma Col-

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[6] *http://www.napawash.org/wp-content/uploads/2010/09/NAPA-Final-Report_NOAA-Climate-Service-Study_September-20101.pdf*

[7] *http://www.sab.noaa.gov/Reports/2013/SAB%20R&D%20Portfolio%20Review%20Report%20to%20NOAA%20FINAL.pdf*

lege of Atmospheric and Geographic Sciences, and Director, National Weather Center.

V. Committee Consideration

On June 18, 2013, H.R. 2413 was introduced by Rep. Jim Bridenstine and referred to the Committee on Science, Space, and Technology.

On July 9, 2013, the Subcommittee on Environment met in open markup session and adopted H.R. 2413, as amended, by voice vote.

On December 5, 2013, the Committee on Science, Space, and Technology met in open markup session and adopted H.R. 2413, as amended, by voice vote. Further, the Committee ordered H.R. 2413 favorably reported to the House, as amended, by unanimous voice vote.

VI. Committee Votes

Clause 3(b) of rule XIII of the Rules of the House of Representatives requires the Committee to list the record votes on the motion to report legislation and amendments thereto. A motion to order H.R. 2413 favorably reported to the House, as amended, was agreed to by voice vote.

During Full Committee consideration of H.R. 2413, the following amendments were considered:

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
Full Committee Markup
December 5, 2013

AMENDMENT ROSTER

H.R. 2413, the "Weather Forecasting Improvement Act of 2013"

No.	Amendment	Summary	
1	**Amendment in the Nature of a Substitute to H.R. 2413 Offered by Mr. Stewart (UT)/Ms. Bonamici (OR) (470)**	The ANS requires NOAA to prioritize weather related activities. It also requires NOAA to collaborate with the nonfederal weather research community, and mandates an annual report to Congress on extramural activities. It requires a strategy from NOAA to assess commercial data opportunities, and a strategy on how it plans to use new computing resources. The ANS establishes a Weather Research and Innovation Advisory Committee, an Interagency Weather Research and Innovation Coordination, a Visiting OAR Researchers Program, and a Visiting Fellows program at NWS.	**Approved by Voice Vote**
2	**Amendment to the ANS to H.R. 2413 Offered by Mr. Rohrabacher (CA) (037)**	Amends Section 10 to require that the strategy includes an assessment of the "expected" cost effectiveness of using commercial data and that the plan for procuring data includes an expected implementation timeline.	**Offered and Withdrawn**

VII. Summary of Major Provisions of the Bill

• Public Safety Prioritization. The bill directs the Administrator of NOAA to prioritize weather-related activities to protect life and property and the enhancement of the national economy in all relevant offices.

• Weather Research Prioritization. The bill codifies and expands NOAA weather research activities, directing the agency to place "priority on developing more accurate, timely, and effective warnings and forecasts of high impact weather events that endanger life and property." The bill also codifies an existing technology transfer initiative carried out jointly between OAR and the NWS aimed at ensuring "continuous development and transition of the latest scientific and technological advances into NWS operations" and supporting the associated research data facilities.

• Tornado Warning Improvement and Extension Program. The bill creates a tornado research program, the goal of which shall be the development and extension of accurate, effective, and timely tornado forecasts, predictions, and warnings, including the prediction of tornadoes beyond one hour in advance. It also requires NOAA to prepare a program plan detailing the research and development activities and the associated budget resources necessary to successfully realize the tornado forecasting improvements.

• Hurricane Warning Improvement Program. The bill creates a hurricane research program, the goal of which shall be to "develop and extend accurate hurricane forecasts and warnings in order to reduce loss of life, injury, and damage to the economy." It also requires NOAA to prepare a program plan detailing the research and development activities and the associated budget resources necessary to successfully realize the hurricane forecasting improvements.

• Weather Research Planning. The bill directs OAR, in coordination with the NWS and NESDIS, to annually develop and issue a prioritized weather R&D plan to restore U.S. world leadership in weather modeling, prediction, and forecasting.

• Improved Observing System Planning. The bill directs NOAA to systematically evaluate the combination of observing systems necessary to meet weather forecasting data requirements, and develop a range of options to address potential data gaps. The bill further specifies that one component of this planning effort shall include Observing System Simulation Experiments (OSSEs) to quantitatively assess the relative value and benefits of potential observing capabilities and systems.

• Observing System Simulation Experiments. Section 8 of the bill specifies that OSSEs shall be conducted prior to acquisition of government owned or leased operational observing systems. It also requires the Assistant Administrator for OAR to use OSSEs to assess the value of data from Global Positioning Systems (GPS) radio occultation and a geostationary hyperspectral sounder global constellation by June 30, 2014.

• Computing Resources Prioritization Report. NOAA must issue an annual plan that explains how NOAA intends to pursue the newest, fastest, and most cost effective high performance computing technologies in support of its weather prediction mission and harness new computing power in OAR and NWS and deter-

mine how it can best be utilized for immediate improvement in research, modeling, forecasting, and experimentation.

• Commercial Weather Data. Section 10 clarifies that NOAA can buy private sector weather data and fly weather sensors on commercial satellites and requires the Secretary of Commerce to develop a strategy to do so within six months of enactment.

• Expanded Weather Coordination. The bill requires the Under Secretary to develop a Federal Advisory Committee to provide advice for prioritizing weather research initiatives at NOAA and identify emerging technologies. The bill requires the Director of the Office of Science and Technology Policy to establish an Interagency Committee for Advancing Weather Services. The bill also gives the Assistant Administrator for OAR the discretionary authority to establish a program to detail OAR researchers to NWS. The bill allows the Assistant Administrator for NWS to establish a program to host post-doctoral fellows and academic researchers at any of the National Centers for Environmental Prediction.

• Authorization of Appropriations. The bill authorizes appropriations for OAR's weather laboratories and cooperative institutes, weather and air chemistry research programs, and joint technology transfer initiative.

VIII. Committee Views

H.R. 2413, the Weather Forecasting Improvement Act of 2013, aims to enhance NOAA's protection of lives and property through improved severe weather forecasting, prioritization of research and computing resources, observing system planning, and emphasis on research-to-operations technology transfer. The bill codifies ongoing research and development activities and builds upon funds provided by Congress following Superstorm Sandy. The core principle that informs this bill is a firm commitment to restore America's leadership in numerical weather prediction, forecasting and, risk communication. As Dr. Tom Bogdan, President of the University Corporation for Atmospheric Research, wrote to the Committee: "By key measures, U.S. weather forecasting capabilities have slipped behind those of a number of international competitors, including the European Union, United Kingdom, and Japan."

Through this prioritization and greater collaboration with the American weather industry and academic partners, H.R. 2413 will result in better prediction of high impact weather events. The Committee is aware of a long series of reports, including from the National Research Council, the National Academy of Public Administration, and the NOAA Science Advisory Board which demonstrate that the Federal weather effort at NOAA has ample room for improvement. A recurring theme of these reports is that efforts to integrate research into the operational needs of the weather service could be much stronger, and that the overall effort at NOAA to consider new ideas and techniques from outside the agency needs to be more vigorous.

Improving these processes should not be expensive, though there are numerous research issues that could also be funded to improve weather forecasting. To improve these processes, it is vital to enhance cooperation and communication with the ample resources outside the agency. The private weather enterprise in America is robust and expanding. Some of the most innovative forecast prod-

ucts available anywhere in the world are routinely produced by American private firms. Many of the most creative thinkers about extreme weather events and forecasting challenges reside in American universities and research institutes and are readily available to work with the agency. This bill would create new processes within NOAA and encourages more consistent, contact between the agency and the broader weather enterprise. The Committee recognizes that there are many important weather research questions that could be pursued in ways that enhance public safety. We encourage the Administration to include the higher funding levels recommended in this Act in future budget requests.

Throughout H.R. 2413, the Committee gives responsibility to different line offices within NOAA, but requires coordination between these offices. The Committee fully expects that the coordination will be real and meaningful, with the goal of improving research-to-operations in a way that improves public safety and efficiency in government. The bill directs the Under Secretary of NOAA to prioritize weather-related activities, especially those that protect American lives and property and enhance our national economy, in all relevant line offices, including NWS, OAR, and NESDIS. This provision highlights that improved forecasting is of central importance to NOAA's public safety mission. We applaud the position articulated by Undersecretary Kathy Sullivan in our hearing on June 26, 2013 that "the forecast services that protect American lives and livelihood . . . are already NOAA's highest priority." Based upon the testimony of witnesses like Dr. Kelvin Droegemeier of the University of Oklahoma and Dr. Shuyi Chen of the University of Miami, the Committee recognizes the interconnectedness of research on weather, oceans, and climate. The language of Section 2 allows NOAA to make decisions that reflect the need for a balanced research portfolio while insisting the agency fulfill the Committee's direction and its commitment that improved weather-related public safety be NOAA's highest priority.

Section 3 codifies and clarifies a NOAA program, led by the Assistant Administrator for OAR, for weather research and forecasting innovation. This program includes a number of elements, including accelerated research, development, and deployment of critical technologies like next-generation radar and aerial observation systems, new global and national models, advanced high performance computing using graphic processing information technology networks, and quantitative assessment tools for measuring the value of data and specific observing systems, as well as a technology transfer initiative between relevant NOAA line offices and in collaboration with external partners. In enumerating the elements of the program in subsection (b), the Committee relied upon the expert advice of the weather enterprise—particularly suggestions from university and not-for-profit research center scientists—to try to capture specific research issues. However, it is not our intent to exclude from consideration other areas of research and development. The Committee's expectation is that the Assistant Administrator for OAR will develop a program that reflects the full range of pertinent research challenges.

The technology transfer initiative prescribed in subsection (b) should be consistent with NOAA's Weather Ready Nation program, build upon the successes of NOAA's weather-related test beds, in-

clude the necessary advanced research data handling and processing, and help to ensure that dedicated resources to support research-to-operations are not diverted. In subsection (3)(b)(4), the Committee directs that the Assistant Administrator for Oceanic and Atmospheric Research establish a technology transfer program designed to move the innovations of OAR into the operational work of NWS. In carrying out this subsection, the Assistant Administrator should consult closely with the Assistant Administrator for Weather Services regarding the value of the science and technology to be transitioned, integrated, and implemented into an operational environment. Section 3 further encourages extramural research collaboration and establishes the sense of Congress that NOAA should provide competitive grants, contracts, and cooperative agreements consistent with historic levels. Subsection (c) directs the Assistant Administrator of OAR to collaborate with and support the non-Federal weather research community. The bill requires the Under Secretary to transmit, as part of the budget process, a report that identifies the funding provided for extramural research. We expect that report to specify extramural research funding in the current and prior fiscal years, as well as the proportion of extramural research funding planned for in the budget request.

Building upon the successes of NOAA's Hurricane Forecast Improvement Program, H.R. 2413 directs the creation of tornado and hurricane warning improvement programs with detailed research, development, and technology transfer budgets and plans. Following several deadly tornado outbreaks in 2013, including in Moore, Oklahoma, the tornado program will focus on extending accurate forecasts and warnings to beyond one hour.

The bill encourages NOAA to address the loss of U.S. competitiveness in weather forecasting by requiring the annual development of a plan to restore and maintain leadership in numerical weather prediction and forecasting. Section 6 goes on to specify that one of the elements of the plan will be that it "identifies and prioritizes specific research and development activities, and performance metrics, weighted to meet the operational weather mission of NWS." This ensures that the Assistant Administrator for Weather Services will have meaningful input into R&D planning because the plan must reflect, to some degree, initiatives that are tied directly to operational needs. This section also includes a requirement that the agency pay special attention to the social science knowledge necessary to turn improved weather forecasting skills into communications that will help the public take effective steps to be safe. The challenge of risk communication was repeatedly highlighted to the Committee in both testimony at the June 26, 2013 hearing and also in informal communications to Members and staff.

In order to address observing system needs and potential data gaps, H.R. 2413 also requires NOAA to conduct comprehensive observing system planning. In support of this planning, the Assistant Administrator for OAR shall conduct OSSEs prior to major observing system acquisitions or commercial data purchases. The bill codifies NOAA's commitment to complete OSSEs on GPS radio occultation and a geostationary hyperspectral sounder global constellation in FY 2014 using funds made available in the Superstorm Sandy Supplemental. NOAA has informed the Com-

mittee that these OSSE studies are underway and directs the corresponding reports be shared with the Committee by June 30, 2014. The bill provides flexibilities within NOAA's assessment of observing systems, and the OSSE provisions are consistent with NOAA Administrators' characterization of these experiments as "powerful tool" to "inform our strategies for investing in observation networks" and "to help determine what new data or technologies will yield the best improvement in forecast accuracy." These activities should be carried out collaboratively with the Joint Center for Satellite Data Assimilation and other relevant bodies.

Section 10 makes clear that NOAA is not prohibited from purchasing weather data through contracts with commercial providers or the placement of weather satellite instruments on government or private payloads. The Committee views NOAA's unwillingness to seriously consider all sources of cost-effective, critical weather data, including from commercial providers, as short-sighted and with the potential to compound future data gaps. To help rectify this resistance to non-NOAA sources of observing data, H.R. 2413 directs the Secretary of Commerce to develop and transmit a strategy to enable the procurement of quality commercial weather data, including commercial opportunities for surface- and space-based observations. The purchase of data from commercial satellite vendors could lead to the best pricing for quality weather data. In assessing the range of commercial opportunities and developing the strategy of quality commercial weather data, the full range of commercial options must be considered, including FAR and non-FAR opportunities, public-private partnerships, commercial service agreements, anchor tenancy agreements, and pay on delivery contracts. NASA has provided a model for many of these options, including data purchases and NASA's Commercial Orbital Transportation Services for working with commercial companies cost-effectively to build confidence in commercial capabilities. If the Department of Commerce requires revised authority in order to implement one or more of these options, the strategy should clearly note this but it should not be a primary criterion in negatively assessing an option.

Section 11 directs NOAA to develop an independent weather research and innovation advisory committee. The Committee encourages NOAA to take advantage of the experience and expertise of NOAA's Science Advisory Board and the Environmental Information Services Working Group in carrying out this section.

H.R. 2413 authorizes funding to allow NOAA to carry out a balanced portfolio of research and development related to weather forecasting and other areas. Authorization of funds for the joint technology transfer initiative enabled by OAR's Global Systems Division advanced data facility indicates the Committee's desire to ensure that dedicated research-to-operations be preserved in order to promote active partnerships between NOAA line offices. The FY 2013 Disaster Relief Appropriations Act "kick-started" important weather forecasting improvement initiatives by providing initial program funding and making possible the procurement of critical enabling hardware such as a Global Hawk for the OAR unmanned aircraft system research and development program and graphic processing unit supercomputing infrastructure for revolutionary new model development. The funding authorized by this bill will follow through on these initiatives by making possible robust 3–5

year operational base technology development programs for new aerial weather observing systems to provide better meteorological data, higher performance research computing, accelerated development of next generation global and national/regional weather models, and an institutionalized OSSE process capability. Dedicated OAR funding for the direct transfer of new knowledge, technologies, and applications to the NWS and other agencies and entities under a "real-time research" approach completes this vision. The bill authorizes appropriations to be made out of the overall funding for operations, research, and facilities at OAR.

IX. Committee Oversight Findings

Pursuant to clause 3(c)(1) of rule XIII of the Rules of the House of Representatives, the Committee held oversight hearings and made findings that are reflected in the descriptive portions of this report.

X. Statement on General Performance Goals and Objectives

In accordance with clause 3(c)(4) of rule XIII of the Rules of the House of Representatives, the performance goals and objectives of the Committee are reflected in the descriptive portions of this report, including the goal to prioritize and redirect the NOAA resources to a focused program of investment on affordable and attainable advances in observational, computing, and modeling capabilities to deliver substantial improvement in weather forecasting and prediction of high impact weather events.

XI. New Budget Authority, Entitlement Authority, and Tax Expenditures

In compliance with clause 3(c)(2) of rule XIII of the Rules of the House of Representatives, the Committee adopts as its own the estimate of new budget authority, entitlement authority, or tax expenditures or revenues contained in the cost estimate prepared by the Director of the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

XII. Advisory on Earmarks

In compliance with clause 9(e), 9(f), and 9(g) of rule XXI, the Committee finds that H.R. 2413, the "Weather Forecasting Improvement Act of 2013", contains no earmarks.

XIII. Committee Cost Estimate

The Committee adopts as its own the cost estimate prepared by the Director of the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

XIV. Congressional Budget Office Cost Estimate

Pursuant to clause 3(c)(3) of rule XIII of the Rules of the House of Representatives, the following is the cost estimate provided by the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, DC, January 13, 2014.

Hon. LAMAR SMITH,
Chairman, Committee on Science, Space, and Technology,
House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 2413, the Weather Forecasting Improvement Act of 2013.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Jeff LaFave.

Sincerely,

DOUGLAS W. ELMENDORF.

Enclosure.

H.R. 2413—Weather Forecasting Improvement Act of 2013

Summary: H.R. 2413 would authorize appropriations over the 2014–2017 period for the National Oceanic and Atmospheric Administration (NOAA) to improve forecasting of severe weather events. The bill also would authorize NOAA to carry out various other activities related to weather forecasting and research.

Assuming appropriation of the authorized and necessary amounts, CBO estimates that implementing the legislation would cost $530 million over the 2014–2019 period. Enacting H.R. 2413 would not affect direct spending or revenues; therefore, pay-as-you-go procedures do not apply.

H.R. 2413 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary impact of H.R. 2413 is shown in the following table. The costs of this legislation fall within budget function 300 (natural resources and environment).

	By fiscal year, in millions of dollars—						
	2014	2015	2016	2017	2018	2019	2014–2019
CHANGES IN SPENDING SUBJECT TO APPROPRIATION							
Weather Forecasting Program:							
Authorization Level	113	120	120	120	0	0	473
Estimated Outlays	45	87	107	119	72	30	460
Planning and Research Activities:							
Estimated Authorization Level	14	14	14	14	14	14	84
Estimated Outlays	6	10	12	14	14	14	70
Total Changes:							
Estimated Authorization Level	127	134	134	134	14	14	557
Estimated Outlays	51	97	119	133	86	44	530

Basis of estimate: For this estimate, CBO assumes that the legislation will be enacted in 2014 and that the authorized and necessary amounts will be appropriated for each fiscal year. Estimated outlays are based on historical spending patterns for similar NOAA programs. Although funds have probably been appropriated through January 15, 2014, to conduct activities authorized under the bill, CBO cannot identify those amounts because NOAA has not yet allocated its 2014 appropriations for those activities.

H.R. 2413 would authorize the appropriation of $112.5 million in 2014 and $120 million a year over the 2015–2017 period for NOAA to develop a program to improve forecasting of severe weather events. Under the bill, NOAA would use those funds to purchase equipment and conduct research to improve the agency's forecasting capabilities and warning systems. In 2013, the agency spent about $80 million to fund similar activities. Assuming appropriation of the authorized amounts, CBO estimates that implementing the program would cost $460 million over the 2014–2019 period.

The legislation also would require NOAA to conduct additional activities related to weather research. H.R. 2413 also would establish committees to help NOAA prioritize research initiatives and coordinate weather-related research across federal agencies. Finally, the bill would establish programs to allow NOAA employees and postdoctoral fellows to work as visiting researchers at National Weather Service facilities. Based on information provided by NOAA and assuming appropriation of the necessary amounts, CBO estimates that conducting those activities would cost $70 million over the 2014–2019 period. Those amounts would be used to hire new employees and contractors, purchase new equipment, and provide grants to academic institutions to perform experiments related to weather.

Pay-As-You-Go considerations: None.

Intergovernmental and private-sector impact: H.R. 2413 contains no intergovernmental or private-sector mandates as defined in UMRA and would impose no costs on state, local, or tribal governments.

Estimate prepared by: Federal costs: Jeff LaFave; Impact on state, local, and tribal governments: Melissa Merrell; Impact on the private sector: Amy Petz.

Estimate approved by: Theresa Gullo, Deputy Assistant Director for Budget Analysis.

XV. Federal Mandates Statement

The Committee adopts as its own the estimate of Federal mandates prepared by the Director of the Congressional Budget Office pursuant to section 423 of the Unfunded Mandates Reform Act.

XVI. Compliance With H. Res. 5

A. Directed Rule Making. This bill does not direct any executive branch official to conduct any specific rule-making proceedings.

B. Duplication of Existing Programs. This bill does not establish or reauthorize a program of the federal government known to be duplicative of another program. Such program was not included in any report from the Government Accountability Office to Congress pursuant to section 21 of Public Law 111–139 or identified in the most recent Catalog of Federal Domestic Assistance published pursuant to the Federal Program Information Act (Public Law 95–220, as amended by Public Law 98–169) as relating to other programs.

XVII. Federal Advisory Committee Statement

Section 11 of the bill consolidates existing advisory activities under a federal advisory committee to provide advice for

prioritizing weather research initiatives at NOAA and to identify emerging technologies.

XVIII. Applicability to Legislative Branch

The Committee finds that the legislation does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the Congressional Accountability Act.

XIX. Section-by-Section Analysis

Section 1. Short Title. This section established the short title as the "Weather Forecasting Improvement Act of 2013".

Section 2. Public Safety Priority. This section directs the Under Secretary of the National Oceanic and Atmospheric Administration (NOAA Administrator) to prioritize weather-related activities, including weather data, forecasts, and warnings for the protection of lives and property.

Section 3. Weather Research and Forecasting Innovation. This section directs the Assistant Administrator of the Office of Oceanic and Atmospheric Research (OAR) to undertake a weather research program and directs the Assistant Administrator to place priority on developing more accurate, timely, and effective warnings and forecasts of high impact weather events that endanger life and property. Section 3 further defines the specific program elements to include advanced radar, aerial systems, computing/modeling, and Observing System Stimulation Experiments (OSSE) and codifies a longstanding joint OAR-National Weather Service (NWS) tech transfer program, moving its funding from NWS. Finally, Section 3 directs NOAA to support weather research through competitive grants, contracts, and cooperative agreements.

Section 4. Tornado Warning Improvement and Extension Program. This section establishes a Tornado Warning Improvement and Extension Program focused on developing and extending accurate tornado forecasts and warnings beyond one hour in order to reduce loss of life, injury, and damage to the economy.

Section 5. Hurricane Warning Improvement Program. This section establishes a Hurricane Warning Improvement Program focused on extending accurate hurricane forecasts and warnings in order to reduce loss of life, injury, and damage to the economy.

Section 6. Weather Research and Development Planning. Section 6 requires NOAA to develop a prioritized weather research plan to guide activities authorized under the Act and restore U.S. leadership in weather modeling, prediction, and forecasting. The section requires the plan to also identify, through consultation with the National Science Foundation, the research necessary to integrate social science knowledge into weather forecast and warning processes.

Section 7. Observing System Planning. Section 7 directs NOAA to maintain a list of observation data requirements and systematically evaluate the combination of systems necessary to meet such requirements. This section further directs NOAA to identify current and potential future data gaps in observing capabilities and develop a range of options to address any identified gaps.

Section 8. Observing System Simulation Experiments. This section directs NOAA to undertake Observing System Simulation Experiments (OSSEs) to quantitatively assess the relative value and benefits of observing capabilities and systems. This section identifies specific instances when an OSSE must be performed. Section 8 specifies that OSSEs shall be conducted prior to acquisition of government owned or leased operational observing systems.

Section 9. Computing Resources Prioritization Report. Section 9 directs NOAA to issue a plan that explains how it intends to: (1) aggressively pursues the newest, fastest, and most cost effective high performance computing technologies in support of its weather prediction mission; (2) ensure a balance between the research requirements; (3) take advantage of advanced development concepts; (4) identify opportunities to reallocate existing advanced computing resources from lower priority uses to improve operational weather prediction; and (5) harness new computing power in OAR and NWS and determine how it can best be utilized for immediate improvement in forecasting and experimentation.

Section 10. Commercial Weather Data. This section 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. This section requires the Secretary of Commerce to transmit a strategy that assesses the range of commercial opportunities for obtaining both surface-based and space-based weather observations. The strategy shall include an analysis of financial or other benefits, methods to address planning and budgeting, and identification of the changes needed to facilitate effective implementation of such strategy.

Section 11. Weather Research and Innovation Advisory Committee. Section 11 requires NOAA to draw upon existing advisory activities in developing an advisory committee to provide advice for prioritizing weather research initiatives at NOAA and identify emerging technologies. The Committee shall be composed of leading experts and innovators from all relevant fields of science and engineering. The Committee will transmit an annual report to the Undersecretary. The Undersecretary will relay such reports to the Committee.

Section 12. Interagency Weather Research and Innovation Coordination. This section requires the Director of the Office of Science and Technology Policy to establish an Interagency Committee for Advancing Weather Services. The Committee will improve coordination of relevant weather research and forecast innovation activities across the federal government.

Section 13. Visiting OAR Researchers Program. Section 13 grants the Assistant Administrator for OAR the authority to establish a program to detail OAR researchers to NWS. If OAR establishes the program, it allows between five and fifteen OAR staff to spend up to one year on detail to the NWS to allow for productive interaction to improve forecasting capabilities. The Undersecretary shall submit an annual report to the Science Committee detailing the program participation and highlighting any innovations that come from this interaction.

Section 14. Visiting Fellows at NWS. This section allows the Assistant Administrator for NWS to establish a program to host post-

doctoral fellows and academic researchers at any of the National Centers for Environmental Prediction.

Section 15. Definitions. This section provides definitions for terms in the bill.

Section 16. Authorization of Appropriations. If the Budget Control Act's FY 2014 discretionary allocations increase, Section 16 authorizes, out of funds made available for OAR's operations, research, and facilities appropriations account, $96.5 million for Fiscal Year 2014 to carry out the weather research program established under section 3. It further specifies that out of the $96.5 million provided in this section, $77.5 million is authorized for weather laboratories and cooperative institutes and $19 million is authorized for weather and air chemistry research programs. It also authorizes for FY 2014, $16 million to carry out the joint technology transfer initiative described in section 3. If discretionary allocations do not increase, the section authorizes $83 million for Fiscal Year 2014 to carry out the weather research program ($65 million for weather laboratories and cooperative institutes and $18 million for weather and air chemistry research programs) as well as $14 million to carry out the joint technology transfer initiative.

For FY 2015–2017, the section authorizes $100 million to carry out the weather research program established under section 3. It further specifies that out of the $100 million provided in this section, $80 million is authorized for weather laboratories and cooperative institutes and $20 million is authorized for weather and air chemistry research programs. Finally, this section also authorizes $20 million annually to carry out the joint technology transfer initiative described in section 3. The bill authorizes appropriations to be made out of the overall funding for operations, research, and facilities at OAR.

XX. Changes in Existing Law Made by the Bill, as Reported

In compliance with clause 3(e) of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (new matter is printed in italic and existing law in which no change is proposed is shown in roman):

SECTION 60161 OF TITLE 51, UNITED STATES CODE

§ 60161. Prohibition

Neither the President nor any other official of the Government shall make any effort to lease, sell, or transfer to the private sector, or commercialize, any portion of the weather satellite systems operated by the Department of Commerce or any successor agency. *This prohibition shall not extend to—*

(1) the purchase of weather data through contracts with commercial providers; or

(2) the placement of weather satellite instruments on cohosted government or private payloads.

DOC HASTINGS, WA
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VANCE McALLISTER, LA
BRADLEY BYRNE, AL

TODD YOUNG
CHIEF OF STAFF

U.S. House of Representatives
Committee on Natural Resources
Washington, DC 20515

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MATTHEW CARTWRIGHT, PA
KATHERINE CLARK, MA

PENNY DODGE
DEMOCRATIC STAFF DIRECTOR

March 20, 2014

The Honorable Lamar Smith
Chairman
Committee on Science, Space and Technology
2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman:

Thank you for working with me to resolve the concerns of the Committee on Natural Resources regarding H.R. 2413. As you know, we were troubled about the effect this bill could have on funding levels for National Oceanic and Atmospheric Administration (NOAA) programs under the jurisdiction of the Committee on Natural Resources.

To address our concerns, you have proposed a change to Section 16 of the Science Committee-reported text of the bill that would be part of a manager's amendment to H.R. 2413 when it is considered by the House of Representatives. This amendment would strike "out of funds made available for operations, research, and facilities in OAR" and replace it with "to OAR" in the three places this phrase occurs in Section 16 of the bill.

With this understanding, the Committee on Natural Resources will forego a sequential referral of the bill. As is normally the case in these matters, I ask that this agreement be memorialized by including this letter and your response in either the bill report for H.R. 2413 or in the Congressional Record during consideration of H.R. 2413 on the Floor.

Again, I thank you and your staff for your willingness to work with us on what I understand is an unintended consequence of the language in Section 16. I look forward to cooperating with you on other matters during the remainder of the 113th Congress.

Sincerely,

Doc Hastings
Chairman

cc: The Honorable Eric Cantor, Majority Leader
The Honorable Peter A. DeFazio, Ranking Minority Member
The Honorable Jim Bridenstine
The Honorable Thomas J. Wickham, Jr., Parliamentarian

LAMAR S. SMITH, Texas
CHAIRMAN

EDDIE BERNICE JOHNSON, Texas
RANKING MEMBER

Congress of the United States
House of Representatives
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6301
(202) 225-6371
www.science.house.gov

March 20, 2014

The Honorable Doc Hastings
Chairman, Committee on Natural Resources
1324 Longworth House Office Building
Washington, D.C. 20515

Dear Chairman Hastings,

Thank you for agreeing to withdraw your claim for a sequential referral of H.R.2413, the Weather Forecasting Improvement Act of 2013, and for working with us to incorporate a mutually agreeable change to provisions of that bill that may affect the Rule X jurisdiction of the Committee on Natural Resources.

I agree that in exchange for the Committee on Natural Resources withdrawing its request for a sequential referral of this bill, the Committee on Science, Space, and Technology will remove language that authorizes funds for the activities in this bill to be appropriated "out of funds made available for operations, research, and facilities in OAR". The bill that will be considered on the floor will authorize appropriations to OAR (Office of Oceanic and Atmospheric Research) for the activities in the bill.

I will insert copies of this exchange in the report filed on H.R. 2413 or in the *Congressional Record* during consideration of this bill on the House floor. I appreciate your cooperation regarding this legislation.

Sincerely,

Lamar Smith

Lamar Smith
Chairman

cc: The Honorable John Boehner, Speaker
The Honorable Eddie Bernice Johnson, Ranking Member, Committee on Science, Space, and Technology
The Honorable Peter DeFazio, Ranking Member, Committee on Natural Resources
Mr. Thomas J. Wickham, Parliamentarian

XXII. PROCEEDINGS OF THE SUBCOMMITTEE ON ENVIRONMENT MARKUP ON H.R. 2413, WEATHER FORECASTING IMPROVEMENT ACT OF 2013

TUESDAY, JULY 9, 2013

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENVIRONMENT,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, D.C.

The Subcommittee met, pursuant to call, at 10:10 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Chris Stewart [Chairman of the Subcommittee] presiding.

Chairman STEWART. The Environment Subcommittee on the Science, Space, and Technology will come to order. Without objection, the Chair is authorized to declare recesses of the Subcommittee at any time. And I now recognize myself for an opening statement.

Good morning and welcome to the morning's Environment Subcommittee markup of H.R. 2413, the Weather Forecasting Improvement Act of 2013, introduced by our Subcommittee's Vice Chairman, Jim Bridenstine, and I serve as a proud cosponsor on this bill.

The legislation before us today prioritizes protection of public safety and forward-looking weather research; improves procurement of observing system data from space, air, and land; and opens up NOAA's process to encourage private sector weather solutions. The legislation is a long-term down payment to upgrade our weather prediction system that has, in some cases, fallen behind international standards.

This markup is a result of the Subcommittee's hard work in both the 112th and 113th Congresses. This year we have had two legislative hearings on restoring U.S. leadership in weather forecasting, where expert witnesses provided testimony on the text of Mr. Bridenstine's legislation, and informed members of the need for improved weather forecasting and the potential for improved research and technology transfer efforts.

Our efforts this Congress build on a similarly deep record established in the 112th Congress, where the Committee explored these issues through multiple hearings and oversight activities. Collectively, this work helped to inform the Committee of NOAA's weather forecasting challenges and opportunities related to the pro-

grammatic management, research prioritization, and commercial data acquisition.

I am pleased that the bill before us today reflects improvement from its original discussion draft to include recommendations from the witness testimony, which expands resources available to achieve the objective of protecting lives and property through weather research and improved forecasting.

I'm also pleased to have been able to work with Ranking Member Bonamici through this process, including by holding a second hearing where we received valuable input from both NOAA and outside witnesses. This input has led to an improved work product and changes that were included in the introduced bill as well as the Manager's Amendment that I will offer today.

We may not agree on every detail, but we certainly agree that improved weather forecasting is an important national priority, so I hope we can continue this cooperative effort today and through our Full Committee markup.

And with that, I yield back.

[The prepared statement of Mr. Stewart follows:]

PREPARED STATEMENT OF SUBCOMMITTEE CHAIRMAN CHRIS STEWART

Chairman Stewart: Good morning and welcome to this morning's Environment Subcommittee markup of H.R. 2413, The Weather Forecasting Improvement Act of 2013, introduced by our Subcommittee's Vice Chairman, Jim Bridenstine, and I serve as a proud co-sponsor.

The legislation before us today prioritizes protection of public safety and forward-looking weather research; improves procurement of observing system data from space, air, and land; and opens up NOAA's process to encourage private sector weather solutions. The legislation is a long-term down payment to upgrade our weather prediction system that has, in some cases, fallen behind international standards.

This markup is a result of the Subcommittee's hard work in both the 112th and 113th Congresses. This year, we have had two legislative hearings on restoring U.S. leadership in weather forecasting, where expert witnesses provided testimony on the text of Mr. Bridenstine's legislation and informed Members of the need for improved weather forecasting and the potential for improved research and technology transition efforts.

Our efforts this Congress build on a similarly deep record established in the 112th Congress, where the Committee explored these issues through multiple hearings and oversight activities. Collectively, this work helped to inform the Committee of NOAA's weather forecasting challenges and opportunities related to programmatic management, research prioritization, and commercial data acquisition.

I am pleased that the bill before us today reflects improvement from its original discussion draft to include recommendations from witness testimony, which expands resources available to achieve the objective of protecting lives and property through weather research and improved forecasting.

I am also pleased to have been able to work with Ranking Member Bonamici throughout this process, including holding a second hearing where we received valuable input from both NOAA and outside witnesses. This input has led to an improved work product, and changes that were included in the introduced bill as well as the manager's amendment that I will offer today. We may not agree on every detail, but we certainly agree that improved weather forecasting is an important national priority, so I hope we can continue this cooperative effort today and through our Full Committee markup.

Chairman STEWART. I now yield to the Ranking Member of the Subcommittee, Ms. Bonamici, for her remarks.

Ms. BONAMICI. Thank you very much, Mr. Chairman. On June 26, 2013, you chaired the second Subcommittee hearing on restoring U.S. leadership in weather forecasting, and I thank you very

much for holding that hearing. The testimony was intelligent and constructive. We had a very distinguished panel of witnesses, all of whom provided extensive input and expertise about ways we can improve weather forecasting.

I was encouraged by your willingness to work together on this important issue, and following the June 26 hearing, I asked my staff to continue to work with your office and the Committee's majority staff to revise the bill to reflect the expertise gathered during that hearing. Then, on July 3, I heard that a markup had been scheduled for today, July 9. This rushed timeline, especially over a holiday recess, did not give us time to work together to improve this bill.

Mr. Chairman, I still want to work on this bill in a bipartisan way, and I ask that we make a concerted effort before we get to the full Committee markup to find language that serves the public safety interest of all of our constituents and is supported by the weather enterprise. Will you commit to that, Mr. Chairman?

Chairman STEWART. We'll certainly commit to working with you in any way that we can. Thank you.

Ms. BONAMICI. Thank you very much, Mr. Chairman.

Experts who testified raised several issues that should be addressed, and here are a few. First, we all agree that public safety is critical, but not one witness who testified stated that weather, which is about a two-week timeframe, should be a higher research priority at NOAA than climate, which is about what happens beyond two weeks. In fact, experts say that it will be difficult to improve weather forecasting without improving our understanding of climactic forces. Americans living along our coasts won't be safer if we reduce progress on seasonal tropical storm and hurricane warnings.

As witnesses at the July 26 hearing noted, these storm forecasts are heavily dependent on accurate climate and ocean modeling, which appears to be weakened under the current vision—version of this bill. Hurricanes and tropical storms are terribly damaging to our country, so it is inconceivable that we would move a bill that purports to improve weather forecasting but would simultaneously hinder NOAA's long-term forecasting for these storms. And it won't help farmers if we require NOAA to work on making five-day weather forecasts marginally more precise at the expense of reducing our progress on making useful seasonal drought forecasts.

Second, it is problematic that a bill to improve weather forecasting seems largely to ignore the National Weather Service, focusing instead on the Office of Oceanic and Atmospheric Research, the line office responsible for research within NOAA. NWS runs its own multimillion dollar R&D enterprise and its own multimillion dollar research-to-operations program. This bill appears to ignore those efforts. I am concerned that the bill does an inadequate job of something the witnesses emphasized: the need to bring better coordination across OAR and NWS.

The witnesses provided many useful suggestions about how to improve the research-to-operations and operations-to-research efforts at NOAA. There are low-cost ways to achieve high impact in generating innovation in NOAA's forecasting efforts and in integrating advice from the broader community into NOAA's work. In-

stead, we appear to be authorizing unnecessary expenditures. For example, the bill authorizes OAR to spend $20 million on a joint technology transfer initiative, but NWS currently spends almost $80 million on research to operations. Do we need a second initiative located in an office that does not do operational forecasts? This seems to empower the wrong office and also appears redundant and potentially wasteful.

Mr. Chairman, because this markup was noticed immediately prior to the July 4 holiday, we have had very little time to turn these ideas into legislative language, and importantly, to vet that language with the weather community. I certainly hope that there will be time for that before moving to a Full Committee markup.

As it stands, the bill we are marking up today remains flawed, a conclusion I reached listening to the testimony of expert witnesses who were invited by the minority and by the majority. This is an area where, if we have a chance to do something good for the public and be truly bipartisan, we can if my colleagues in the majority are willing.

I want to emphasize how concerned I am about this rushed timeline. Members have not even had a chance to submit questions for the record following our June 26 hearing, which was less than two weeks ago, much less received answers back. The record of that hearing is still open. This bill is important to the safety of the public. Why rush it and risk not getting it right?

Because of the rushed time frame for this Subcommittee markup, I plan to submit substantive amendments at the Full Committee markup. I remain optimistic that we can both improve public safety and the weather enterprise if we work together, and I look forward to doing that.

Mr. Chairman, thank you, and I yield back.

[The prepared statement of Ms. Bonamici follows:]

PREPARED STATEMENT OF RANKING SUBCOMMITTEE MEMBER SUZANNE BONAMICI

Mr. Chairman, on June 26, 2013, you chaired the second Subcommittee hearing on restoring U.S. leadership in weather forecasting. Thank you for holding that hearing. The testimony was intelligent and constructive. We had a very distinguished panel of witnesses, all of whom provided extensive input and expertise about ways we can improve weather forecasting.

I was encouraged by your willingness to work together on this important issue, and following the June 26th hearing, I asked my staff to continue working with your office and the Committee's Majority staff to revise the bill to reflect the expertise gathered during that hearing.

Then on July 3rd, I heard that a markup had been scheduled for today, July 9th. This rushed timeline, especially over a holiday recess, did not give us time to work together to improve the bill.

Mr. Chairman, I still want to work on this bill in a bipartisan way, and I ask that we make a concerted effort before we get to the Full Committee to find language that serves the public safety interests of all of our constituents and is supported by the weather enterprise. Will you please commit to that? Thank you, Mr. Chairman.

The experts who testified raised several issues that should be addressed. Here are a few.

First, we all agree that public safety is critical. But not one witness who testified stated that weather, which is about a two-week time frame, should be a higher research priority at NOAA than climate, which is about what happens beyond two weeks. In fact, experts say that it will be difficult to improve weather forecasting without improving our understanding of climactic forces.

Americans living along our coasts won't be safer if we reduce progress on seasonal tropical storm and hurricane warnings. As witnesses at the June 26th hearing noted, these storm forecasts are heavily dependent on accurate climate and ocean modeling, which appears to be weakened under this bill. Hurricanes and tropical storms are terribly damaging to our country, so it's inconceivable that we would move a bill that purports to improve weather forecasting but would simultaneously hinder NOAA's long-term forecasting for these storms. And it won't help farmers if we require NOAA to work on making five-day weather forecasts marginally more precise at the expense of reducing our progress on making useful seasonal drought forecasts.

Second, it's problematic that a bill to improve weather forecasting seems to largely ignore the National Weather Service, focusing instead on the Office of Oceanic and Atmospheric Research, the line office responsible for research within NOAA.

NWS runs its own multi-million dollar R&D enterprise and its own multi-million dollar research to operations program. This bill appears to ignore those efforts. I am concerned that the bill does an inadequate job of something the witnesses emphasized—the need to bring better coordination across OAR and NWS.

The witnesses provided many useful suggestions about how to improve the research to operations and operations to research efforts at NOAA. There are low-cost ways to achieve high impact in generating innovation in NOAA's forecasting efforts and in integrating advice from the broader community into NOAA's work.

Instead, we appear to be authorizing unnecessary expenditures. For example, the bill authorizes OAR to spend $20 million on a joint technology transfer initiative, but NWS currently already spends almost $80 million on research to operations. Do we need a second initiative located in an office that does not do operational forecasts? This seems to empower the wrong office and also appears redundant and potentially wasteful.

Mr. Chairman, because this markup was noticed immediately prior to the July 4th holiday, we have had very little time to turn these ideas into legislative language and, importantly, to vet that language with the weather community. I certainly hope that there will be time for that before moving to a Full Committee markup.

As it stands, the bill we are marking up today remains flawed, a conclusion I reached listening to the testimony of the expert witnesses who were invited by the Minority and by the Majority. This is an area where we have a chance to do something good for the public and be truly bipartisan if my colleagues in the Majority are willing.

I want to emphasize how concerned I am about this rushed timeline. Members have not even had a chance to submit questions for the record following our June 26th hearing, much less receive answers back. The record of that hearing is still open. This bill is important to the safety of the public; why rush it and risk not getting it right?

Because of the rushed time frame for this Subcommittee markup, I plan to submit substantive amendments at the Full Committee markup. I remain optimistic that we can improve both public safety and the weather enterprise if we can work together.

Thank you, and I yield back.

Chairman STEWART. Thank you, Ms. Bonamici.

Pursuant to Committee Rule 2(f) and House Rules XI 2(h)(4), the Chair announces that he may postpone roll call votes on matters on which the yeas and nays are ordered.

Pursuant to notice, I now call up H.R. 2413 for markup. The clerk will report the bill.

The CLERK. H.R. 2413, a bill to prioritize and redirect NOAA resources to a focused program of investment on near-term, affordable, and attainable advances in observational computing and modeling capabilities to deliver substantial improvement in weather forecasting and prediction of high-impact weather events such as tornadoes and hurricanes and for other purposes.

[H.R. 2413 appears in Appendix I.]

Chairman STEWART. Without objection, the bill is considered as read.

I yield five minutes to Mr. Bridenstine for his statement on the bill.

Mr. BRIDENSTINE. Thank you, Mr. Chairman, for allowing me to briefly describe my bill. I also want to thank the Chairman for his leadership on this issue and for scheduling today's markup on this very important and timely topic.

I can tell you, Mr. Chairman, my staff was here all week last week, and we didn't get any calls about, you know, having any desire to talk about any of these issues last week.

So let me briefly describe my bill. The Weather Forecasting Improvement Act of 2013 will prioritize the mission of NOAA to include the protection of lives and property and make funds available to improve weather-related research, operations, and computing resources. The bill both directs NOAA to undertake quantitative cost-benefit assessments used in obtaining data for forecasts and prepare a report outlining the options of commercial opportunities for obtaining space-based weather observations.

The centerpiece of this bill is a codification and expansion of NOAA weather research activities specifically directing the Agency to place "priority emphasis on development of more accurate and timely warnings and forecasts of high-impact weather events that endanger life and property."

The bill also codifies an existing technology transfer initiative carried out jointly between the Office of Oceanic and Atmospheric Research and the National Weather Service aimed at ensuring "continuous development and transition of the latest scientific and technological advances into NWS operations."

The bill creates a Tornado Warning Extension Program, the goal of which shall be to "develop and extend accurate tornado forecasts and warnings beyond one hour in order to reduce life—loss of life, injury, and damage to the economy."

It also requires NOAA to prepare a program plan detailing the research and development activities and associated budget resources necessary to successfully realize the tornado forecasting improvements.

The bill also directs NOAA to systematically evaluate the combination of observing systems necessary to meet weather forecasting data requirements and develop a range of options to address potential data gaps. It further specifies that one component of this planning effort shall include observing system simulation experiments to quantitatively assess the relative value and benefits of potential observing capabilities and systems.

Finally, the bill clarifies that NOAA is not prohibited from obtaining weather data through contracts with commercial providers and directs NOAA to prepare a report assessing the range of commercial opportunities for obtaining cost-effective, space-based weather observations.

Mr. Chairman, my State has seen all too many times the destructive power of tornadoes and severe weather. In the wake of the latest outbreak in May that cost 48 lives, it is painfully clear that we must do more. The good news is that we can do more. In testimony before the Subcommittee, witnesses detailed how a concentrated effort to improve forecasting innovation would improve protection of lives and property. Dr. Droegemeier, from the Univer-

sity of Oklahoma, testified that with concerted research and technology development, zero deaths from severe weather should be our ultimate goal. By making weather research and the protection of lives a priority and lives and property NOAA's top priority, the bill before us today makes a small but important first step towards achieving this goal.

Thank you, Mr. Chairman, and I yield back.

[The prepared statement of Mr. Bridenstine is unavailable.]

Chairman STEWART. Thank you, Mr. Vice Chairman. I now recognize the Ranking Member, the gentlewoman from Texas, Ms. Johnson, for five minutes.

Ms. JOHNSON Thank you very much, Mr. Chairman.

And I would like to reiterate the comments of my colleague, Ms. Bonamici. Weather should not be, cannot responsibly be, a partisan issue. The whole country experiences severe weather, and billions of dollars in business and investments are tied to weather and seasonal forecasts. I am disappointed that we don't have a bipartisan bill that all Members can rally behind at today's markup. The Committee has never tried to pass a weather authorization that lacked the support of the weather enterprise stakeholders. This bill does not have the support now, and based on the testimony at the June 26th hearing, I doubt it can get that support without significant changes.

The Science, Space, and Technology Committee has had its reputational ups and downs, but there are only one or two areas in our jurisdiction that have been as historically nonpartisan as weather forecasting. I know this is a hard Congress to find space to cooperate, but I want to encourage all the Members of the strongest terms to take the time to develop a strong, nonpartisan piece of legislation. Reauthorizing the other programs is a type of policy issue where the American people just cannot understand why we can't get along. I hope that we can get there before we schedule a markup at Full Committee, and I want to lend my support to Chairman Stewart and Ranking Member Bonamici in this effort.

The short time Members have been given to prepare for this markup is not going to allow us to fix this bill today, but I want to join Ms. Bonamici in asking the Chairman to work with us in the coming days to produce a bill that we can all be proud of when we are done.

Thank you, and I yield back.

[The prepared statement of Ms. Johnson follows:]

PREPARED STATEMENT OF FULL COMMITTEE RANKING MEMBER EDDIE BERNICE JOHNSON

Mr. Chairman, I would like to reiterate the comments of my colleague, Ms. Bonamici.

Weather should not be, cannot responsibly be, a partisan issue. The whole country experiences severe weather, and billions of dollars in business and investments are tied to weather and seasonal forecasts. I am disappointed that the efforts of our Chairman and Ranking Member on this Subcommittee have not produced a bipartisan bill that all the Members can rally behind.

The Committee has never tried to pass a weather authorization that lacked the support of the weather enterprise. This bill does not have that support now and, based on the testimony of June 26, I doubt it can get that support without significant changes.

The Science, Space, and Technology Committee has had its reputational ups and downs, but there are only one or two areas in our jurisdiction that have been as historically non-partisan as weather forecasting. I know this is a hard Congress to find space to cooperate, but I want to encourage all the Members in the strongest terms to try here. Reauthorizing weather programs is the type of policy issue where the American people just cannot understand why we can't get along.

I hope that we can get there before we mark up at Full Committee, and I will be the first to congratulate both Members if they can honestly address the problems with the current bill and move us to a place where all of us can be proud of our work. I will do anything I can to help in this effort.

Chairman STEWART. Thank you, Ms. Johnson. Is there any further discussion of the bill?

Mr. GRAYSON. I would like to say a few words if I may. Congressman Grayson, from Florida.

Chairman STEWART. Yes, sir. And we recognize the gentleman from Florida.

Mr. GRAYSON. Thank you.

Mr. Chairman, trying to be as dispassionate and objective here as possible, you have heard the Ranking Members of the Committee and the Subcommittee indicate to you that it wasn't necessarily the best practice to release the draft of this bill the day before the July 4th weekend when Congress was not in session. It is our desire—everyone's desire here to come up with a bill that is the best bill that we can get to the Committee; understanding that, and understanding that sometimes there is a choice we have to make between doing things fast and doing things right, and having heard the arguments that were made, will the Chairman consider a one-week recess for this markup?

I will yield to the Chair.

Chairman STEWART. We appreciate that. And I would like to point out that the bill was introduced on June 18th, which was, of course, several weeks prior to the July 4th break. It has been available to the Members for, you know, at least that amount of time. And, of course, there was a discussion previous to that even. That being a fact, I believe we will go ahead. The Chair decides to go, and I will go ahead with the markup as scheduled.

Mr. GRAYSON. Well, recalling my time—reclaiming my time, I do want to point out that the Manager's Amendment was, in fact, released just a few days ago, and in fact, the two amendments I am offering today are premised upon specific changes that were made from the original draft and what we were given on July 3rd. So I think they were material changes that were made. I don't think you would dispute that, because you were the one who made those changes. So——

Chairman STEWART. Yes——

Mr. GRAYSON [continuing]. With that in mind, I would prefer to see us proceed in a manner where every Member of the Committee feels that they have been given the proper time to give their input and make this bill the best that it can be.

Chairman STEWART. Again, we appreciate your comments. As the author of the Manager's Amendment, it's very—I think generally technical in the sense that there are a few changes that were made in the structure, in some cases even commas and semicolons is all, very little substantive to it, and I believe there has been adequate time, even over the last week, since we brought the Manager's Amendment for anyone to read and have input to that.

Mr. GRAYSON. Well, reclaiming my time. The price that you all pay for doing this this way is that you haven't earned the cooperation of the minority. That may mean something to you; it may not. We both know that is going to be very hard to get any bill passed through the Senate, any bill actually signed into law when you are not making it a bipartisan bill but rather a partisan bill.

Chairman STEWART. Yes.

Mr. GRAYSON. It seems to me to be a small price to pay for the chance of making this a bipartisan bill to simply postpone this proceeding for one week. There is nothing in this bill that is time-sensitive. This is a bill that could have been introduced three months ago, six months ago. It could be introduced six months from now. It is not as if hurricanes are going to go away in the meantime or tornadoes. So again, with the possibility that we might be able to make this a bipartisan bill, I have to ask you once more—and this will be the last time, I promise—that we postpone these proceedings for one week in order to try to make this a bipartisan bill.

Mr. GRAYSON. Mr. Grayson, once again, we appreciate your comments, and thank you for this being the last time that you're going to ask. That's good to know. We believe there has been adequate time since the bill was introduced and adequate time since the Manager's Amendment was introduced. Again, it's not substantive. Many of it—much of it is almost entirely grammatical in its nature and we believe there has been time—adequate time for us to proceed. So thank you.

Mr. GRAYSON. All right. I yield the balance of my time.

Mr. ROHRABACHER. Mr. Chairman.

Chairman STEWART. Yes.

Mr. ROHRABACHER. If I could just put this in a little perspective, 10 days is a long time to be able to consider a bill, and I don't know. I have been here a number of years, and we would have been grateful to have had 10 days' notice in knowing what the bill was. And people do work over the 4th of July break, just to note. I know maybe your staff doesn't. My staff worked up until I think the 2nd or 3rd of July. I was in contact with them at any time. That means that actions could have been taken and calls to the office here and to the various Members and to the Chairman's office would have been returned.

So I just would think that the criticism that in some way the day before the 4th of July break—business didn't stop that day. It went on during the week of 4th of July, at least it did in my office. So if indeed there was some kind of an attempt to short-circuit the right of the minority to have time for consideration, I would think that that would be a very serious charge and that we should take a look at ourselves, and is that something that really happened and deal with it and make it right. I do think that the criticism here, however, is unjustified.

Thank you very much, Mr. Chairman.

Mr. GRAYSON. Will the gentleman yield?

Mr. ROHRABACHER. I certainly will.

Mr. GRAYSON. Thank you. Just to respond, I don't think anybody is suggesting that nobody did anything since the 3rd of July. In fact, Ms. Bonamici has introduced four amendments that were produced since July 3rd, and I have introduced two. That is not the

same as saying that we have had enough time to thoroughly go over this and make this the best bill that it can be. The text that we are working from is something that was given to us on July 3rd. I don't need to tell you what happened on July 4th.

July 6th and 7th were a weekend, and this is the first full day back—we were back in session after a week-long recess. I don't think that one can do one's best legislating under those conditions. I am not saying that your office couldn't. I am saying that our office had to extend itself to do what we were able to do by today. Probably Ms. Bonamici feels the same way. That is the sentiment she expressed. And what is the rush? But in any event, I understand your point, and I guess we can proceed.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman.

Chairman STEWART. Yes, thanks to both the gentleman. And I would remind all of us, the purpose of this markup is to discuss and to improve the bill, to offer amendments if those are appropriate and to vote on those amendments. So we are in the process of doing, I think, Mr. Grayson, what you are hoping to accomplish. And rather than delay that, I believe that we should proceed as scheduled with the understanding that there has been adequate time and that there will be time in the future if there are concerns before this bill is brought up before the Full Committee.

So with that final comment on that, again, we will proceed. Although I am hesitant to ask this question, is there any further discussion on the bill?

Ms. BONAMICI. Mr. Chairman.

Chairman STEWART. Yes, Ms. Bonamici.

Ms. BONAMICI. Thank you, Mr. Chairman. I did want to respond to some of the concerns that have been raised about the timing. And just so—not to be defensive, but I want to explain that there were calls in to talk with staff. The markup was scheduled on July 3rd for today, and, of course, as Mr. Grayson has explained, July 4th was a holiday, and then we had a weekend intervening. The concern isn't just with our staff cooperating with each other, which I hope we will continue to do. The concern is that with a lot of these amendments and with this legislation, it is important to get the input of the weather community. We want to make sure that we have a bill that addresses the real needs out there to improve weather forecasting and that it is also workable and effective for the stakeholders involved. So it isn't just our staff needing to communicate with each other, even though it was a holiday weekend; it is getting input from the people who will be implementing this legislation that is important as well. And I just wanted to explain that, Mr. Chairman.

Chairman STEWART. Again, and, Ms. Bonamici, I appreciate your comments. May I remind you and other Members that we have, I think, gone to extraordinary measures in order to do just what you've said. We held two hearings on this. We held a subsequent hearing at the request of the minority. We allowed them and others to invite their own witnesses once again, and we feel like we have had the opportunity to get input from the experts in the field. Without objection, and I ask unanimous consent that the bill is considered as read and open to amendment at any point and the

Members proceed with the amendments in the order listed on the roster. So ordered.

The first amendment on the roster is an amendment offered by the gentlelady from Oregon, Ms. Bonamici. And the clerk shall report the amendment.

The CLERK. Amendment to H.R. 2413 offered by Ms. Bonamici of Oregon, amendment number 001. Page 2, lines 4 through 11, strike——

[The amendment of Ms. Bonamici appears in Appendix I.]

Chairman STEWART. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize, once again, Ms. Bonamici for five minutes to explain the amendment.

Ms. BONAMICI. Thank you very much, Mr. Chairman. This amendment would strike Section 2 of the bill. Two weeks ago—well, actually less than two weeks ago, the Subcommittee received testimony regarding this bill. This section raised a significant amount of concern for the witnesses of that hearing. Every witness said that it would be potentially counterproductive to prioritize weather research over climate or oceans research as the section does.

Mr. Chairman and Committee Members, we all care about public safety, but those expert witnesses were very clear that the most significant research challenges in understanding weather processes and improving forecasting ability lie beyond the arbitrary boundary used to separate weather from climate, which is just 14 days. They also noted that ocean atmosphere interface questions are significant for weather forecasting.

Nowhere is this more true than as it relates to tropical storms. If what you want is to have a more powerful seasonal forecast about the severity of hurricanes, for example, or if you want to understand the generation and behavior of the storms, you have to study oceans and climate.

I want to add that Dr. Droegemeier, who is here and testified from Oklahoma, said this: "My final comment concerns climate and weather in a mutually reinforcing context. All of us recognize the importance of balance between weather and climate investments in our Nation's research and operations portfolio, yet the traditional line dividing weather and climate is increasingly blurred as climate models are now run at resolutions approaching those of weather models."

Consequently, we would do well to consider weather and climate not as two distinct elements at the extreme ends of the spectrum, but rather as inseparable parts of the Earth's system.

Mr. Chairman, because this language, I believe, is counterproductive to improving weather forecasting and anticipating that we will be able to work out some language that would be a better reflection of the expert testimony we received, my amendment would strike this section.

I also want to point out, Mr. Chairman, that it has been mentioned this morning that Dr. Droegemeier talked about the goal of zero deaths. But that, Mr. Chairman, is not in the bill, so we need to have further conversations about how we can improve weather forecasting without limiting the work of NOAA and its relevant

line offices, which, I also want to add, are not defined in this section.

Mr. Chairman, although I have serious concerns about this section of the bill and offer this amendment, as I explained, we have received pretty clear testimony that this section is problematic and could be counterproductive to the goal of ending—improving weather forecasting. However, given your commitment, Mr. Chairman, to work with us as we move forward, I will withdraw this amendment and look forward to having further conversations about addressing this issue as we work to improve this bill, hopefully before the full Committee markup.

Thank you, Mr. Chairman, and I yield back.

Chairman STEWART. Okay. And thanks once again, Ms. Bonamici.

And if there are no further comments that anyone would like to add after your comments, we appreciate your willingness to withdraw the bill, and we look forward to again working with you to hopefully improve this before it goes before the Full Committee.

The second amendment on the roster is the amendment offered by the Chair. And the clerk shall report the amendment.

The CLERK. Amendment to H.R. 2413 offered by Mr. Stewart of Utah.

[The amendment of Mr. Stewart appears in Appendix I.]

Chairman STEWART. Ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize myself for five minutes to explain this amendment.

This two-page Manager's Amendment, as I have said, is comprised of a handful of technical and clarifying changes to the bill. Most of these are simple wordsmithing. The following three are minor clarifying, substantive provisions made in response to valuable testimony submitted by witnesses at our two hearings on this bill.

First, on the June 26th hearing, testimony from NOAA Administrator Kathy Sullivan expressed concern that the bill not stipulate that only Observatory System Simulation Experiments, otherwise known as OSSEs, be used to assess the relative value and benefits of the observing systems. This was never the intent of the bill's requirement that NOAA undertake observing system planning and prioritization to address potential gaps in weather satellite coverage, so the amendment clarifies that NOAA use not only OSSEs but also observing system experiments and other assessment tools in these planning efforts.

Second, Administrator Sullivan recommended that Congress not require OSSEs to benefit the—to assess the benefits of existing systems and instead focus resources on potential new systems. We agree that this is a concern and appreciate NOAA's explanation of why this is important. And so the amendment strikes language requiring OSSEs on existing systems, once again improving the bill because of the testimony of our witnesses.

Finally, the amendment clarifies that in carrying out the requirement to conduct OSSEs, NOAA shall prioritize assessments of the value of data from both global positioning system radio occultation and a geostationary hyperspectral sound global constellation. These

technologies, which the Committee has received testimony on at multiple hearings, hold great promise to improve severe weather forecasting and to minimize the harmful effects of potential weather satellite data gap.

It is our understanding that NOAA is pursuing OSSEs on these technologies using funding from Hurricane Sandy supplemental spending bill, so the bill codifies and prioritizes this effort.

And with that, I yield back.

Are there any other comments on this amendment?

Ms. BONAMICI. Mr. Chairman.

Chairman STEWART. Yes.

Ms. BONAMICI. Thank you very much, Mr. Chairman. I move to strike the last word.

Chairman STEWART. So ordered.

Ms. BONAMICI. Thank you, Mr. Chairman. I want to briefly comment on the Manager's Amendment. I am generally supportive of the technical corrections in this amendment, although they do not remedy all of the concerns raised by Members and the witnesses. I do find it necessary, however, to discuss and object to the portion of this amendment that amends Section 7 of the bill.

Section 7 of the bill, entitled "Observing System Simulation Experiments," requires NOAA to run a specific type of simulation experiment on a host of NOAA acquisitions. And, as you said, we have heard from several witnesses at the hearing on June 26 that this was an overly prescriptive requirement. We heard testimony that there are multiple tools available to NOAA to evaluate acquisitions, and different approaches may be more appropriate in different circumstances.

I would note that Dr. Droegemeier, the majority's own witness at the June 26 hearing, spoke to this issue specifically saying that, I think, the only thing that we are saying is basically there are many tools available, probably let the scientists decide which ones are most appropriate. And I agree with that sentiment wholeheartedly.

Unfortunately, the Manager's Amendment only adds to the prescriptive nature of this requirement by directing NOAA to analyze two specific potential acquisitions with this tool. I would note that these appear to be proposals from two specific companies, which only adds to my discomfort here. With this language, we are taking a step back.

Based on what the expert witnesses—including the majority's witness—said in our Subcommittee, it is clear we should either be deleting this section of the bill or, at the very least, making it much less prescriptive. Instead, this section of the Manager's Amendment makes it more prescriptive. For this reason, I oppose the amendment and hope this is something we can address as we move forward.

Thank you very much, Mr. Chairman. I yield back.

Chairman STEWART. Thank you, Ms. Bonamici. Again, let me reiterate it was never the intention of this bill's requirement that NOAA undertake observing systems planning and prioritization to address these gaps in coverage. The amendment simply clarifies that NOAA use not only OSSEs but also observing system experiments and other assessments in these planning tools.

And if I could finally reiterate with this, the overall importance of the OSSEs, which have been roundly endorsed by many different weather experts and stakeholders, is critical in NOAA's gap mitigation planning and are in fact already underway as a result of funding provided by the hurricane supplemental spending.

Is there further discussion on this amendment?

Ms. BONAMICI. Mr. Chairman.

Chairman STEWART. Yes, the Ranking Member.

Ms. BONAMICI. If I could be recognized again, Mr. Chairman, I just—I would just like to clarify the section I am referring to is on page two of the amendment where it calls for amendment on page nine after line 3, inserting a new subsection of priority OSSEs that does use the term "shall complete OSSEs." So there is a section that adds required mandatory OSSEs in certain circumstances.

I yield back, Mr. Chairman.

Chairman STEWART. Thank you. Is there further discussion on the amendment?

Mr. GRAYSON. Just a moment, Mr. Chairman.

Chairman STEWART. Yes. The gentleman from Florida.

Mr. GRAYSON. Thank you. I just want to observe that support for this amendment should—could not be construed necessarily as support for Section 7 because amendment number 4 that we will be considering would strike the entire section. So one could vote for this amendment and still agree with Ms. Bonamici about her point.

Thank you. I yield the rest of my time.

Chairman STEWART. And so noted. Thank you.

Any further discussion?

Hearing none, the vote occurs on the Stewart amendment.

All in favor, say aye.

Those opposed, say no.

The ayes have it, and the amendment is agreed to.

The next amendment on the roster is the amendment offered by the gentleman from Florida, Mr. Grayson. And the clerk shall report the amendment.

The CLERK. Amendment to H.R. 2413 offered by Mr. Grayson of Florida, amendment number 143.

[The amendment of Mr. Grayson appears in Appendix I.]

Chairman STEWART. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize Mr. Grayson for five minutes to explain his amendment.

Mr. GRAYSON. Chairman Stewart, Ranking Member Bonamici, the amendment before you is a simple technical amendment that I hope we can all support this morning. It adds only five words to the bill, "such as tornadoes and hurricanes." My amendment would add these five words to page 3, line 13 of the bill immediately after the word "severe storms." The exact same phrase that these words provide appears in a discussion draft of this bill that was posted on the Committee's website until yesterday, one day before this markup.

As you are aware, Mr. Chairman, this bill would authorize almost half a billion dollars for the research being described in Section 3 of the bill, specifically, $400 million. I feel it is important

that the words "tornado" and "hurricane" explicitly appear in Section 3 at least once. Currently, that is not the case, so I urge support for this simple technical amendment.

And I yield the balance of my time.

Chairman STEWART. Thank you, Mr. Grayson.

Mr. Bridenstine.

Mr. BRIDENSTINE. Thank you, Mr. Chairman.

I would like to thank the gentleman from Florida for his amendment. This amendment adds reference for tornadoes and hurricanes to severe storm forecasting within the bill. And I believe this is a good amendment.

While our Congressional Districts face very different extreme weather events, I do not believe that this is overly prescriptive at all, and I am glad that we both agree for the need to improve forecasting capabilities. I am honored to support this amendment.

Ms. EDWARDS. Mr. Chairman.

Chairman STEWART. Yes, Ms. Edwards.

Ms. EDWARDS. Mr. Chairman, you know, I had not planned to speak on this, but I have to tell you that in reviewing Mr. Grayson's amendment, understanding that it may be accepted by the majority, it is case in point why it was necessary to review this and to move forward. We would not have actually had to do an amendment had we had the kind of bipartisan cooperation that the Ranking Member spoke about earlier.

And so looking at Mr. Grayson's amendment and seeing something as simple as adding such as hurricanes and tornadoes, that the American public would have been shocked that we would have been able to move forward a bill without an amendment that wouldn't recognize that we had these kind of severe storms, given what this country and what parts of this country have experienced.

And so I just want to echo the concern that sometimes moving fast does not always produce the best results, and this just happens to be one example of that, although I am supportive of the amendment.

And with that, I yield.

Chairman STEWART. Thank you, Ms. Edwards.

And once again, I believe that that is the purpose of these Subcommittee markups is to do what you have asked and all of us hope to do here. And I just have to reject the statement that the Chair nor the majority has not made an effort to work in a bipartisan manner. I believe that Ms. Bonamici and I have had a relationship where we have tried to do that. We are going to continue to try to do that.

I agree with the statement made by others that this is a Subcommittee that should be bipartisan, and we want to be bipartisan, but I don't believe that we have violated that effort. In fact, I don't believe that the timing of this bill is an indication of our unwillingness to be bipartisan in this effort. It is simply not. We want to work with the minority, and we will work with the minority. And I think that some may be reading too much into the simple timing of this bill when was not our intention at all.

Having said that——

Mr. ROHRABACHER. Mr. Chairman.

Chairman STEWART. Yes.

Mr. ROHRABACHER. If we are going to demand before we even start the amendment process that every piece of legislation be considered perfect before we can go through the perfection process of amendments, this—we would never get anything done. There would never be a bill that was perfect enough that a comma shouldn't be changed from one place to another. That's what this process is all about. That's why you have Subcommittee meetings.

And sometimes, by the way, there aren't Subcommittee meetings of markups, and it goes directly to the Full Committee. And the fact that we are right here, right now perfecting this bill demonstrates, I think, good will on the part of the leadership and a commitment to making sure we have good legislation by being open to amendments from both sides of the aisle. So I would commend you rather than suggest that any criticism of you and how you have handled yourself is in any way justified. Thank you.

Chairman STEWART. All right. Thank you, Mr. Rohrabacher.

Is there any further discussion on the amendment?

Hearing none, let me make a note here that we have probably 35 minutes to complete these hearings if we can, so we are going to try and move a little more quickly, taking the time as necessary to discuss it, of course.

Hearing on the vote occurs on the Grayson amendment to number 143.

All in favor, say aye.

Those opposed, say no.

The ayes have it, and the amendment is agreed to.

The next amendment on the roster is an amendment offered by the gentlelady from Oregon, Ms. Bonamici. And the clerk shall report the amendment.

The CLERK. H.R.—amendment to H.R. 2413 offered by Ms. Bonamici of Oregon, amendment number 002.

[The amendment of Ms. Bonamici appears in Appendix I.]

Chairman STEWART. I ask unanimous consent to dispense with the reading.

Without objection, so ordered. I recognize Ms. Bonamici for five minutes to explain the amendment.

Ms. BONAMICI. Thank you very much, Mr. Chairman.

This amendment strikes the requirement that the assistant administrator for OAR is required to run observing system simulation experiments or so-called OSSEs. The Subcommittee learned in our June 26 hearing that OSSEs are not the only analytical tool available to evaluate potential configurations of observing systems on weather forecasting, and we talked about that again this morning. According to that expert testimony, other tools have been developed that are quicker, less expensive, and potentially more robust. I expect that if we modified the language of the section to simply require the use of the more appropriate—most appropriate and effective analytical tool, which in some cases would be an OSSE and some cases not, we would have broad bipartisan support.

I hope we can get there before we mark up at Full Committee, and barring that, I ask that we strike this section as it now stands, particularly because of the provisions that were added in the amendment you offered, Mr. Chairman. And I hope we can work

with knowledgeable members of the weather enterprises to craft a responsible language.

Additionally, as I noted, the Manager's Amendment now appears to create an earmark for the benefit of one or two companies, and I don't know what this would cost the taxpayer, but it is unclear why we should do this or what we hope to learn.

With that, I yield back, Mr. Chairman.

Chairman STEWART. Thank you. I moved to last—strike the last word and recognize myself to speak on the amendment.

The amendment would strike Observing System Simulation Experiments from the legislation, and I oppose this amendment. OSSEs play a very important part in the observing system. Planning for NOAA, these tools are available at a quantitative easing—assessing of the relative value and the benefits of potential observing capabilities and systems which aid in NOAA's accurate forecasting abilities. Two weeks ago, the current head of NOAA, Dr. Kathy Sullivan, called these experiments one of the tools to help determine what new data or technologies will yield the best improvement in forecasting accuracy. Likewise, former NOAA Administrator called Observing System Simulation Experiments a powerful tool to inform our strategies for investing in observing networks.

NOAA recently contracted with Riverside Global Science Solutions to assess its approach to future satellite gaps, and their report stated clearly that OSSEs should be a normal part of NOAA planning and evaluations. Moreover, OSSEs are critical to determine how best to mitigate the degradation of NOAA weather services and should be used to inform decisions which proposed alternatives and combinations of alternatives provide the best cost-benefit to gap mitigation.

And with that, I yield back.

Are there others who would like to address the amendment?

Ms. BONAMICI. Mr. Chairman.

Chairman STEWART. Yes. I recognize Ms. Bonamici.

Ms. BONAMICI. Thank you, Mr. Chairman.

And I am not disagreeing that OSSEs can be a valuable tool, as we heard in the testimony. But, as explained, the amendment would strike the provision, and I hope that we can continue to work to make this a better section, even in light of the Manager's Amendment.

We have heard pretty clear testimony that the section is problematic, but given the Chairman's commitment to work with me as we move forward, I will withdraw this amendment and hope we can discuss this issue further and work out bipartisan language regarding the use of OSSEs before this bill moves forward for a markup at the Full Committee.

Thank you very much, Mr. Chairman.

Chairman STEWART. Okay. Thank you. And with that, the amendment is withdrawn.

The next amendment on the roster is an amendment offered by the gentleman from Florida, Mr. Grayson. And the clerk shall report the amendment.

The CLERK. Amendment to H.R. 2413 offered by Mr. Grayson of Florida, amendment number 144.

[The amendment of Mr. Grayson appears in Appendix I.]

Chairman STEWART. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize Mr. Grayson for five minutes to discuss his amendment.

Mr. GRAYSON. Mr. Chairman, this amendment simply reestablishes equal treatment under this bill for hurricanes and tornadoes. I recognize that our time is very limited this morning, as the Chairman has already pointed out. Maybe it might be better for me to just reserve the balance of my time in the hope that we can move quickly on this.

I reserve the balance of my time.

Chairman STEWART. The Chair recognizes the reserving balance of your time.

Are there others who would like to speak to the amendment?

The Vice Chairman, Mr. Bridenstine.

Mr. BRIDENSTINE. I would just like to support the gentleman from Florida in this amendment.

Chairman STEWART. Was there further discussion on the amendment?

Hearing none, the vote occurs on the Grayson amendment.

All in favor, say aye.

Those opposed, say no.

The ayes have it, and the amendment is agreed to.

The next amendment on the roster is an amendment offered by the gentlelady from Oregon, Ms. Bonamici. The clerk shall report the amendment. My apologies. Ms. Edwards.

The CLERK. Amendment to H.R. 2413 offered by Ms. Edwards of Maryland, amendment number 003.

[The amendment of Ms. Edwards appears in Appendix I.]

Chairman STEWART. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize Ms. Edwards now for five minutes to explain her amendment.

Ms. EDWARDS. Thank you, Mr. Chairman.

My amendment would strike Section 8 of the bill entitled "Computing Resources Prioritization Report." This section requires NOAA to issue a plan for high-performance computing support of its advanced research and operational weather prediction models. Included in this plan, NOAA must identify opportunities to reallocate existing computer resources to improve operational weather prediction.

While this language, on its face, seems like it would be helpful to move towards a shared goal of improving operational weather prediction models, I believe in reality it would be detrimental to the Agency and to our Nation. NOAA's weather and climate computing takes place both in the Office of Oceans and Atmosphere Research, OAR, as well as the National Weather Service.

While they are not rigid lines, much of the weather and climate research computing takes place at OAR, and much of the operational weather computing takes place at the National Weather Service. The provision in this bill attempts to take the resources of

OAR with the functions of the National Weather Service. The result of this would be a reduction in research computing focused on climate and weather. This amendment really aims to undermine climate research computing, and I simply cannot support this.

The witnesses at the June 26th Subcommittee hearing were clear. All of these activities are critical for the improvement of weather and climate forecasting, and each is related. Not one of the witnesses advocated the approach that has been taken in the majority bill, none, not a single one, not even the witnesses called by the majority. Even after holding two hearings, no witness was able to support this effort. Moreover, acting Administrator Sullivan specifically cautioned against this approach in her testimony at the hearing.

I believe that the proper path forward would be to find sufficient resources to improve all of these vital activities which save lives and are critical to the economy.

Of course, I realize that the hands of my Republican colleagues are tied in this respect as they continue to push for flat or lowered funding levels, even as we require and expect more of our science agencies, a wholesome problem on this Committee and the Congress.

In particular, I would like to highlight that although this bill and my colleagues on the other side of the aisle claim a desire to improve operational weather computing at NOAA, they all voted against providing NOAA with the resources to do just that in the Sandy Disaster Relief Appropriations Act of 2013. That legislation provided NOAA with funds to improve specifically operational and weather research computing. Acting Administrator Sullivan testified that these funds will allow NOAA to improve their operational computing power tenfold by 2015.

So my colleagues had a chance to do something concrete to improve the same operational computing at NOAA and yet they chose not to. I think it is a better approach to recognize the resources required to accomplish these goals and to ensure these improvements, rather than prescribing organizational changes that truly serve to be a detriment in the long term while ignoring the real challenges. I urge adoption of the amendment, and I yield back the balance of my time.

Chairman STEWART. Thank you, Ms. Edwards.

The Chair recognizes the Vice Chair, Mr. Bridenstine.

Mr. BRIDENSTINE. Thank you, Mr. Chairman.

This amendment would strike Section 8 of this bill, the computing resources prioritization reports, which directs NOAA to issue a plan for high-performance computing support of its advanced research and operational weather prediction models. I oppose this amendment. It is crucial that computer resources remain a top priority to advance weather forecasting research and models. Over the years, an imbalance has formed between the resources available for weather and climate modeling research. Do we have a—the graph there? Computer resources available to weather are substantially lower than that of climate.

[Chart]

Mr. BRIDENSTINE. I would like to show on the screen a chart developed by Dr. Cliff Mass at the University of Washington. The

first five bars illustrate the computing power of NOAA's climate-focused supercomputers. The first five bars are NOAA's climate computing supercomputers. The last bar shows the capability of the National Weather Service's operational computer. I don't know if you guys can see the last bar. I can't see it from here. The imbalance is clear, and the chart speaks for itself, which is why the bill includes a provision requiring a review. It's just a review of how NOAA's supercomputers can be put to use for weather forecasting, not just climate science.

I yield back.

Chairman STEWART. Thank you, Mr. Bridenstine.

I would move to strike the last word and recognize myself to speak on the amendment.

Ms. Edwards, we are sympathetic to your pleas for funding, and in a perfect world, we would be able to fund everything that we would like to. We would be able to fund many needs that perhaps go unfunded today. But the reality is is that we have to prioritize and we have to choose, that one of the great dangers, I believe, facing the future of our Nation is our inability to do—be effective at that. And I believe that this bill helps us move NOAA and other—and setting their priorities move forward in an effective way.

Is there further discussion on the amendment?

Ms. BONAMICI. Mr. Chairman.

Chairman STEWART. The Chair recognizes the Ranking Member.

Ms. BONAMICI. Thank you very much, Mr. Chairman. I move to strike the last word.

Chairman STEWART. So ordered.

Ms. BONAMICI. Thank you, Mr. Chairman.

I want to state my support for Ms. Edwards' amendment. Yes, we should increase our support for operational weather computing, but I cannot agree with increasing support for the operational weather computing by reducing weather and climate research computing resources, and that is what Section 8 of this bill attempts to do.

I also want to note, as Ms. Edwards did, that this Congress just recently appropriated millions of dollars for upgrades to NOAA's operational weather computing. That was about $25 million for a supercomputer that was in the Sandy supplemental project so that the National Weather Service will, once implemented, have the most powerful computer and computing ability, probably, in the world.

Acting Administrator Sullivan testified that as a result of those appropriated dollars, NOAA's operational weather computing power would increase tenfold by 2015. So this seems like an issue that we just recently addressed.

We need to be financially responsible, Mr. Chairman. And so, as we move forward, although we have to have sustained support for improvements to both operational and research computing at NOAA, the best way to do that is continue supporting NOAA when they make their budget requests. Reducing other important parts of the agency is counterproductive, and I cannot support that.

For this reason, I urge adoption of the amendment, and I yield back. Thank you, Mr. Chairman.

Chairman STEWART. Thank you, Ms. Bonamici.

Is there further discussion on the amendment?

Mr. NEUGEBAUER. Mr. Chairman.

Chairman STEWART. Yes.

Mr. NEUGEBAUER. Thank you, Mr. Chairman. I am going to rise in opposition to this amendment. I think your chart was very compelling, and as I understand Section 8, it basically says to—six months after enactment of this act, that NOAA Chief Information Officer, in coordination with the Assistant Administrator of OAR, they'll come up with a plan on what is the best utilization of the computer resources that they have to make sure that they're dedicating enough resources to the prediction side. Am I missing something here?

Chairman STEWART. I don't believe so, Mr. Neugebauer.

Mr. NEUGEBAUER. Yes. And, as I think the Chairman pointed out, you know, we don't have an unlimited amount of resources here. And every agency—every federal agency in our entire government is going to have to be looking at how they're utilizing American, hard-working taxpayers' money and making sure that we are utilizing them in the most efficient and effective way. And I think moving some of those dollars away from research on climate change to saving lives for weather prediction—probably the American people think that is a pretty good investment on our behalf. And so I urge other Members not to support this amendment.

Mr. TAKANO. Mr. Chairman.

Chairman STEWART. Yes. And thank you, Mr. Neugebauer. And, I am sorry, was there—

Mr. TAKANO. I seek recognition, Mr. Chairman.

Chairman STEWART. Yes.

Mr. TAKANO. Mr. Chairman, I would like to comment briefly and then yield the balance of my time to my colleague, Ms. Edwards. It has become apparent to me that the pleas of balance are disingenuous, that this is really an attempt to undermine research efforts on the Federal Government on climate change.

You know, I find it absurd that the balance—the term balance is being used to justify this with charts that purport to show an inordinate amount of resources being spent on climate—the federal resources that we must continue to support acquiring knowledge and acquiring better understanding of the total systems in order to understand the more localized effects that result in weather.

I yield the balance of my time to my colleague.

Ms. EDWARDS. Thank you to my colleague, Mr. Takano.

And I just want to point out to the majority that the chart that has been shown—and it is important for the public to understand this—does not reflect the $25 million at all, not even on the chart. And so, you know, I think, you know, if we are thinking about fiscal responsibility, then it is responsible for us to acknowledge the $25 million that is actually already going to the National Weather Service that acting Director Sullivan pointed out to us to show how they plan to raise the computing capacity.

I would also like to say again that I understand, because it has been clear on this Subcommittee, it has been clear and our Full Committee, that there is a deep animus to anything related to climate research on the side of the majority. But the fact is that climate impacts weather and that our experts need to have the full

knowledge and expertise about this impact so that there can be better forecasting so that it works for our farmers and for our industry.

And I suppose you can bury your head in the sand, if there is any sand left on the beach, when another severe climate event happens and our weather services are not able to keep up with that for the American public.

And so those are the choices that we have, but the reality is that whoever causes climate, wherever it is caused, it is impacting weather and it impacts our weather forecasting. And it is important for us as policymakers to stop having this silly debate and to provide the agencies with the resources that they need to respond so that our communities are not further devastated by the impacts of severe weather events.

And I would just close by saying to my colleagues, really pleading with them, that for our coastal communities, for our communities in the midsection of our States that are experiencing very, very severe weather events and not to have the kind of capacity that we need to save lives is very irresponsible, and I would rather see us make sure that we spend those resources appropriately, recognizing money that has already been designated, funding that has already been designated to provide for greater computing power and not to destroy the element that is there that is going to help our scientists better understand the impact of climate on weather.

And when another community is devastated, whether it is this year or next year or the year after, I guess I would leave it to the scientists on this Committee to explain to the American public how we failed them.

And with that, I yield.

Mr. SENSENBRENNER. Mr. Chairman.

Chairman STEWART. Yes, the Chair recognizes Mr. Sensenbrenner.

Mr. SENSENBRENNER. Mr. Chairman, I moved to strike the last word and yield to the gentleman from Oklahoma.

Chairman STEWART. So noted.

Mr. BRIDENSTINE. Thank you, Mr. Sensenbrenner.

I just would like to bring up the chart one more time if that is possible.

[Chart]

Mr. BRIDENSTINE. Okay. So the last bar there is a bar that is significant. And it is true that $25 million is not included in that last bar and it is true that that would be a tenfold increase. But when you go from that bar, which is pretty much—you can't see it from here. It doesn't—you increase it by tenfold and it's still the lowest bar on the chart. This does not in any way reflect balance, as the folks on the other side of the aisle has—have tried to insinuate, that we are unbalanced. This is what is unbalanced, if you look at that chart. And if you increase the last bar by 10 times, it is still going to be the lowest bar on the chart.

What we do need is we do need balance because the priority here is to save lives. I have constituents in Oklahoma who have been dealing with these, you know, catastrophic weather events for hundreds of years in Oklahoma we have been dealing with this. And certainly, our goal here is not to render ineffective the research on

climate. Our goal here is to save lives, and to do that, we have to prioritize on weather forecasting and warning.

I yield back.

Mr. SENSENBRENNER. I yield back as well.

Chairman STEWART. I thank both the gentleman. The Chair would comment as some of the things that are being said. It is not our intention at all to undermine climate research. As the Vice Chairman has pointed out, we are simply trying to bring some balance and to set priorities, and we recognize that there are people in coastal areas that have great concerns with climate research, but there are millions of people living in the central and southern parts of this Nation that have great interest as well in weather research. And we have seen the devastating impacts very clearly that that can have on their lives this last spring and will continue to.

So, with that, is there any further discussion on the amendment?

Mr. ROHRABACHER. Mr. Chairman, just—I move to strike the last word.

Chairman STEWART. Yes, Mr. Rohrabacher.

Mr. ROHRABACHER. And I appreciate the Chairman's sincerity and his efforts to reach out to the minority on this. And let me just say I think that you have struck a balanced approach, but if I could speak up for an unbalanced approach for a moment.

As this chart amply demonstrates, for the last 10 to 15 years there has been a huge imbalance in the passing out and the granting of research grants by—whether it is Department of Energy or whether it is NOAA or whatever agency it happens to be. And that huge imbalance, in order to correct that, will take—will mean that we have to focus more heavily on one side than the other. You correct imbalances by focusing on the imbalance. And to suggest that that is itself not trying to make things better but are—is an unbalanced approach is actually irrational.

Let me suggest from a distance, and you take a look at how much money the Federal Government has been putting into climate research, it's no wonder those of us who are skeptical that mankind is causing the climate to change, no wonder that we are a bit disturbed because climate research, if you—with a close look has become synonymous with research cronyism.

Over the last 10 years we have seen—and actually 20 years now, we have seen grant after grant being given for—to anyone who can come up with something that will excite the public about global climate change in a way that would suggest that mankind is responsible in order to justify restrictions on human activity or control of human activity by the government. We have seen everything from the polar bears are disappearing and all the way to the—my coastal district is going to be flooded, and there is not going to be any more sand, which is—was just mentioned by one of our colleagues.

This type of basic research aimed at alarming the public to the point that the public will accept further levels of a decline in their standard of living or control of their lives and their economic activities is something that is very disturbing to us and should not be taken lightly. That is one side of the—what we are talking about in a broader view. And while I accept the Chairman's balanced approach, I am very happy to be the aggressive person in trying to point out the nonsense that we are talking about.

Second of all, the people that we are—that are the most concerned about making decisions and trying to determine where the best use of our tax dollars is going to be, the things that will really help our own people, the people—will protect our people from weather incidents that cause people to die or lose their income, those people who are the most vocal about sequestration are now trying to suggest that we can't prioritize, and we can't in any way try to rectify the fact that these research grants have been so out of balance for so long.

And so I would suggest that we—this type of debate is fundamental to people who would kind of have an honest disagreement on whether or not the climate cycles are caused by human activity or caused by the sun. That's an honest disagreement, and I think that it pops up every now and then in debates on policy just like this.

But as I say, the big picture is as important in the understanding of this debate as are the details in this legislation.

Thank you very much, Mr. Chairman.

Chairman STEWART. Thank you, Mr. Rohrabacher.

The Chair recognizes the Ranking Member, Ms. Bonamici.

Ms. BONAMICI. Thank you very much, Mr. Chairman.

I had two questions for Mr.—Vice Chair Bridenstine, one of which you already answered, Mr. Bridenstine, about how the chart is not reflect the Sandy supplemental funding.

And my other question, if you could please give us the underlying data for the chart, because we would like to determine whether it considers the use of other agency computers by NOAA. So we would appreciate receiving that.

And also, just in response to some of the discussion and further support of Ms. Edwards' amendment, I would like to just point out that when Dr. Droegemeier was here from Oklahoma, his written testimony says this: "Climate models have proven capable of reproducing environments hundreds of years in the past and thus can be useful for determining future environments and hence the types of storms that might be expected to form within them. Conversely, our understanding of and ability to predict high-impact weather will improve climate model representations of storms' precipitation, the radiation budget, and even chemical processes. We are moving toward the day when we no longer use separate models for weather and climate and our investments likewise should reflect that trajectory."

I again support Ms. Edwards' amendment, and I yield back. Thank you, Mr. Chairman.

Chairman STEWART. Thank you, Ms. Bonamici.

And we recognize the Vice Chair.

Mr. BRIDENSTINE. Well, thank you, Mr. Chairman.

The chart there came from—it was developed by Dr. Cliff Mass of the University of Washington who, from all evidence that I have seen, is not by any stretch necessarily a conservative researcher. And certainly I think that that chart is accurate, and it reflects priorities that have been mismanaged over time.

And so with that I would also say that Dr. Droegemeier was very clear about the fact that we do have an ability—given the advancing technology of today, we do have the ability—to predict torna-

does up to an hour in advance. And if you remember, during his testimony he showed us charts, lines of tornadoes that they predicted an hour in advance and not only that they would form but the direction that they would go, and they were extremely accurate.

That reflects the fact that we can save lives, and we can save property, and we can prevent catastrophic economic effects from these kind of disasters if we do properly prioritize.

And so with that I will yield back.

Chairman STEWART. Thank you. Is further discussion on the amendment?

Mr. GRAYSON. May I be recognized, Mr. Chairman.

Chairman STEWART. Yes, sir. The Chair recognizes the gentleman from Florida.

Mr. GRAYSON. Thank you. The chart in question that we have been debating now for, oh, geez, almost half an hour has a Y axis that is listed as P capacity petaflops. Is there anybody in the majority who can identify what a petaflop is?

I yield. I take it the answer is no.

Mr. BRIDENSTINE. It is the ability to do—it's computing capacity, the ability to do calculations.

Mr. GRAYSON. How many?

Mr. BRIDENSTINE. That's a great question.

Chairman STEWART It's a thousand teraflops.

Mr. GRAYSON. A thousand teraflops, all right. And what is a teraflop?

Chairman STEWART. That is a—one million megaflops.

Mr. GRAYSON. Oh, okay. Well, I see where this is going. What is a megaflop?

Mr. BRIDENSTINE. It is one more than a flip-flop.

Mr. GRAYSON. Listen, here is the point. The point is that we have been talking about a chart that simply says in visual form that we are devoting more computer resources to climate than we are to weather. I don't think there is anything really wrong with that. Climate is a much more difficult problem to map than weather it is. It is just intrinsically more complicated. It deals with much longer periods of time than weather does. It is like saying, well, an MRI of the brain is going to be more complicated than an MRI of the arm. That is just the way it is. And with that understanding, I think that Ms. Edwards' observations are well taken.

I yield the rest of my time.

Chairman STEWART. I thank you, Mr. Grayson.

Is there further discussion on the amendment? Hearing none, the vote occurs on the amendment.

All in favor, say aye.

Those opposed, say no.

The nays have it, and the amendment is not agreed to.

Ms. EDWARDS. I would ask for a recorded vote, Mr. Chairman.

Chairman STEWART. The clerk will call the roll.

The CLERK. Mr. Stewart.

Chairman STEWART. No.

The CLERK. Mr. Bridenstine.

Mr. BRIDENSTINE. No.

The CLERK. Mr. Bridenstine votes no.

Mr. Sensenbrenner.

Mr. SENSENBRENNER. No.
The CLERK. Mr. Sensenbrenner votes no.
Mr. Rohrabacher.
Mr. ROHRABACHER. No.
The CLERK. Mr. Rohrabacher votes no.
Mr. Neugebauer.
Mr. NEUGEBAUER. No.
The CLERK. Mr. Neugebauer votes no.
Mr. Brown.
[No response.]
The CLERK. Mr. Weber.
Mr. WEBER. No.
The CLERK. Mr. Weber votes no.
Ms. Bonamici.
Ms. BONAMICI. Aye.
The CLERK. Ms. Bonamici votes aye.
Ms. Brownley.
[No response.]
The CLERK. Ms. Edwards.
Ms. EDWARDS. Aye.
The CLERK. Ms. Edwards votes aye.
Mr. Takano.
Mr. TAKANO. Aye.
The CLERK. Mr. Takano votes aye.
Mr. Grayson.
Mr. GRAYSON. Aye.
The CLERK. Mr. Grayson votes aye.
Mr. Stewart is recorded as voting no. Mr. Chairman——
Chairman STEWART. The clerk will report the vote.
The CLERK. Mr. Chairman, four Members have voted aye; six members have voted nay.
Chairman STEWART. The amendment is not agreed to.

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY - 113th
Subcommittee on Environment Roll Call

Working Quorum: 4 Reporting Quorum: 7

DATE: 7/9/2013

Bill: H.R. 2413 AMENDMENT NO. 6

ROLL CALL NO. 1

Amendment Sponsor: Edwards NOT AGREED TO

MEMBER	AYE	NO	PRESENT	NOT VOTING
1 Mr. STEWART – *UT*		•		
2 Mr. BRIDENSTINE – *OK* **		•		
3 Mr. SENSENBRENNER – *WI*		•		
4 Mr. ROHRABACHER – *CA*		•		
5 Mr. NEUGEBAUER – *TX*		•		
6 Mr. BROUN – *GA*				
7 Mr. WEBER – *TX*		•		
1 Ms. BONAMICI – *OR*	•			
2 Ms. BROWNLEY – *CA*				
3 Ms. EDWARDS – *MD*	•			
4 Mr. TAKANO – *CA*	•			
5 Mr. GRAYSON – *FL*	•			
TOTALS	4	6		

** Vice Chair

The next amendment on the roster is an amendment offered by the gentlelady from Oregon, Ms. Bonamici. And the clerk will report the amendment.

The CLERK. Amendment to H.R. 2413 offered by——

[The amendment by Ms. Bonamici appears in Appendix I.]

Chairman STEWART. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize Ms. Bonamici for five minutes to explain her—the amendment.

Ms. BONAMICI. Thank you very much, Mr. Chairman.

As we heard in the testimony, severe weather events that can result in the loss of life and property have become all too frequent in recent years. We have seen it across the country, and we know the consequences can be devastating. That is why we are here today. The willingness and ability to improve weather forecasting at NOAA is something that this bill intends to do, but as I said in the June 26th hearing on the bill, if we want to improve weather forecasting, we should focus on the actual weather forecasters' needs at the National Weather Service.

The witness—witnesses who testified before the Subcommittee at the June 26th hearing agree. The current authorizing language focuses only on funding at the OAR, the Office of Oceanic and Atmospheric Research, which is contrary to the stated intention of this legislation. If improving weather forecasting is the goal, then the bill should not fund OAR's weather effort over the work of the National Weather Service. This could prove to be both problematic within NOAA and importantly, counterproductive.

Therefore, I offer this amendment that removes the language in the bill that authorizes OAR only. It is a common-sense amendment, Mr. Chairman.

I yield back.

Chairman STEWART. Thank you, Ms. Bonamici. I move to strike the last word and recognize myself to speak to the amendment.

The amendment would completely strike Section 11 of this bill and the authorization of the appropriations. I oppose this amendment. Striking the authorization for appropriations of these activities would cut at the heart of the bill's very purpose. We are ensuring that the priorities of the bill—to protect lives through increased weather research—is funded through a Congressional mandate. In these austere times, it is critical that our most important research programs are authorized by Congress and thus are protected by future budgetary constraints.

Is there further discussion on the amendment?

Ms. BONAMICI. Mr. Chairman.

Chairman STEWART. Yes, the Chair recognizes the Ranking Member.

Ms. BONAMICI. Mr. Chairman, as I explained earlier, I have serious concerns about this section of the bill, which is why I have offered this amendment and explained why it is problematic and counterproductive to the goal of improving weather forecasting.

But given the Chairman's commitment to work with me as we move forward, I am going to withdraw this amendment and look forward to addressing this issue as we work to improve the bill.

Chairman STEWART. Thank you. The Chair recognizes the Ranking Member as withdrawing the amendment. We appreciate your willingness and look forward to working with you on that. And with that, the amendment is withdrawn.

The final amendment on the roster today is an amendment again offered by the gentlelady from Oregon, Ms. Bonamici. And the clerk shall report the amendment.

The CLERK. Amendment to H.R. 2413 offered by Ms. Bonamici of Oregon, amendment number 005.

[The amendment of Ms. Bonamici appears in Appendix I.]

Chairman STEWART. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize Ms. Bonamici for five minutes to discuss her amendment.

Ms. BONAMICI. Thank you very much, Mr. Chairman.

As I explained in the prior amendment, putting all of the emphasis on OAR is not consistent with our intention to improve weather forecasting at NOAA.

We heard testimony from NOAA and experts in the weather community at the June 26th hearing cautioning this Committee about the detrimental consequences if weather research programs are emphasized over other research programs or if research is emphasized over weather forecasting. Resources for research are already under constraints across all federal agencies, especially with the cuts already in place and slated to be implemented from the sequestration. This bill in its current form makes things worse and actually jeopardizes research at NOAA that could improve weather forecasting.

NOAA needs a solid research portfolio and a solid weather forecasting portfolio. Weakening one to strengthen the other could have serious negative consequences for NOAA's ability to provide accurate, timely weather forecasting, and the witnesses at the June 26th hearing all seemed to agree. A strategy that emphasizes progress in all areas of NOAA's research enterprise can only be accomplished if the OAR has the resources it needs.

In order for OAR to accomplish NOAA's weather forecasting objectives, I propose this amendment that would strike through the current section that authorizes only certain programs and replaced it with language that authorizes funding for all programs and research within OAR. The funding levels proposed in my amendments are FY 2012 spending levels with three percent for inflation added for each year over the next five years. This replacement language will make NOAA whole again and relieve the Agency from the negative impacts of sequestration.

I yield back, Mr. Chairman.

Chairman STEWART. Thank you, Ms. Bonamici.

I move to strike the last word and recognize myself to speak to the amendment.

The amendment once again would strike parts of—or entirely Section 11, which authorize appropriations for weather research and technology transfers and replace it with an authorization of all NOAA research activities, including climate and weather. It also calls for significant spending increases in the out years. And as

we've seen with other amendments, this amendment would gut the bill's fundamental objective, which is to prioritize weather research without increasing spending. To paraphrase the Vice Chairman, Mr. Bridenstine's, earlier comments, if we want to make weather research and public safety a priority, we have to prioritize weather research and public safety. It is as simple as that. And for these reasons, I strongly oppose the amendment.

Is there further discussion on the amendment?

Ms. BONAMICI. Mr. Chairman.

Chairman STEWART. Yes, Ms. Bonamici.

Ms. BONAMICI. Thank you very much, Mr. Chairman.

Again, as with the other amendments, I have serious concerns about this section of the bill, which is why I have offered this amendment. We have received pretty clear testimony that this section could be problematic and counterproductive to the goal of improving weather forecasting.

However, as with the other amendments, given the Chairman's commitment to work with me as we move forward, I will withdraw this amendment. I look forward to addressing this issue as we work to improve the bill.

And, Mr. Chairman, I just want to add, with this amendment, as with others, I hope and trust that we can have these conversations before we move to a Full Committee markup. I am here, as you are, to improve weather forecasting and, as was discussed earlier in this Subcommittee markup, there is a lot of room for bipartisan cooperation here, and having a bipartisan bill significantly increases our chances of having legislation that can be signed into law and will actually improve weather forecasting.

So I am withdrawing this amendment as well as the others with the understanding that we are going to continue to work together with the goal of improving weather forecasting in a bipartisan bill that I hope all Members will be able to support and—

Mr. GRAYSON. Will the gentlelady yield before the gentlelady finishes?

Ms. BONAMICI. Yes, I will yield, Mr. Grayson.

Mr. GRAYSON. Thank you. I just wanted to ask the majority where these numbers came from. This is just for my own edification. And I understand that the amendment is being withdrawn, so it will become moot, but I just want to know where the numbers 80 million and 20 million and 20 million came from. Maybe you can explain that to me. I will yield to anybody who can do that.

Mr. BRIDENSTINE. I would like to get back to you on that.

Mr. GRAYSON. Yes. All right. I yield back.

Chairman STEWART. All right. The Chair thanks the Ranking Member for her comments. And once again, we look forward to working in a bipartisan fashion. And the Chair recognizes that the amendment has been withdrawn.

Are there any further amendments?

Hearing none and a reporting quorum being present, the question is on the bill, H.R. 2413, as amended.

Those in favor, say aye.

Those opposed, say no.

The ayes have it, and the bill as amended is agreed to.

I move that the bill H.R. 2413, as amended, be favorably reported to the full Committee on Science, Space, and Technology and the staff be authorized to make necessary technical and conforming changes.

Without objection, so ordered.

If there is any further discussion, that completes our business, and this concludes the Subcommittee markup. The Subcommittee on Environment stands adjourned.

[Whereupon, at 11:29 a.m., the Subcommittee was adjourned.]

Appendix I

H.R. 2413, WEATHER FORECASTING IMPROVEMENT ACT OF 2013,

SECTION-BY-SECTION ANALYSIS, AMENDMENTS

AMENDMENT ROSTER

I

113TH CONGRESS
1ST SESSION

H. R. 2413

To prioritize and redirect NOAA resources to a focused program of investment on near-term, affordable, and attainable advances in observational, computing, and modeling capabilities to deliver substantial improvement in weather forecasting and prediction of high impact weather events, such as tornadoes and hurricanes, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JUNE 18, 2013

Mr. BRIDENSTINE (for himself, Mr. SMITH of Texas, Mr. STEWART, and Mr. HARRIS) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

---

A BILL

To prioritize and redirect NOAA resources to a focused program of investment on near-term, affordable, and attainable advances in observational, computing, and modeling capabilities to deliver substantial improvement in weather forecasting and prediction of high impact weather events, such as tornadoes and hurricanes, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the "Weather Forecasting
3 Improvement Act of 2013".

4 **SEC. 2. PUBLIC SAFETY PRIORITY.**

5 In accordance with the critical responsibility of
6 NOAA to ensure and enhance the provision of data, fore-
7 casts, and warnings for the protection of life and property
8 and the enhancement of the national economy, the Under
9 Secretary shall make these weather-related activities the
10 top priority in the planning and management of programs
11 within all relevant line offices.

12 **SEC. 3. WEATHER RESEARCH AND FORECASTING INNOVA-**
13 **TION.**

14 (a) PROGRAM.—The Assistant Administrator for
15 OAR shall undertake a program to develop improved un-
16 derstanding of and forecast capabilities for atmospheric
17 events, placing priority on developing more accurate and
18 timely warnings and forecasts of high impact weather
19 events that endanger life and property.

20 (b) PROGRAM ELEMENTS.—The program described
21 in subsection (a) shall focus on the following activities:

22 (1) Improving the fundamental understanding
23 of weather consistent with section 2, including
24 boundary layer and other atmospheric processes.

25 (2) Research and development, and transfer of
26 knowledge, technologies, and applications to the

1 NWS and other appropriate agencies and entities,
2 including the American weather industry and aca-
3 demic partners, related to—
4 (A) advanced radar technologies, including
5 those emphasizing rapid, fine-scale sensing of
6 the boundary layer and the use of innovative,
7 dual-polarization, phased-array technologies;
8 (B) aerial weather observing systems;
9 (C) high performance computing and infor-
10 mation technology networks;
11 (D) advanced forecast modeling that im-
12 proves the timing, track, and intensity forecasts
13 of severe storms and related phenomena, such
14 as storm surge, including through—
15 (i) more effective use of existing, and
16 the development of new, regional and na-
17 tional cloud-resolving models; and
18 (ii) enhanced global models;
19 (E) observing system simulation experi-
20 ments as described in section 7;
21 (F) atmospheric chemistry and interactions
22 essential to accurately characterizing atmos-
23 pheric composition and predicting meteorolog-
24 ical processes, including cloud microphysical,
25 precipitation, and atmospheric electrification

1 processes to more effectively understand their
2 role in severe weather; and
3 (G) additional sources of weather data and
4 information, including commercial observing
5 systems.
6 (3) A technology transfer initiative, carried out
7 jointly and in coordination with the Assistant Ad-
8 ministrator for Weather Services, and in cooperation
9 with the American weather industry and academic
10 partners, to ensure continuous development and
11 transition of the latest scientific and technological
12 advances into NWS operations.
13 (c) ACADEMIC RESEARCH.—In carrying out the pro-
14 gram under this section, the Assistant Administrator for
15 OAR shall collaborate with and support the academic
16 weather research community, including by making funds
17 available to institutions of higher education through com-
18 petitive grants and contracts.
19 **SEC. 4. TORNADO WARNING EXTENSION PROGRAM.**
20 (a) IN GENERAL.—In carrying out section 3, the As-
21 sistant Administrator for OAR shall establish a tornado
22 warning extension program.
23 (b) GOAL.—The goal of such program shall be to de-
24 velop and extend accurate tornado forecasts and warnings

1 beyond 1 hour in order to reduce loss of life, injury, and
2 damage to the economy.
3 (c) PROGRAM PLAN.—Within 180 days after the date
4 of enactment of this Act, the Assistant Administrator for
5 OAR, in consultation with the Assistant Administrator for
6 Weather Services, shall issue a program plan that details
7 the specific research, development, and technology trans-
8 fer activities, as well as corresponding resources and
9 timelines, necessary to achieve the program goal.
10 (d) BUDGET FOR PLAN.—Following completion of
11 the plan, the Under Secretary shall transmit annually to
12 Congress a proposed budget corresponding to the activities
13 identified in the plan.

14 **SEC. 5. WEATHER RESEARCH AND DEVELOPMENT PLAN-**
15 **NING.**

16 Not later than 6 months after the date of enactment
17 of this Act, and annually thereafter, the Assistant Admin-
18 istrator for OAR, in coordination with the Assistant Ad-
19 ministrator for Weather Services and the Assistant Ad-
20 ministrator for NESDIS, shall issue a plan to restore
21 United States leadership in weather modeling, prediction,
22 and forecasting that—
23 (1) describes weather technology goals, objec-
24 tives, and progress of NOAA for the program estab-
25 lished under section 3;

1 (2) identifies and prioritizes specific research
2 and development activities and the associated mile-
3 stones necessary to achieve such goals and objec-
4 tives;
5 (3) describes how the program will collaborate
6 with stakeholders from institutions of higher edu-
7 cation and industry in support of program goals and
8 objectives; and
9 (4) identifies, through consultation with the Na-
10 tional Science Foundation, research necessary to en-
11 hance the integration of social science knowledge
12 into weather forecast and warning processes, includ-
13 ing to improve the credible communication of threat
14 information necessary to enable improved severe
15 weather planning on the part of individuals and
16 communities.
17 **SEC. 6. OBSERVING SYSTEM PLANNING.**
18 The Under Secretary shall—
19 (1) develop and maintain a prioritized list of
20 observation data requirements necessary to ensure
21 weather forecasting capabilities to protect life and
22 property to the maximum extent practicable;
23 (2) undertake ongoing systematic evaluations of
24 the combination of observing systems, data, and in-
25 formation needed to meet the requirements devel-

1 oped under paragraph (1), assessing various options
2 to maximize observational capabilities and their cost-
3 effectiveness;
4 (3) identify current and potential future data
5 gaps in observing capabilities related to the require-
6 ments under paragraph (1); and
7 (4) determine a range of options to address
8 gaps identified under paragraph (3).
9 **SEC. 7. OBSERVING SYSTEM SIMULATION EXPERIMENTS.**
10 (a) IN GENERAL.—In support of the requirements of
11 section 6, the Assistant Administrator for OAR shall un-
12 dertake OSSEs to quantitatively assess the relative value
13 and benefits of observing capabilities and systems. Tech-
14 nical and scientific OSSE evaluations—
15 (1) may include assessments of the impact of
16 observing capabilities on—
17 (A) global weather prediction;
18 (B) hurricane track and intensity fore-
19 casting;
20 (C) tornado warning times and accuracy;
21 and
22 (D) prediction of mid-latitude severe local
23 storm outbreaks; and
24 (2) should be conducted in cooperation with
25 other appropriate entities within NOAA, other Fed-

1 eral agencies, the American weather industry, and
2 academic partners.
3 (b) REQUIREMENTS.—OSSEs shall quantitatively—
4 (1) determine the potential impact of proposed
5 space-based, sub-orbital, and in-situ observing sys-
6 tems on analyses and forecasts;
7 (2) evaluate and compare observing system de-
8 sign options; and
9 (3) assess the relative capabilities and costs of
10 various observing systems and combinations of ob-
11 serving systems in providing data necessary to pro-
12 tect life and property.
13 (c) IMPLEMENTATION.—OSSEs—
14 (1) shall be conducted prior to the acquisition
15 of major Government-owned or Government-leased
16 operational observing systems, including polar-orbit-
17 ing and geostationary satellite systems;
18 (2) shall be conducted prior to the purchase of
19 any new commercially provided data critical to fore-
20 cast accuracy and may be conducted on existing ob-
21 serving systems;
22 (3) shall be conducted within 2 years after the
23 date of enactment of this Act for any existing com-
24 mercially provided observing system data contract in
25 excess of $15 million; and

1 eral agencies, the American weather industry, and
2 academic partners.
3 (b) REQUIREMENTS.—OSSEs shall quantitatively—
4 (1) determine the potential impact of proposed
5 space-based, sub-orbital, and in-situ observing sys-
6 tems on analyses and forecasts;
7 (2) evaluate and compare observing system de-
8 sign options; and
9 (3) assess the relative capabilities and costs of
10 various observing systems and combinations of ob-
11 serving systems in providing data necessary to pro-
12 tect life and property.
13 (c) IMPLEMENTATION.—OSSEs—
14 (1) shall be conducted prior to the acquisition
15 of major Government-owned or Government-leased
16 operational observing systems, including polar-orbit-
17 ing and geostationary satellite systems;
18 (2) shall be conducted prior to the purchase of
19 any new commercially provided data critical to fore-
20 cast accuracy and may be conducted on existing ob-
21 serving systems;
22 (3) shall be conducted within 2 years after the
23 date of enactment of this Act for any existing com-
24 mercially provided observing system data contract in
25 excess of $15 million; and

1 (4) may be conducted on existing observing sys-
2 tems where such data costs NOAA in excess of $20
3 million.
4 (d) RESULTS.—All OSSE results shall be publicly re-
5 leased and fully considered by NOAA for implementation.
6 **SEC. 8. COMPUTING RESOURCES PRIORITIZATION REPORT.**
7 Not later than 6 months after the date of enactment
8 of this Act, and annually thereafter, the NOAA Chief In-
9 formation Officer, in coordination with the Assistant Ad-
10 ministrator for OAR and the Assistant Administrator for
11 Weather Services, shall issue a plan for high performance
12 computing support of its advanced research and oper-
13 ational weather prediction models that—
14 (1) assures that NOAA aggressively pursues the
15 newest, fastest, and most cost effective high per-
16 formance computing technologies in support of its
17 weather prediction mission;
18 (2) assures a balance between the research re-
19 quirements to develop the next generation of re-
20 gional and global models and its highly reliable oper-
21 ational models;
22 (3) takes advantage of advanced development
23 concepts to make its next generation weather pre-
24 diction models available in beta-test mode to
25 NOAA's operational forecasters, the American

1 (1) NESDIS.—The term "NESDIS" means
2 the National Environmental Satellite, Data, and In-
3 formation Service.
4 (2) NOAA.—The term "NOAA" means the Na-
5 tional Oceanic and Atmospheric Administration.
6 (3) NWS.—The term "NWS" means the Na-
7 tional Weather Service.
8 (4) OAR.—The term "OAR" means the Office
9 of Oceanic and Atmospheric Research.
10 (5) OSSE.—The term "OSSE" means the Ob-
11 serving System Simulation Experiment.
12 (6) UNDER SECRETARY.—The term "Under
13 Secretary" means the Under Secretary of Commerce
14 for Oceans and Atmosphere.
15 **SEC. 11. AUTHORIZATION OF APPROPRIATIONS.**
16 Out of funds made available for operations, research,
17 and facilities in OAR, there are authorized to be appro-
18 priated for each of fiscal years 2014 through 2017—
19 (1) $100,000,000 to carry out section 3, of
20 which—
21 (A) $80,000,000 is authorized for weather
22 laboratories and cooperative institutes; and
23 (B) $20,000,000 is authorized for weather
24 and air chemistry research programs; and

1 (2) $20,000,000 for the joint technology trans-
2 fer initiative described in section 3(b)(3).

SECTION-BY-SECTION ANALYSIS OF

H.R. 2413, WEATHER FORECASTING IMPROVEMENT ACT OF 2013

The Weather Improvement Act of 2013
Section-by-Section Analysis

Section 1. Short Title. This section establishes the short title as the "Weather Forecasting Improvement Act of 2013".

Section 2. Public Safety Priority. This section directs the Under Secretary of the National Oceanic and Atmospheric Administration (NOAA Administrator) 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. This section directs the Assistant Administrator of the Office of Oceanic and Atmospheric Research (OAR) to undertake a weather research program and directs the Assistant Administrator to place priority emphasis on developing more accurate and timely warnings and forecasts of high impact weather events that endanger life and property. Section 3 further defines the specific program elements to include advanced radar, aerial systems, computing/modeling, and Observing System Stimulation Experiments (OSSE) and codifies a longstanding joint OAR-National Weather Service (NWS) tech transfer program, moving its funding from NWS. Finally, Section 3 directs NOAA to support academic weather research through competitive grants and contracts.

Section 4. Tornado Warning Extension Program. This section establishes a Tornado Warning Extension Program focused on developing and extending accurate tornado forecasts and warnings beyond one hour in order to reduce loss of life, injury, and damage to the economy.

Section 5. Weather Research and Development Planning. Section 5 directs NOAA to develop a prioritized weather research plan to guide activities authorized under the Act and restore U.S. leadership in weather modeling, prediction, and forecasting. The section requires the plan to identify, through consultation with the National Science Foundation, the research necessary to integrate social science knowledge into weather forecast and warning processes.

Section 6. Observing System Planning. Section 6 directs NOAA to maintain a list of observation data requirements and systematically evaluate the combination of systems necessary to meet such requirements. This section further directs NOAA to identify current and potential future data gaps in observing capabilities and develop a range of options to address any identified gaps.

Section 7. Observing System Simulation Experiments. This section directs NOAA to undertake Observing System Simulation Experiments (OSSEs) to quantitatively assess the relative value and benefits of observing capabilities and systems. This section identifies specific instances when OSSEs must be performed.

Section 8. Computing Resources Prioritization Report. Section 8 directs NOAA to issue a plan that: (1) assures that NOAA aggressively pursues the newest, fastest, and most cost effective

high performance computing technologies in support of its weather prediction mission; (2) assures a balance between the research requirements; (3) takes advantage of advanced development concepts; and (4) identifies opportunities to reallocate existing advanced computing resources from lower priority uses to improve operational weather prediction.

Section 9. Commercial Weather Data. This section 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 10. Definitions. This section provides definitions for terms in the bill.

Section 11. Authorization of Appropriations. Section 11 authorizes, out of funds made available for OAR's operations, research, and facilities appropriations account, $100 million for each of fiscal years 2014 through 2017 to carry out the weather research program established under section 3. It further specifies that out of the $100 million provided in this section, $80 million is authorized for weather laboratories and cooperative institutions and $20 million is authorized to be used for weather and air chemistry research programs. Finally, this section also authorizes $20 million annually to carry out the joint technology transfer initiative described in section 3.

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AMENDMENT TO H.R. 2413

OFFERED BY Bonamici

Page 2, lines 4 through 11, strike section 2 (and redesignate accordingly).

Page 2, line 23, strike "consistent with section 2".

☒

AMENDMENT TO H.R. 2413

OFFERED BY MR. STEWART OF UTAH

Page 2, line 9, strike "these" and insert "such".

Page 2, line 15, strike "undertake" and insert "conduct".

Page 4, line 19, insert "**LEAD TIME**" after "**WARNING**".

Page 6, line 13, strike "credible".

Page 6, line 23, insert ", using OSEs, OSSEs, and other assessment tools," after "undertake".

Page 7, line 1, strike "assessing" and insert "examining".

Page 7, line 20, insert "lead" after "tornado warning".

Page 8, line 17, insert "and" after the semicolon.

Page 8, line 19, insert "major" after "purchase of any".

Page 8, line 19, through page 9, line 3, strike "critical to" and all that follows through "$20 million".

Page 9, line 4, redesignate subsection (d) as subsection (e).

Page 9, after line 3, insert the following new subsection:

1 (d) PRIORITY OSSEs.—Not later than June 30,
2 2014, the Assistant Administrator for OAR shall complete
3 OSSEs to assess the value of data from both Global Posi-
4 tioning System radio occultation and a geostationary
5 hyperspectral sounder global constellation.

Page 11, lines 10 and 12, redesignate paragraphs (5) and (6) as paragraphs (6) and (7), respectively.

Page 11, after line 9, insert the following new paragraph:

6 (5) OSE.—The term "OSE" means an Observ-
7 ing System Experiment.

Page 11, line 10, strike "means the" and insert "means an".

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AMENDMENT TO H.R. 2413
OFFERED BY MR. GRAYSON OF FLORIDA

Page 3, line 13, insert ", such as tornadoes and hurricanes," after "severe storms".

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AMENDMENT TO H.R. 2413

OFFERED BY Bonamici

Page 3, lines 19 and 20, strike subparagraph (E) (and redesignate accordingly).

Page 7, line 9, through page 9, line 5, strike section 7 (and redesignate accordingly).

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AMENDMENT TO H.R. 2413
OFFERED BY MR. GRAYSON OF FLORIDA

Page 5, after line 13, insert the following new section (and redesignate the subsequent sections accordingly):

1 **SEC. 5. HURRICANE WARNING PRECISION PROGRAM.**

2 (a) IN GENERAL.—In carrying out section 3, the As-
3 sistant Administrator for OAR shall establish a hurricane
4 warning precision program.

5 (b) GOAL.—The goal of such program shall be to de-
6 velop and extend accurate hurricane forecasts and warn-
7 ings in order to reduce loss of life, injury, and damage
8 to the economy.

9 (c) PROGRAM PLAN.—Within 180 days after the date
10 of enactment of this Act, the Assistant Administrator for
11 OAR, in consultation with the Assistant Administrator for
12 Weather Services, shall issue a program plan that details
13 the specific research, development, and technology trans-
14 fer activities, as well as corresponding resources and
15 timelines, necessary to achieve the program goal.

16 (d) BUDGET FOR PLAN.—Following completion of
17 the plan, the Under Secretary shall transmit annually to

1 Congress a proposed budget corresponding to the activities
2 identified in the plan.

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AMENDMENT TO H.R. 2413

OFFERED BY Rep. Edwards

Page 9, line 6, through page 10, line 5, strike section 8 (and redesignate accordingly).

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AMENDMENT TO H.R. 2413

OFFERED BY Bonamici

Page 11, line 15, through page 12, line 2, strike section 11.

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AMENDMENT TO H.R. 2413

OFFERED BY Bonamici

Page 11, line 15, through page 12, line 2, amend section 11 to read as follows:

1 **SEC. 11. AUTHORIZATION OF APPROPRIATIONS.**

2 There are authorized to be appropriated to the Under
3 Secretary for the activities of OAR—

4 (1) $382,784,000 for fiscal year 2014;

5 (2) $394,268,000 for fiscal year 2015;

6 (3) $406,096,000 for fiscal year 2016; and

7 (4) $418,278,000 for fiscal year 2017.

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AMENDMENT ROSTER

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

Environment Subcommittee Markup

July 9, 2013

AMENDMENT ROSTER

H.R. 2413, *the "Weather Forecasting Improvement Act of 2013"*

No.	Amendment	Summary	
1	**Amendment offered by Ms. Bonamici (OR) #001**	Strikes Section 2 of the bill which directs the Under Secretary to make the provision of data, forecasts and warnings the top priority in the planning and management of programs within all relevant line offices.	**Offered and Withdrawn**
2	**Amendment offered by Mr. Stewart (UT) #004**	Makes technical corrections to the bill and modifies the requirements for the Observing System Simulation Experiments in Section 7.	**Agreed to by Voice Vote**
3	**Amendment offered by Mr. Grayson (FL) #143**	Includes tornadoes and hurricanes as part of the term severe storms.	**Agreed to by Voice Vote**
4	**Amendment offered by Bonamici (OR) #002**	Strikes Section 7 requiring the Assistant Administrator to carry out Observing System Simulation Experiments (OSSE) and removes OSSEs as part of the program elements of Weather Research and Forecasting Innovation in Section 3.	**Offered and Withdrawn**
5	**Amendment offered by Mr. Grayson (FL) #144**	Adds a new section to the bill which requires the Assistant Administrator for OAR to establish a hurricane warning precision program to develop and extend accurate hurricane forecasts and warnings.	**Agreed to by Voice Vote**
6	**Amendment offered by Ms. Edwards (MD) #003**	Strikes Section 8 which requires a plan to be developed for high performance computing support of advanced research and operational weather prediction models.	**Not Agreed to by Record Vote 6-4**
7	**Amendment offered by Ms. Bonamici (OR) #004**	Strikes Section 11 which includes the authorization of appropriations for the activities in the bill.	**Offered and Withdrawn**
8	**Amendment offered by Ms. Bonamici (OR) #005**	Amends Section 11 to authorize appropriations for all the activities of the Office of Oceanic and Atmospheric Research at $383,784,000 for FY2014 and increasing each year up to $418,278,000 for FY2017.	**Offered and Withdrawn**

XXIII. PROCEEDINGS OF THE FULL COMMITTEE MARKUP ON H.R. 2413, THE WEATHER FORECASTING IMPROVEMENT ACT OF 2013

THURSDAY, DECEMBER 5, 2013

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
WASHINGTON, DC.

The Committee met, pursuant to call, at 9:08 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Lamar Smith [Chairman of the Committee] presiding.

Chairman SMITH. The Committee on Science, Space and Technology will come to order. Without objection, the Chair is authorized to declare recesses of the Committee at any time. Pursuant to Committee Rule 2F and House Rule 112(h)(4), the Chair announces that he may postpone roll call votes. Now, I will recognize myself in opening statement.

The Science, Space and Technology Committee today meets to mark up four bills, H.R. 2413, the Weather Forecasting Improvement Act of 2013 offered by Mr. Bridenstine of Oklahoma, H.R. 2431, the National Integrated Drought Information System Reauthorization Act of 2013, sponsored by Mr. Hall of Texas, H.R. 2981, the Technology and Research Accelerating National Security and Future Economic Resiliency Act of 2013, or TRANSFER Act, sponsored by Mr. Collins of New York, and H.R. 3625, offered by Mr. Brooks of Alabama, which provides for termination liability costs for certain high priority NASA projects. Each of the bill sponsors will explain their bill in more detail shortly. But let me offer my views on each very briefly.

Mr. Bridenstine's weather forecasting bill protects lives and property through improved weather research to better forecast warnings of tornadoes and hurricanes. Now, I want to compliment Mr. Bridenstine for working with Environment Subcommittee Chairman Chris Stewart and Ranking Member Suzanne Bonamici in drafting a bipartisan amendment which strengthens this bill.

Our second bill is H.R. 2431, the National Integrated Drought Information System Reauthorization Act of 2013 by Mr. Hall. And I thank the gentleman for his persistent leadership over the years on this issue. Droughts in Texas and elsewhere had been severe, and the NIDIS program has helped state and local governments, farm-

ers, ranchers and others both monitor and predict drought conditions. A companion bill has already been reported by the Senate Commerce Committee. The goal is to reach an agreement with our Senate counterparts so we can put this bipartisan bill on the President's desk early next year.

Our third bill, the TRANSFER Act, sponsored by Mr. Collins of New York, has bipartisan co-sponsors and many endorsements. The bill accelerates the transition of technology developed at universities, Federal laboratories and non-profit research institutions to the private sector. Mr. Collins has himself started several small businesses and currently chairs the Small Business Health and Technology Subcommittee. His personal experience has made him a champion for small businesses.

Finally, our fourth bill sponsored by Mr. Brooks of Alabama protects funding for key NASA programs. It also frees up over half a billion dollars in funding that Congress already provided the agency toward the development of the space launch system, an Orion crew vehicle and space station operations. Unfortunately, NASA's chief financial officer decided to change NASA's rules on termination liability three years ago from the way NASA managed termination liability for over 50 years. We need to fix this situation with this bill. These funds will be freed up to do what Congress intended, develop these high priority NASA programs. With an amendment to be sponsored by Ms. Edwards that I support, we have bipartisan support for Mr. Brooks' bill to address NASA termination liability. And I want to thank Mr. Brooks for his initiative on this issue, along with Space Subcommittee Chairman Steve Palazzo who also sought to address this issue with the NASA reauthorization bill.

All four bills provide bipartisan commonsense solutions that will keep America competitive and on the forefront of innovation. So I urge my colleagues to support all the bills.

[The prepared statement of Mr. Smith follows:]

PREPARED STATEMENT OF CHAIRMAN LAMAR SMITH

The Science, Space, and Technology Committee meets today to mark-up four bills:

- H.R. 2413, the "Weather Forecasting Improvement Act of 2013," offered by Mr. Bridenstine of Oklahoma;
- H.R. 2431, the "National Integrated Drought Information System Reauthorization Act of 2013," sponsored by Mr. Hall of Texas;
- H.R. 2981, the "Technology and Research Accelerating National Security and Future Economic Resiliency Act of 2013," or TRANSFER Act, sponsored by Mr. Collins of New York; and
- H.R. 3625, offered by Mr. Brooks of Alabama, which provides for termination liability costs for certain hi-priority NASA projects.

Each of the bills' sponsors will explain their bill in more detail shortly, but let me offer my views on each.

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Our second bill today is H.R. 2431, The National Integrated Drought Information System Reauthorization Act of 2013, offered by Mr. Hall of Texas. I thank the gentleman for his persistent leadership over the years on this issue.

Droughts in Texas have been severe, and the NIDIS [pronounced NEYE-Diss] program has helped state and local governments, farmers, ranchers, and others both monitor and predict drought conditions.

A companion bill has already been reported by the Senate Commerce Committee. The goal is to reach an agreement with our Senate counterparts so we can put this bipartisan bill on the President's desk early next year.

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Unfortunately, NASA's Chief Financial Officer decided to change NASA's rules on termination liability three years ago from the way NASA managed termination liability for over 50 years. We seek to fix this situation with this bill.

These funds will be freed up to do what Congress intended-develop these high-priority NASA programs.

With an amendment to be sponsored by Ms. Edwards that I support, we have bipartisan support for Mr. Brooks' bill to address NASA termination liability.

I want to thank Mr. Brooks for his initiative on this issue, along with Space Subcommittee Chairman Steve Palazzo, who also sought to address this issue with the NASA authorization bill.

All four bills provide bipartisan common-sense solutions that will keep America competitive and on the forefront of innovation. I urge my colleagues to support all four bills.

Chairman SMITH. I now recognize the Ranking Member, the gentlewoman from Texas, Ms. Johnson, for her opening statement.

Ms. JOHNSON. Thank you very much, Mr. Chairman. And I do apologize for whatever this voice may come out to be this morning. Today, we are marking up four relatively bipartisan bills, and it is my hope that they will be even more bipartisan after today's markup.

First, we have H.R. 2413, the Weather Forecasting Improvement Act of 2013. Weather forecasting and weather research are issues that should be truly bipartisan. And I am very pleased that with the addition of the Manager's Amendment, we now have a bill that we can receive bipartisan support. As amended, this will be a strong bill, and it will improve weather forecasting at NOAA. And I urge my colleagues to support it. One of the things that we learned as we received expert advice on this legislation is that weather research can be strengthened but that we cannot do it at the expense of ocean or climate research. These are all pieces of the same puzzle. The progress in all of these areas is necessary for progress in any single area. This bill would improve weather research at NOAA and better integrate that research within the forecasting community. And it accomplishes this without harming the other important work that NOAA does. I want to especially commend environmental—Environment Subcommittee Chairman Mr. Stewart, Ranking Member Ms. Bonamici, and the bill's sponsor, Mr. Bridenstine, for their cooperative spirit and hard work that got us to where we are today. I hope that we can use this process as a model for future bipartisan legislative action.

Next, we have 2431, the National Integrated Drought Information System Reauthorization Act of 2013. This vital program was originated by my friend and former chairman, Mr. Ralph Hall, in

2006. The program provides critical draft—drought information to communities all across our nation. Over the past three decades, it is estimated that droughts have cost our country hundreds of billions of dollars in economic impacts. Loss estimates from the 2012 drought alone run upwards of $17 billion. Moreover, the effects of climate change are anticipated to exacerbate this problem in many parts of our country, including in our home State of Texas. In the light of the scope of the economic impacts of drought and the potential of the NIDIS programs to lessen these impacts, I am concerned that we are cutting the program's authorization level. My colleague from Oregon has an amendment to modestly increase the authorization levels, and I plan on supporting that amendment and urge my others to do as well.

The next bill being considered is H.R. 2981, the TRANSFER Act, a bipartisan bill introduced by Mr. Collins and Mr. Kilmer that will help accelerate the commercialization of federally funded research. Our investment in basic research has led to incredible discoveries that improve our lives. But identifying and moving those ideas into the marketplace is not an easy task. In today's economy, private capital is even harder to come by, especially for unproven technologies. This is where the TRANSFER Act can make an impact. It can move good ideas and technologies further along the path toward commercialization. It can help spur the creation of new startups and spinoffs, and help those new businesses succeed by providing resources, and maybe even more importantly, advice and services. I would like to commend my colleagues for their hard work to improve technology transfer.

Now, just recently, the small business community has raised some concerns over how the TRANSFER Act is funded. While I strongly support the thrust of this bill, I do want to emphasize that these concerns will need to be addressed in order for this bill to move forward. I am a little concerned that we are rushing to mark this bill up without having first identified a viable path forward on this issue. This bill was crafted by our Committee, and it also was referred to this Small Business Committee. Kicking this bill over to the Small Business Committee without having identified a funding fix seems like a recipe for inaction. I hope we can continue to work on this issue and ultimately get this bill enacted. But I am concerned that rushing the bill to markup today will not make this any easier.

Finally, we consider H.R. 3625, to provide for termination liability costs for certain National Aeronautics and Space Administration projects. This bill makes necessary changes to the way in which NASA accounts for termination costs in their flagship programs. When Congress funds spacecraft development, we want the funding to go to spacecraft development. We don't want sufficient portions of the funding to be aside—set aside for just in case money for potential termination costs. Unfortunately, this requires a legislative fix because the Anti-Deficiency Act requires some reserves. And, frankly, NASA is unable to float these reserves anymore due to the tight budgetary times we are in. I look forward to a productive markup today. And I yield back. Thank you. [The prepared statement of Ms. Johnson follows:]

PREPARED STATEMENT OF RANKING MEMBER EDDIE BERNICE JOHNSON

Thank you Mr. Chairman. Today we are marking up four relatively bipartisan bills, and it is my hope that they will be even more bipartisan after today's markup.

First we have H.R. 2413, the Weather Forecasting Improvement Act of 2013.

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One of the things that we learned as we received expert advice on this legislation is that weather research can be strengthened, but that we cannot do it at the expense of ocean or climate research. These are all pieces of the same puzzle, and progress in all of these areas is necessary for progress in any single area.

This bill will improve weather research at NOAA and better integrate that research with the forecasting community, and it accomplishes this without harming the other important work that NOAA does.

I want to especially commend Environment Subcommittee Chairman Stewart, Ranking Member Bonamici, and the bill sponsor Mr. Bridenstine for their cooperative spirit and hard work that got us to where we are today. I hope that we can use this process as a model for future bipartisan legislative action.

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In light of the scope of the economic impacts of drought, and the potential of the NIDIS program to lessen these impacts, I am concerned that we are cutting the program's authorization level. My colleague from Oregon has an amendment to modestly increase the authorization levels, and I plan on supporting that amendment, and urge others to do so as well.

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I look forward to a productive markup today, and I yield back.

Chairman SMITH. Thank you, Ms. Johnson. Pursuant to notice, I now call up H.R. 2413, the Weather Forecasting Improvement Act of 2013, which was introduced by Representative Bridenstine and submitted by the Subcommittee on Environment. And the clerk will report the bill.

The CLERK. H.R. 2413, the Weather Forecasting Improvement Act of 2013, as amended by the Subcommittee on Environment.

[H.R. 2413 appears in Appendix I]

Chairman SMITH. Without objection, the bill would be considered as read, and the gentleman from Oklahoma, Mr. Bridenstine, is recognized for five minutes to explain the bill.

Mr. BRIDENSTINE. Thank you, Mr. Chairman. It is truly an honor to see the Weather Forecasting Improvement Act come before this Committee today. Today's markup is of important legislation. This important legislation is the result of months of hard work by a coalition of Members and staff on both sides of the aisle, as well as the individuals and the invaluable input that we have all received from experts and leaders in academia and business. And of course, let us not forget constituents like mine in Oklahoma who have seen firsthand the devastating effects or tornadic activity. I want to thank the Chairman of the Full Committee, Mr. Smith, and the Chairman of the Environment Subcommittee, Mr. Stewart, not only for their co-sponsorship of this legislation but for their leadership and commitment to seeing this bill moved to the House floor. I also want to thank the Ranking Member of the Environment Subcommittee, Ms. Bonamici, and her staff for their willingness to work with us on the amendment in the nature of a substitute that will allow the bill to pass this Committee with strong bipartisan support.

H.R. 2413 makes the protection of lives and property the top priority of NOAA and follows through on that commitment by prioritizing funding and other resources on severe weather detection and forecasting while not increasing overall spending. Millions of Americans, both in government and private industry, have dedicated their careers and lives to the mission of providing their fellow citizens with accurate, timely weather forecasts, and the technology this bill advances will greatly assist their efforts. In particular, I have seen firsthand the capabilities of phased array radar in the American military, and I am certain that it will help lead America's weather forecasting efforts towards the goal of having zero preventable deaths occur as a result of severe weather systems like a tornado. For Oklahomans and for all Americans, I urge adoption of the Stewart/Bonamici amendment and passage of this important legislation. Thank you, Mr. Chairman.

Chairman SMITH. All right. Thank you, Mr. Bridenstine. We have two amendments listed on the roster in regard to this bill, and we will proceed now with the first amendment, which is an amendment in the nature of a substitute offered by Mr. Stewart and Ms. Bonamici. And the clerk will report the amendment.

The CLERK. Amendment in the nature of a substitute to H.R. 2413, the Weather Forecasting Improvement Act of 2013 offered by Mr. Stewart of Utah and Ms. Bonamici of Oregon.

[The amendment of Mr. Stewart and Ms. Bonamici appears in Appendix I]

Chairman SMITH. Okay. Without objection, the amendment will be considered as read. And the gentleman from Utah is recognized to explain the amendment.

Mr. STEWART. Thank you, Mr. Chairman and the Ranking Member, Ms. Johnson, to both of you for your leadership. Again, I would like to thank my friend, Jim Bridenstine, for his leadership and vision in offering this legislation. And finally, to the Ranking Member of the Subcommittee, Ms. Bonamici, for her willingness to work so hard in finding agreement on this legislation. And I have to add that for me, this has been a gratifying experience of what I think is bipartisan cooperation, and I think we are seeing its fruition today.

Mr. Chairman, the Manager's Amendment in the nature of a substitute includes a number of clarifying and, in some cases, substantive provisions made in response to some of the valuable testimony submitted by the witnesses in our two hearings on this bill and subsequent hearings on the potential satellite gap. The Subcommittee worked to help inform the Committee of NOAA's weather forecasting challenges and opportunities related to the problematic management research prioritization and commercial data acquisition. This input has led to an improved work product and changes that were included in this amendment.

Mr. Chairman, I have a letter of support to this amendment from the University Corporation of Atmospheric Research, President Tom Bogdan, and I would like to add that to the record.

Chairman SMITH. Okay. Without objection, so ordered.

[The information appears in Appendix II]

Mr. STEWART. The amendment before us prioritizes protection of public safety and forward looking weather research. It improves the procurement of observing systems for getting data from space, air and land and opens up NOAA's process to encourage private sector weather solutions. The amendment is a long term down payment to upgrade our weather prediction systems that has, in some cases, fallen behind international standards. The need to adopt this amendment and the bill cannot be overstated. As we heard from witnesses at a hearing in this Congress, we are facing a critical gap in active weather satellites beginning as early as 2016. This bill will help to mitigate this gap by allowing NOAA access to critical satellite weather data from outside of their agency in the event that this gap does materialize.

We may not agree on every detail, but I think we certainly agree that improved weather forecasting is an important national priority. And this amendment will help NOAA to achieve that objective protecting lives and property through weather research and improved forecasting. And with that, Mr. Chairman, I would yield back my time.

Chairman SMITH. Thank you, Mr. Stewart. Does the gentlewoman from Oregon wish to be recognized?

Ms. BONAMICI. Yes, thank you, Mr. Chairman.

Chairman SMITH. The gentlelady is recognized.

Ms. BONAMICI. Thank you, Mr. Chairman. I am honored to join Subcommittee Chairman, Mr. Stewart, in offering this amendment

in the nature of a substitute. Members on both sides of the aisle can be assured that this important bill has become a truly bipartisan effort built on extensive advice from the weather community. Mr. Bridenstine introduced a very well-intentioned bill that went a long way toward improving the tools available to NOAA for evaluating emerging forecast technologies. His emphasis on tornado research was appropriate and very helpful. At the Subcommittee markup, Mr. Grayson added a beneficial amendment for a focused hurricane research program.

This amendment, in the nature of a substitute, adds to the tools and programs of the original bill. Many experts told us that to improve weather forecasting, the research at OAR and the forecasting at NWS needed to be better coordinated and integrated. This amendment contains provisions to accomplish that.

The amendment will provide for NOAA to use the Department of Defense model of integrating operational needs and research. We have language in this amendment that will more tightly align the research at OAR with the operational needs of the weather service. The amendment also includes incentives to open up NOAA to insights from the broader weather community. At every opportunity, we charge the agency to consult with the American Weather Industry and researches as they develop research plans and undertake new initiatives. We also press NOAA to get serious about its growing private sector solutions to their data needs. We make clear that we expect as historical support for extramural research to continue even as research at OAR expands.

The engine of weather forecasting innovation has not always been found within NOAA but in the labs and research communities that work with NOAA. That must continue. The amendment establishes a new Federal Advisory Committee Act, or FACA Committee, to provide ongoing advice about public sector innovations the weather service could—should consider adopting. The amendment establishes a visiting scholars program to let top academics work side by side with NWS forecasters. The FACA panel and the visiting scholars program replicate the continuous innovation that European meteorologists have experienced through their use of visiting researchers and outside advice.

The amendment provides an explicit focus on tapping the expertise of social scientists in communicating risk and working in communities. Witnesses' emphasize the importance of this work. The best forecasting skill and technology in the world won't be effective unless we deliver the messages to the public and they result in real action. As amended, the bill is designed to improve public safety, enhance the American economy and transform the innovation culture at NOAA.

I can assure Members on my side of the aisle that we have addressed the issues that were brought up during the Subcommittee markup. Weather research is strengthened, but not at the expense of other important work. During the committee process, we heard from witness after witness who stressed that weather forecasting involves many different scientific disciplines. This amendment reflects and understanding that we cannot choose one area of research at the expense of others without endangering the process as

a whole. I ask my caucus colleagues to support this bipartisan amendment.

I want to thank Chairman Smith and Ranking Member Johnson for giving us this support to work out a compromise. I want to thank Mr. Bridenstine for his willingness to work with us and consider changes to the original bill. And I particularly want to thank Chairman Stewart. All along, Mr. Stewart's attitude has been collaborative and constructive, and the result is a bipartisan bill that I hope will swiftly move to the floor and through the Senate. I know the Chairman shares with me a core belief that weather should not be a partisan issue and that the American public needs and deserves the best weather forecasting system we can provide.

The majority staff, particularly Dan Byers, Clint Woods and Taylor Jordan worked hard on this and deserve the thanks of all the Committee Members. On our side, Dan Pearson and Andrea Jones spent countless hours working to move this effort forward. And I am grateful for their tireless commitment on the issue. And I also want to give special thanks to Eric Ffitch from my office for his hard work on this bill as well.

The weather community deserves recognition for their generous and comprehensive advice as we work toward this amendment and through the bill. Each side has made compromises along the way. It is not the bill the friends—my friends on this side of the aisle would—it is not the bill that my friends on the other side of the aisle started with, and it is not the bill that we would likely move, were we in the majority. But it is a bill that we can move together with broad support in the weather community, and it is a bill that will make measurable improvements in weather research and weather forecasting.

And, finally, Mr. Chairman, I ask unanimous consent to include letters in the record from the American Commercial Space Weather Association, Planet IQ, the Weather Coalition, GeoOptics and four universities. And with that, Mr. Chairman, I yield——

Chairman SMITH. Okay. Without objection, so ordered.

[The information appears in Appendix II]

Ms. BONAMICI. Thank you, Mr. Chairman. I yield back.

Chairman SMITH. Thank you, Ms. Bonamici. Are there any amendments to the amendment in the nature of a substitute? The gentleman from California, Mr. Rohrabacher, is recognized.

Mr. ROHRABACHER. Thank you very much. Mr. Chairman, I have an amendment at the desk.

Chairman SMITH. The clerk will report the amendment.

The CLERK. Amendment to the amendment in the nature of a substitute to H.R. 2413 offered by Mr. Rohrabacher.

[The amendment of Mr. Rohrabacher appears in Appendix I]

Chairman SMITH. Without objection, the amendment will be considered as read, and the gentleman from California is recognized to explain the amendment.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman. My amendment would make small, but I think good and important changes to Section 10 of the commercial weather data, and in the subsection regarding the strategy to procure quality commercial weather data. My amendment would do two things, change the wording from cost effectiveness to expected cost effectiveness of

these commercial opportunities, and it would also ensure that this strategy includes an expected timeline for implementation.

The first change, the use of the word expected, is important because it is a statement that we understand this to be an estimate based on the best available data. But since what we are telling the administration to provide is outside their comfort zone, outside their normal practices and policies, that we understand the reported cost effectiveness will not be with the same confidence level that we are used to seeing from these people. So an example of this might be in NASA's COTS program to ensure the capabilities of commercial companies to deliver cargo to the international space station. The way the COTS program was designed is great and should be a guide for what we use for other similar activities in the future where we are bringing in the private sector. But they weren't really able to capture necessarily the cost effectiveness of these same opportunities before we actually tried the system out. NASA had an expectation of what the cost effectiveness would be of this commercial resupply, but none of the cost models could accurately predict within the normal confidence levels how this program would turn out. And it turned out, of course, to be much better than anyone predicted. So as we move forward with commercial acquisition of weather data, which I think is an important goal, the broad range of ways we can do that—and we are looking at those broad ranges—I think it is important for us to acknowledge that no cost model is likely to give us the full value of the benefit that we are likely to see. Now, we will end up understanding that when we try this commercialization, we actually end up getting more benefit than what is usually predicted using the standard ways of predicting benefit.

My second change, the inclusion of a timeline—note the word "expected" here as well—is also small but important. A timeline makes a strategy more real in the people's mind. Otherwise, it just becomes a binder on the shelf that gets dusted off every year to see what we didn't get done over the previous 12 months. So if we have a timeline of what we want to accomplish, that is sort of a—I believe that gives people who are—who should be implementing this policy a much greater reason and guidelines of how to do that and how serious they should take it and—during a given time period. For that reason, I believe that this Committee should make it clear and explicit that we are expecting a timeline to be part of this strategy.

Now, I understand, Mr. Chairman, there is an agreement that my amendment and my proposals will be looked at seriously. And if everybody reaches a consensus that it will be in some way worked into the Manager's Amendment. And understanding that agreement, I am now withdrawing the amendment that I had just proposed.

Chairman SMITH. And thank you, Mr. Rohrabacher. Without objection, the amendment will be withdrawn. And let me reaffirm your comments and say that we do expect to be able to continue to massage the language between here and the House floor and we would expect to adopt some of that language in the Manager's Amendment. So appreciate your comments and appreciate your efforts.

Mr. ROHRABACHER. Mr. Chairman, thank you very much for that. And I would just note that I didn't mention the patent issue once during my comments.

Chairman SMITH. That is also appreciated. Are there any other amendments to the amendment in the nature of a substitute? If not, the question is on agreeing to the amendment in the nature of a substitute. All in favor, say aye. Those opposed, no. And the ayes have it. And the amendment in the nature of a substitute is agreed to. Are there any other amendments to the underlying bill? And if not, a reporting quorum being present, the question is on the bill, H.R. 2413, as amended, those in favor say aye. Opposed, nay. The ayes have it in the Bill, as amended, is ordered reported favorably. Without objection, the Motion to Reconsider is laid upon the table. I move that the bill, H.R. 2413, as amended, be favorably reported to the House and the Staff be authorized to make any necessary technical and conforming changes. Without objection, so ordered.

Appendix I

H.R. 2413, WEATHER FORECASTING IMPROVEMENT ACT OF 2013,

SECTION-BY-SECTION ANALYSIS, AMENDMENTS

AMENDMENT ROSTER

H.R. 2413, AS AMENDED BY THE SUBCOMMITTEE ON ENVIRONMENT ON JULY 9, 2013

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the "Weather Forecasting
3 Improvement Act of 2013".

4 **SEC. 2. PUBLIC SAFETY PRIORITY.**

5 In accordance with the critical responsibility of
6 NOAA to ensure and enhance the provision of data, fore-
7 casts, and warnings for the protection of life and property
8 and the enhancement of the national economy, the Under
9 Secretary shall make such weather-related activities the
10 top priority in the planning and management of programs
11 within all relevant line offices.

12 **SEC. 3. WEATHER RESEARCH AND FORECASTING INNOVA-**
13 **TION.**

14 (a) PROGRAM.—The Assistant Administrator for
15 OAR shall conduct a program to develop improved under-
16 standing of and forecast capabilities for atmospheric
17 events, placing priority on developing more accurate and
18 timely warnings and forecasts of high impact weather
19 events that endanger life and property.

20 (b) PROGRAM ELEMENTS.—The program described
21 in subsection (a) shall focus on the following activities:

1 (1) Improving the fundamental understanding
2 of weather consistent with section 2, including
3 boundary layer and other atmospheric processes.
4 (2) Research and development, and transfer of
5 knowledge, technologies, and applications to the
6 NWS and other appropriate agencies and entities,
7 including the American weather industry and aca-
8 demic partners, related to—
9 (A) advanced radar technologies, including
10 those emphasizing rapid, fine-scale sensing of
11 the boundary layer and the use of innovative,
12 dual-polarization, phased-array technologies;
13 (B) aerial weather observing systems;
14 (C) high performance computing and infor-
15 mation technology networks;
16 (D) advanced forecast modeling that im-
17 proves the timing, track, and intensity forecasts
18 of severe storms, such as tornadoes and hurri-
19 canes, and related phenomena, such as storm
20 surge, including through—
21 (i) more effective use of existing, and
22 the development of new, regional and na-
23 tional cloud-resolving models; and
24 (ii) enhanced global models;

1 (E) observing system simulation experi-
2 ments as described in section 8;
3 (F) atmospheric chemistry and interactions
4 essential to accurately characterizing atmos-
5 pheric composition and predicting meteorolog-
6 ical processes, including cloud microphysical,
7 precipitation, and atmospheric electrification
8 processes to more effectively understand their
9 role in severe weather; and
10 (G) additional sources of weather data and
11 information, including commercial observing
12 systems.
13 (3) A technology transfer initiative, carried out
14 jointly and in coordination with the Assistant Ad-
15 ministrator for Weather Services, and in cooperation
16 with the American weather industry and academic
17 partners, to ensure continuous development and
18 transition of the latest scientific and technological
19 advances into NWS operations.
20 (c) ACADEMIC RESEARCH.—In carrying out the pro-
21 gram under this section, the Assistant Administrator for
22 OAR shall collaborate with and support the academic
23 weather research community, including by making funds
24 available to institutions of higher education through com-
25 petitive grants and contracts.

1 **SEC. 4. TORNADO WARNING LEAD TIME EXTENSION PRO-**
2 **GRAM.**

3 (a) IN GENERAL.—In carrying out section 3, the As-
4 sistant Administrator for OAR shall establish a tornado
5 warning extension program.

6 (b) GOAL.—The goal of such program shall be to de-
7 velop and extend accurate tornado forecasts and warnings
8 beyond 1 hour in order to reduce loss of life, injury, and
9 damage to the economy.

10 (c) PROGRAM PLAN.—Within 180 days after the date
11 of enactment of this Act, the Assistant Administrator for
12 OAR, in consultation with the Assistant Administrator for
13 Weather Services, shall issue a program plan that details
14 the specific research, development, and technology trans-
15 fer activities, as well as corresponding resources and
16 timelines, necessary to achieve the program goal.

17 (d) BUDGET FOR PLAN.—Following completion of
18 the plan, the Under Secretary shall transmit annually to
19 Congress a proposed budget corresponding to the activities
20 identified in the plan.

21 **SEC. 5. HURRICANE WARNING PRECISION PROGRAM.**

22 (a) IN GENERAL.—In carrying out section 3, the As-
23 sistant Administrator for OAR shall establish a hurricane
24 warning precision program.

25 (b) GOAL.—The goal of such program shall be to de-
26 velop and extend accurate hurricane forecasts and warn-

1 ings in order to reduce loss of life, injury, and damage
2 to the economy.
3 (c) PROGRAM PLAN.—Within 180 days after the date
4 of enactment of this Act, the Assistant Administrator for
5 OAR, in consultation with the Assistant Administrator for
6 Weather Services, shall issue a program plan that details
7 the specific research, development, and technology trans-
8 fer activities, as well as corresponding resources and
9 timelines, necessary to achieve the program goal.
10 (d) BUDGET FOR PLAN.—Following completion of
11 the plan, the Under Secretary shall transmit annually to
12 Congress a proposed budget corresponding to the activities
13 identified in the plan.

14 **SEC. 6. WEATHER RESEARCH AND DEVELOPMENT PLAN-**
15 **NING.**

16 Not later than 6 months after the date of enactment
17 of this Act, and annually thereafter, the Assistant Admin-
18 istrator for OAR, in coordination with the Assistant Ad-
19 ministrator for Weather Services and the Assistant Ad-
20 ministrator for NESDIS, shall issue a plan to restore
21 United States leadership in weather modeling, prediction,
22 and forecasting that—
23 (1) describes weather technology goals, objec-
24 tives, and progress of NOAA for the program estab-
25 lished under section 3;

1 (2) identifies and prioritizes specific research
2 and development activities and the associated mile-
3 stones necessary to achieve such goals and objec-
4 tives;
5 (3) describes how the program will collaborate
6 with stakeholders from institutions of higher edu-
7 cation and industry in support of program goals and
8 objectives; and
9 (4) identifies, through consultation with the Na-
10 tional Science Foundation, research necessary to en-
11 hance the integration of social science knowledge
12 into weather forecast and warning processes, includ-
13 ing to improve the communication of threat informa-
14 tion necessary to enable improved severe weather
15 planning on the part of individuals and communities.
16 **SEC. 7. OBSERVING SYSTEM PLANNING.**
17 The Under Secretary shall—
18 (1) develop and maintain a prioritized list of
19 observation data requirements necessary to ensure
20 weather forecasting capabilities to protect life and
21 property to the maximum extent practicable;
22 (2) undertake, using OSEs, OSSEs, and other
23 assessment tools, ongoing systematic evaluations of
24 the combination of observing systems, data, and in-
25 formation needed to meet the requirements devel-

1 oped under paragraph (1), examining various op-
2 tions to maximize observational capabilities and
3 their cost-effectiveness;
4 (3) identify current and potential future data
5 gaps in observing capabilities related to the require-
6 ments under paragraph (1); and
7 (4) determine a range of options to address
8 gaps identified under paragraph (3).

9 **SEC. 8. OBSERVING SYSTEM SIMULATION EXPERIMENTS.**

10 (a) IN GENERAL.—In support of the requirements of
11 section 7, the Assistant Administrator for OAR shall un-
12 dertake OSSEs to quantitatively assess the relative value
13 and benefits of observing capabilities and systems. Tech-
14 nical and scientific OSSE evaluations—
15 (1) may include assessments of the impact of
16 observing capabilities on—
17 (A) global weather prediction;
18 (B) hurricane track and intensity fore-
19 casting;
20 (C) tornado warning lead times and accu-
21 racy; and
22 (D) prediction of mid-latitude severe local
23 storm outbreaks; and
24 (2) should be conducted in cooperation with
25 other appropriate entities within NOAA, other Fed-

1 eral agencies, the American weather industry, and
2 academic partners.
3 (b) REQUIREMENTS.—OSSEs shall quantitatively—
4 (1) determine the potential impact of proposed
5 space-based, sub-orbital, and in-situ observing sys-
6 tems on analyses and forecasts;
7 (2) evaluate and compare observing system de-
8 sign options; and
9 (3) assess the relative capabilities and costs of
10 various observing systems and combinations of ob-
11 serving systems in providing data necessary to pro-
12 tect life and property.
13 (c) IMPLEMENTATION.—OSSEs—
14 (1) shall be conducted prior to the acquisition
15 of major Government-owned or Government-leased
16 operational observing systems, including polar-orbit-
17 ing and geostationary satellite systems; and
18 (2) shall be conducted prior to the purchase of
19 any major new commercially provided data.
20 (d) PRIORITY OSSEs.—Not later than June 30,
21 2014, the Assistant Administrator for OAR shall complete
22 OSSEs to assess the value of data from both Global Posi-
23 tioning System radio occultation and a geostationary
24 hyperspectral sounder global constellation.

1 (e) RESULTS.—All OSSE results shall be publicly re-
2 leased and fully considered by NOAA for implementation.
3 **SEC. 9. COMPUTING RESOURCES PRIORITIZATION REPORT.**
4 Not later than 6 months after the date of enactment
5 of this Act, and annually thereafter, the NOAA Chief In-
6 formation Officer, in coordination with the Assistant Ad-
7 ministrator for OAR and the Assistant Administrator for
8 Weather Services, shall issue a plan for high performance
9 computing support of its advanced research and oper-
10 ational weather prediction models that—
11 (1) assures that NOAA aggressively pursues the
12 newest, fastest, and most cost effective high per-
13 formance computing technologies in support of its
14 weather prediction mission;
15 (2) assures a balance between the research re-
16 quirements to develop the next generation of re-
17 gional and global models and its highly reliable oper-
18 ational models;
19 (3) takes advantage of advanced development
20 concepts to make its next generation weather pre-
21 diction models available in beta-test mode to
22 NOAA's operational forecasters, the American
23 weather industry, and its partners in academic and
24 government research; and

1 (4) identifies opportunities to reallocate existing
2 advanced computing resources from lower priority
3 uses to improve operational weather prediction.

4 **SEC. 10. COMMERCIAL WEATHER DATA.**

5 (a) AMENDMENT.—Section 60161 of title 51, United
6 States Code, is amended by adding at the end the fol-
7 lowing: "This prohibition shall not extend to—
8 "(1) the purchase of weather data through con-
9 tracts with commercial providers; or
10 "(2) the placement of weather satellite instru-
11 ments on cohosted government or private payloads.".
12 (b) REPORT.—Within 6 months after the date of en-
13 actment of this Act, the Under Secretary shall submit to
14 the Committee on Science, Space, and Technology of the
15 House of Representatives and the Committee on Com-
16 merce, Science, and Transportation of the Senate a report
17 assessing the range of commercial opportunities for ob-
18 taining space-based weather observations, including the
19 cost-effectiveness of these opportunities, and providing a
20 plan for procuring data from these non-governmental
21 sources.

22 **SEC. 11. DEFINITIONS.**

23 In this Act:

1 (1) NESDIS.—The term "NESDIS" means
2 the National Environmental Satellite, Data, and In-
3 formation Service.
4 (2) NOAA.—The term "NOAA" means the Na-
5 tional Oceanic and Atmospheric Administration.
6 (3) NWS.—The term "NWS" means the Na-
7 tional Weather Service.
8 (4) OAR.—The term "OAR" means the Office
9 of Oceanic and Atmospheric Research.
10 (5) OSE.—The term "OSE" means an Observ-
11 ing System Experiment.
12 (6) OSSE.—The term "OSSE" means an Ob-
13 serving System Simulation Experiment.
14 (7) UNDER SECRETARY.—The term "Under
15 Secretary" means the Under Secretary of Commerce
16 for Oceans and Atmosphere.
17 **SEC. 12. AUTHORIZATION OF APPROPRIATIONS.**
18 Out of funds made available for operations, research,
19 and facilities in OAR, there are authorized to be appro-
20 priated for each of fiscal years 2014 through 2017—
21 (1) $100,000,000 to carry out section 3, of
22 which—
23 (A) $80,000,000 is authorized for weather
24 laboratories and cooperative institutes; and

1 (B) $20,000,000 is authorized for weather
2 and air chemistry research programs; and
3 (2) $20,000,000 for the joint technology trans-
4 fer initiative described in section 3(b)(3).

SECTION–BY–SECTION ANALYSIS OF

H.R. 2413, THE WEATHER FORECASTING IMPROVEMENT ACT OF 2013

AS AMENDED BY THE SUBCOMMITTEE ON ENVIRONMENT ON JULY 9, 2013

Section 1. Short Title.

This section establishes the short title as the "Weather Forecasting Improvement Act of 2013."

Section 2. Public Safety Priority.

This section directs the Under Secretary of the National Oceanic and Atmospheric Administration (NOAA Administrator) 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.

This section directs the Assistant Administrator of the Office of Oceanic and Atmospheric Research (OAR) to undertake a weather research program and directs the Assistant Administrator to place priority emphasis on developing more accurate and timely warnings and forecasts of high impact weather events that endanger life and property. Section 3 further defines the specific program elements to include advanced radar, aerial systems, computing/modeling, and Observing System Stimulation Experiments (OSSE) and codifies a longstanding joint OAR-National Weather Service (NWS) tech transfer program, moving its funding from NWS. Finally, Section 3 directs NOAA to support academic weather research through competitive grants and contracts.

Section 4. Tornado Warning Extension Program.

This section establishes a Tornado Warning Extension Program focused on developing and extending accurate tornado forecasts and warnings beyond one hour in order to reduce loss of life, injury, and damage to the economy.

Section 5. Hurricane Warning Precision Program.

This section establishes a hurricane warning precision program aimed at developing and extending accurate hurricane forecasts and warnings in order to reduce loss of life, injury, and damage to the economy.

Section 6. Weather Research and Development Planning.

Section 5 directs NOAA to develop a prioritized weather research plan to guide activities authorized under the Act and restore U.S. leadership in weather modeling, prediction, and forecasting. The section requires the plan to identify, through consultation with the National Science Foundation, the research necessary to integrate social science knowledge into weather forecast and warning processes.

Section 7. Observing System Planning.

Section 6 directs NOAA to maintain a list of observation data requirements and systematically evaluate the combination of systems necessary to meet such requirements. This section further directs NOAA to identify current and potential future data gaps in observing capabilities and develop a range of options to address any identified gaps.

Section 8. Observing System Simulation Experiments.

This section directs NOAA to undertake Observing System Simulation Experiments (OSSEs) to quantitatively assess the relative value and benefits of observing capabilities and systems. This section identifies specific instances when OSSEs must be performed.

Section 9. Computing Resources Prioritization Report.

Section 9 directs NOAA to issue a plan that: (1) assures that NOAA aggressively pursues the newest, fastest, and most cost effective high performance computing technologies in support of its weather prediction mission; (2) assures a balance between the research requirements; (3) takes advantage of advanced development concepts; and (4) identifies opportunities to reallocate existing advanced computing resources from lower priority uses to improve operational weather prediction.

Section 10. Commercial Weather Data.

This section 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 11. Definitions. This section provides definitions for terms in the bill.

Section 12. Authorization of Appropriations.

Section 11 authorizes, out of funds made available for OAR's operations, research, and facilities appropriations account, $100 million for each of Fiscal Years 2014 through 2017 to carry out the weather research program established under section 3. It further specifies that out of the $100 million provided in this section, $80 million is authorized for weather laboratories and cooperative institutions and $20 million is authorized for weather and air chemistry research programs. Finally, this section also authorizes $20 million annually to carry out the joint technology transfer initiative described in section 3.

AMENDMENT IN THE NATURE OF A SUBSTITUTE TO H.R. 2413 OFFERED BY MR. STEWART OF UTAH AND MS. BONAMICI OF OREGON

Strike all after the enacting clause and insert the following:

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the "Weather Forecasting
3 Improvement Act of 2013".

4 **SEC. 2. PUBLIC SAFETY PRIORITY.**

5 In accordance with NOAA's critical mission to pro-
6 vide science, service, and stewardship, the Under Sec-
7 retary shall prioritize weather-related activities, including
8 the provision of weather data, forecasts, and warnings for
9 the protection of life and property and the enhancement
10 of the national economy, in all relevant line offices.

11 **SEC. 3. WEATHER RESEARCH AND FORECASTING INNOVA-**
12 **TION.**

13 (a) PROGRAM.—The Assistant Administrator for
14 OAR shall conduct a program to develop improved under-
15 standing of and forecast capabilities for atmospheric
16 events and their impacts, placing priority on developing
17 more accurate, timely, and effective warnings and fore-

casts of high impact weather events that endanger life and property.

(b) PROGRAM ELEMENTS.—The program described in subsection (a) shall focus on the following activities:

(1) Improving the fundamental understanding of weather consistent with section 2, including boundary layer and other atmospheric processes.

(2) Improving the understanding of how the public receives, interprets, and responds to warnings and forecasts of high impact weather events that endanger life and property.

(3) Research and development, and transfer of knowledge, technologies, and applications to the NWS and other appropriate agencies and entities, including the American weather industry and academic partners, related to—

(A) advanced radar, radar networking technologies, and other ground-based technologies, including those emphasizing rapid, fine-scale sensing of the boundary layer and the use of innovative, dual-polarization, phased-array technologies;

(B) aerial weather observing systems;

(C) high performance computing and information technology networks;

1 (D) advanced numerical weather prediction
2 systems and forecasting tools and techniques
3 that improve the forecasting of timing, track,
4 intensity, and severity of high impact weather,
5 including through—
6 (i) the development of more effective
7 mesoscale models;
8 (ii) more effective use of existing, and
9 the development of new, regional and na-
10 tional cloud-resolving models;
11 (iii) enhanced global models; and
12 (iv) integrated assessment models;
13 (E) quantitative assessment tools for meas-
14 uring the value of data and observing systems,
15 including OSSEs (as described in section 8),
16 OSEs, and AOAs;
17 (F) atmospheric chemistry and interactions
18 essential to accurately characterizing atmos-
19 pheric composition and predicting meteorolog-
20 ical processes, including cloud microphysical,
21 precipitation, and atmospheric electrification
22 processes, to more effectively understand their
23 role in severe weather; and

1 (G) additional sources of weather data and
2 information, including commercial observing
3 systems.
4 (4) A technology transfer initiative, carried out
5 jointly and in coordination with the Assistant Ad-
6 ministrator for NWS, and in cooperation with the
7 American weather industry and academic partners,
8 to ensure continuous development and transition of
9 the latest scientific and technological advances into
10 NWS operations.
11 (c) EXTRAMURAL RESEARCH.—
12 (1) IN GENERAL.—In carrying out the program
13 under this section, the Assistant Administrator for
14 OAR shall collaborate with and support the non-
15 Federal weather research community, which includes
16 institutions of higher education, private entities, and
17 nongovernmental organizations, by making funds
18 available through competitive grants, contracts, and
19 cooperative agreements.
20 (2) SENSE OF CONGRESS.—It is the sense of
21 Congress that not less than 30 percent of the funds
22 authorized for research and development at OAR by
23 this Act should be made available for this purpose.
24 (3) REPORT.—The Under Secretary shall trans-
25 mit to Congress annually, concurrently with NOAA's

1 budget request, a description of current and planned
2 activities under this section.

3 **SEC. 4. TORNADO WARNING IMPROVEMENT AND EXTEN-**
4 **SION PROGRAM.**

5 (a) IN GENERAL.—The Under Secretary, in collabo-
6 ration with the American weather industry and academic
7 partners, shall establish a tornado warning improvement
8 and extension program.

9 (b) GOAL.—The goal of such program shall be to re-
10 duce the loss of life and economic losses from tornadoes
11 through the development and extension of accurate, effec-
12 tive, and timely tornado forecasts, predictions, and warn-
13 ings, including the prediction of tornadoes beyond one
14 hour in advance.

15 (c) PROGRAM PLAN.—Not later than 6 months after
16 the date of enactment of this Act, the Assistant Adminis-
17 trator for OAR, in consultation with the Assistant Admin-
18 istrator for NWS, shall develop a program plan that de-
19 tails the specific research, development, and technology
20 transfer activities, as well as corresponding resources and
21 timelines, necessary to achieve the program goal.

22 (d) BUDGET FOR PLAN.—Following completion of
23 the plan, the Assistant Administrator for OAR, in con-
24 sultation with the Assistant Administrator for NWS, shall

1 transmit annually to Congress a proposed budget cor-
2 responding to the activities identified in the plan.

3 **SEC. 5. HURRICANE WARNING IMPROVEMENT PROGRAM.**

4 (a) IN GENERAL.—The Under Secretary, in collabo-
5 ration with the American weather industry and academic
6 partners, shall establish a hurricane warning improvement
7 program.

8 (b) GOAL.—The goal of such program shall be to de-
9 velop and extend accurate hurricane forecasts and warn-
10 ings in order to reduce loss of life, injury, and damage
11 to the economy.

12 (c) PROGRAM PLAN.—Not later than 6 months after
13 the date of enactment of this Act, the Assistant Adminis-
14 trator for OAR, in consultation with the Assistant Admin-
15 istrator for NWS, shall develop a program plan that de-
16 tails the specific research, development, and technology
17 transfer activities, as well as corresponding resources and
18 timelines, necessary to achieve the program goal.

19 (d) BUDGET FOR PLAN.—Following completion of
20 the plan, the Assistant Administrator for OAR, in con-
21 sultation with the Assistant Administrator for NWS, shall
22 transmit annually to Congress a proposed budget cor-
23 responding to the activities identified in the plan.

1 **SEC. 6. WEATHER RESEARCH AND DEVELOPMENT PLAN-**
2 **NING.**

3 Not later than 6 months after the date of enactment
4 of this Act, and annually thereafter, the Assistant Admin-
5 istrator for OAR, in coordination with the Assistant Ad-
6 ministrators for NWS and NESDIS, shall issue a research
7 and development plan to restore and maintain United
8 States leadership in numerical weather prediction and
9 forecasting that—

10 (1) describes the forecasting skill and tech-
11 nology goals, objectives, and progress of NOAA in
12 carrying out the program conducted under section 3;

13 (2) identifies and prioritizes specific research
14 and development activities, and performance metrics,
15 weighted to meet the operational weather mission of
16 NWS;

17 (3) describes how the program will collaborate
18 with stakeholders, including the American weather
19 industry and academic partners; and

20 (4) identifies, through consultation with the Na-
21 tional Science Foundation, American weather indus-
22 try, and academic partners, research necessary to
23 enhance the integration of social science knowledge
24 into weather forecast and warning processes, includ-
25 ing to improve the communication of threat informa-
26 tion necessary to enable improved severe weather

1 planning and decisionmaking on the part of individ-
2 uals and communities.

3 **SEC. 7. OBSERVING SYSTEM PLANNING.**

4 The Under Secretary shall—

5 (1) develop and maintain a prioritized list of
6 observation data requirements necessary to ensure
7 weather forecasting capabilities to protect life and
8 property to the maximum extent practicable;

9 (2) undertake, using OSSEs, OSEs, AOAs, and
10 other appropriate assessment tools, ongoing system-
11 atic evaluations of the combination of observing sys-
12 tems, data, and information needed to meet the re-
13 quirements developed under paragraph (1), assessing
14 various options to maximize observational capabili-
15 ties and their cost-effectiveness;

16 (3) identify current and potential future data
17 gaps in observing capabilities related to the require-
18 ments under paragraph (1); and

19 (4) determine a range of options to address
20 gaps identified under paragraph (3).

21 **SEC. 8. OBSERVING SYSTEM SIMULATION EXPERIMENTS.**

22 (a) IN GENERAL.—In support of the requirements of
23 section 7, the Assistant Administrator for OAR shall un-
24 dertake OSSEs to quantitatively assess the relative value

1 and benefits of observing capabilities and systems. Tech-
2 nical and scientific OSSE evaluations—
3 (1) may include assessments of the impact of
4 observing capabilities on—
5 (A) global weather prediction;
6 (B) hurricane track and intensity fore-
7 casting;
8 (C) tornado warning lead times and accu-
9 racy; and
10 (D) prediction of mid-latitude severe local
11 storm outbreaks; and
12 (2) shall be conducted in cooperation with other
13 appropriate entities within NOAA, other Federal
14 agencies, the American weather industry, and aca-
15 demic partners.
16 (b) REQUIREMENTS.—OSSEs shall quantitatively—
17 (1) determine the potential impact of proposed
18 space-based, suborbital, and in situ observing sys-
19 tems on analyses and forecasts;
20 (2) evaluate and compare observing system de-
21 sign options; and
22 (3) assess the relative capabilities and costs of
23 various observing systems and combinations of ob-
24 serving systems in providing data necessary to pro-
25 tect life and property.

1 (c) IMPLEMENTATION.—OSSEs—

2 (1) shall be conducted prior to the acquisition
3 of major Government-owned or Government-leased
4 operational observing systems, including polar-orbit-
5 ing and geostationary satellite systems, with a
6 lifecycle cost of more than $500,000,000; and

7 (2) shall be conducted prior to the purchase of
8 any major new commercially provided data with a
9 lifecycle cost of more than $500,000,000.

10 (d) PRIORITY OSSEs.—Not later than June 30,
11 2014, the Assistant Administrator for OAR shall complete
12 OSSEs to assess the value of data from both Global Posi-
13 tioning System radio occultation and a geostationary
14 hyperspectral sounder global constellation.

15 (e) RESULTS.—Upon completion of all OSSEs, re-
16 sults shall be publicly released and accompanied by an as-
17 sessment of related private and public sector weather data
18 sourcing options, including their availability, affordability,
19 and cost effectiveness. Such assessments shall be devel-
20 oped in accordance with section 50503 of title 51, United
21 States Code.

22 **SEC. 9. COMPUTING RESOURCES PRIORITIZATION REPORT.**

23 Not later than 12 months after the date of enactment
24 of this Act, and annually thereafter, the NOAA Chief In-
25 formation Officer, in coordination with the Assistant Ad-

1 ministrator for OAR and the Assistant Administrator for
2 NWS, shall produce a report that explains how NOAA in-
3 tends to—
4 (1) aggressively pursue the newest, fastest, and
5 most cost effective high performance computing
6 technologies in support of its weather prediction mis-
7 sion;
8 (2) ensure a balance between the research re-
9 quirements to develop the next generation of re-
10 gional and global models and its highly reliable oper-
11 ational models;
12 (3) take advantage of advanced development
13 concepts to, as appropriate, make its next generation
14 weather prediction models available in beta-test
15 mode to its operational forecasters, the American
16 weather industry, and its partners in academic and
17 government research;
18 (4) identify opportunities to reallocate existing
19 advanced computing resources from lower priority
20 uses to improve advanced research and operational
21 weather prediction; and
22 (5) harness new computing power in OAR and
23 NWS for immediate improvement in forecasting and
24 experimentation.

1 **SEC. 10. COMMERCIAL WEATHER DATA.**

2 (a) AMENDMENT.—Section 60161 of title 51, United
3 States Code, is amended by adding at the end the fol-
4 lowing: "This prohibition shall not extend to—

5 "(1) the purchase of weather data through con-
6 tracts with commercial providers; or

7 "(2) the placement of weather satellite instru-
8 ments on cohosted government or private payloads.".

9 (b) STRATEGY.—

10 (1) IN GENERAL.—Not later than 6 months
11 after the date of enactment of this Act, the Sec-
12 retary of Commerce, in consultation with the Under
13 Secretary, shall transmit to the Committee on
14 Science, Space, and Technology of the House of
15 Representatives and the Committee on Commerce,
16 Science, and Transportation of the Senate a strategy
17 to enable the procurement of quality commercial
18 weather data. The strategy shall assess the range of
19 commercial opportunities, including public-private
20 partnerships, for obtaining both surface-based and
21 space-based weather observations. The strategy shall
22 include the cost effectiveness of these opportunities,
23 as well as provide a plan for procuring data from
24 these nongovernmental sources, as appropriate.

25 (2) REQUIREMENTS.—The strategy shall in-
26 clude—

1 (A) an analysis of financial or other bene-
2 fits to, and risks associated with, acquiring
3 commercial weather data or services, including
4 through multiyear acquisition approaches;
5 (B) an identification of methods to address
6 planning, programming, budgeting, and execu-
7 tion challenges to such approaches, including—
8 (i) how standards will be set to ensure
9 that data is reliable and effective;
10 (ii) how data may be acquired from
11 commercial experimental or innovative
12 techniques and then evaluated for integra-
13 tion into operational use;
14 (iii) how to guarantee public access to
15 all forecast-critical data to ensure that the
16 American weather industry and the public
17 continue to have access to information crit-
18 ical to their work; and
19 (iv) in accordance with section 50503
20 of title 51, United States Code, methods to
21 address potential termination liability or
22 cancellation costs associated with weather
23 data or service contracts; and
24 (C) an identification of any changes needed
25 in the requirements development and approval

1 processes of the Department of Commerce to
2 facilitate effective and efficient implementation
3 of such strategy.

4 **SEC. 11. WEATHER RESEARCH AND INNOVATION ADVISORY**
5 **COMMITTEE.**

6 (a) ESTABLISHMENT.—The Under Secretary shall es-
7 tablish a Federal Advisory Committee to—
8 (1) provide advice for prioritizing weather re-
9 search initiatives at NOAA to produce real improve-
10 ment in weather forecasting;
11 (2) provide advice on existing or emerging tech-
12 nologies or techniques that can be found in private
13 industry or the research community that could be in-
14 corporated into forecasting at NWS to improve fore-
15 casting;
16 (3) identify opportunities to improve commu-
17 nications between weather forecasters, emergency
18 management personnel, and the public; and
19 (4) address such other matters as the Under
20 Secretary or the Advisory Committee believes would
21 improve innovation in weather forecasting.
22 (b) COMPOSITION.—
23 (1) IN GENERAL.—The Under Secretary shall
24 appoint leading experts and innovators from all rel-
25 evant fields of science and engineering that inform

1 meteorology, including atmospheric chemistry, at-
2 mospheric physics, hydrology, social science, risk
3 communications, electrical engineering, and com-
4 puter modeling.
5 (2) NUMBER.—The Advisory Committee shall
6 be composed of at least 12 members, with the chair
7 of the Advisory Committee chosen from among the
8 members.
9 (3) RESTRICTION.—The Under Secretary may
10 not appoint a majority of members who are employ-
11 ees of NOAA-funded research centers.
12 (c) ANNUAL REPORT.—The Advisory Committee
13 shall transmit annually to the Under Secretary a report
14 on progress made by NOAA in adopting the Advisory
15 Committee's recommendations. The Under Secretary shall
16 transmit a copy of such report to the Committee on
17 Science, Space, and Technology of the House of Rep-
18 resentatives and the Committee on Commerce, Science,
19 and Transportation of the Senate.
20 (d) DURATION.—Section 14 of the Federal Advisory
21 Committee Act (5 U.S.C. App.) shall not apply to the Ad-
22 visory Committee until the date that is 5 years after the
23 date of enactment of this Act.

1 **SEC. 12. INTERAGENCY WEATHER RESEARCH AND INNOVA-**
2 **TION COORDINATION.**

3 (a) ESTABLISHMENT.—The Director of the Office of
4 Science and Technology Policy shall establish an Inter-
5 agency Committee for Advancing Weather Services to im-
6 prove coordination of relevant weather research and fore-
7 cast innovation activities across the Federal Government.
8 The Interagency Committee shall—

9 (1) include participation by the National Aero-
10 nautics and Space Administration, the Federal Avia-
11 tion Administration, NOAA and its constituent ele-
12 ments, the National Science Foundation, and such
13 other agencies involved in weather forecasting re-
14 search as the President determines are appropriate;

15 (2) identify and prioritize top forecast needs
16 and coordinate those needs against budget requests
17 and program initiatives across participating offices
18 and agencies; and

19 (3) share information regarding operational
20 needs and forecasting improvements across relevant
21 agencies.

22 (b) CO-CHAIR.—The Federal Coordinator for Meteor-
23 ology shall serve as a co-chair of this panel.

24 (c) FURTHER COORDINATION.—The Director shall
25 take such other steps as are necessary to coordinate the
26 activities of the Federal Government with those of the

1 American weather industry, State governments, emer-
2 gency managers, and academic researchers.

3 **SEC. 13. VISITING OAR RESEARCHERS PROGRAM.**

4 (a) IN GENERAL.—The Assistant Administrator for
5 OAR, in collaboration with the Assistant Administrator
6 for NWS, may establish a program to detail OAR re-
7 searchers to the NWS.

8 (b) GOAL.—The goal of this program is to enhance
9 forecasting innovation through regular, direct interaction
10 between OAR's world-class scientists and NWS's oper-
11 ational staff.

12 (c) ELEMENTS.—The program shall allow no fewer
13 than 5 and no more than 15 OAR staff to spend up to
14 1 year on detail to the NWS. Such detail shall be at any
15 of the National Centers for Environmental Prediction or
16 at any of the Regional Forecast Offices where such inter-
17 action could be productive in improving forecasting capa-
18 bilities. Candidates shall be jointly selected by the Assist-
19 ant Administrator for OAR and the Assistant Adminis-
20 trator for NWS.

21 (d) REPORT.—The Under Secretary shall report an-
22 nually to the Committee on Science, Space, and Tech-
23 nology of the House of Representatives and to the Com-
24 mittee on Commerce, Science, and Transportation of the

1 Senate on participation in such program and shall high-
2 light any innovations that come from this interaction.

3 **SEC. 14. VISITING FELLOWS AT NWS.**

4 (a) IN GENERAL.—The Assistant Administrator for
5 NWS may establish a program to host postdoctoral fellows
6 and academic researchers at any of the National Centers
7 for Environmental Prediction.

8 (b) GOAL.—This program shall be designed to pro-
9 vide direct interaction between forecasters and talented
10 academic and private sector researchers in an effort to
11 bring innovation to forecasting tools and techniques avail-
12 able to the NWS.

13 (c) SELECTION AND APPOINTMENT.—Such fellows
14 shall be competitively selected and appointed for a term
15 not to exceed 1 year.

16 **SEC. 15. DEFINITIONS.**

17 In this Act:

18 (1) AOA.—The term "AOA" means an Anal-
19 ysis of Alternatives.

20 (2) NESDIS.—The term "NESDIS" means
21 the National Environmental Satellite, Data, and In-
22 formation Service.

23 (3) NOAA.—The term "NOAA" means the Na-
24 tional Oceanic and Atmospheric Administration.

1 (4) NWS.—The term "NWS" means the Na-
2 tional Weather Service.
3 (5) OAR.—The term "OAR" means the Office
4 of Oceanic and Atmospheric Research.
5 (6) OSE.—The term "OSE" means an Observ-
6 ing System Experiment.
7 (7) OSSE.—The term "OSSE" means an Ob-
8 serving System Simulation Experiment.
9 (8) UNDER SECRETARY.—The term "Under
10 Secretary" means the Under Secretary of Commerce
11 for Oceans and Atmosphere.
12 **SEC. 16. AUTHORIZATION OF APPROPRIATIONS.**
13 (a) FISCAL YEAR 2014.—There are authorized to be
14 appropriated for fiscal year 2014—
15 (1) out of funds made available for operations,
16 research, and facilities in OAR, $83,000,000 to
17 carry out section 3, of which—
18 (A) $65,000,000 is authorized for weather
19 laboratories and cooperative institutes; and
20 (B) $18,000,000 is authorized for weather
21 and air chemistry research programs; and
22 (2) out of funds made available for research
23 and development in NWS, an additional amount of
24 $14,000,000 for OAR to carry out the joint tech-

1 nology transfer initiative described in section
2 3(b)(4).
3 (b) ALTERNATIVE FUNDING FOR FISCAL YEAR
4 2014.—If the Budget Control Act of 2011 (Public Law
5 112–25) is repealed or replaced with an Act that increases
6 allocations, subsection (a) shall not apply, and there are
7 authorized to be appropriated for fiscal year 2014—
8 (1) out of funds made available for operations,
9 research, and facilities in OAR, $96,500,000 to
10 carry out section 3, of which—
11 (A) $77,500,000 is authorized for weather
12 laboratories and cooperative institutes; and
13 (B) $19,000,000 is authorized for weather
14 and air chemistry research programs; and
15 (2) out of funds made available for research
16 and development in NWS, an additional amount of
17 $16,000,000 for OAR to carry out the joint tech-
18 nology transfer initiative described in section
19 3(b)(4).
20 (c) FISCAL YEARS 2015 THROUGH 2017.—Out of
21 funds made available for operations, research, and facili-
22 ties in OAR for each of fiscal years 2015 through 2017,
23 there are authorized to be appropriated—
24 (1) $100,000,000 to carry out section 3, of
25 which—

1 (A) $80,000,000 is authorized for weather
2 laboratories and cooperative institutes; and
3 (B) $20,000,000 is authorized for weather
4 and air chemistry research programs; and
5 (2) an additional amount of $20,000,000 for
6 the joint technology transfer initiative described in
7 section 3(b)(4).

Amend the title so as to read: "A bill to prioritize and redirect NOAA resources to a focused program of investment on affordable and attainable advances in observational, computing, and modeling capabilities to deliver substantial improvement in weather forecasting and prediction of high impact weather events, such as those associated with hurricanes, tornadoes, droughts, floods, storm surges, and wildfires, and for other purposes.".

AMENDMENT TO THE AMENDMENT IN THE NATURE OF A SUBSTITUTE FOR H.R. 2413 OFFERED BY MR. ROHRABACHER OF CALIFORNIA

Page 12, line 22, strike "include the cost effectiveness" and insert "include the expected cost effectiveness".

Page 12, line 23, strike "provide a plan for procuring data" and insert "provide a plan for procuring data, including an expected implementation timeline,".

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
Full Committee Markup
December 5, 2013

AMENDMENT ROSTER

H.R. 2413, the "Weather Forecasting Improvement Act of 2013"

No.	Amendment	Summary	
1	**Amendment in the Nature of a Substitute to H.R. 2413 Offered by Mr. Stewart (UT)/Ms. Bonamici (OR) (470)**	The ANS requires NOAA to prioritize weather related activities. It also requires NOAA to collaborate with the nonfederal weather research community, and mandates an annual report to Congress on extramural activities. It requires a strategy from NOAA to assess commercial data opportunities, and a strategy on how it plans to use new computing resources. The ANS establishes a Weather Research and Innovation Advisory Committee, an Interagency Weather Research and Innovation Coordination, a Visiting OAR Researchers Program, and a Visiting Fellows program at NWS.	**Approved by Voice Vote**
2	**Amendment to the ANS to H.R. 2413 Offered by Mr. Rohrabacher (CA) (037)**	Amends Section 10 to require that the strategy includes an assessment of the "expected" cost effectiveness of using commercial data and that the plan for procuring data includes an expected implementation timeline.	**Offered and Withdrawn**

Appendix II

Letters for the Record

LETTER SUBMITTED BY UNIVERSITY CORPORATION OF ATMOSPHERIC RESEARCH, PRESIDENT TOM BOGDAN

DR. THOMAS J. BOGDAN
UCAR PRESIDENT

303-497-1652
BOGDAN@UCAR.EDU

December 3, 2013

The Honorable Lamar Smith
Chairman
House Science, Space and
Technology Committee
2321 Rayburn House Office Building
Washington, D.C. 20515

The Honorable Chris Stewart
Chairman
House Science, Space and
Technology Committee
2321 Rayburn House Office Building
Washington, D.C. 20515

The Honorable Eddie Bernice
Johnson
Ranking Member
House Science, Space and
Technology Committee
394 Ford House Office Building
Washington, D.C. 20515

The Honorable Suzanne Bonamici
Ranking Member
House Science, Space and
Technology Committee
394 Ford House Office Building
Washington, D.C. 20515

Dear Chairmen Smith and Stewart and Ranking Members Johnson and Bonamici:

On behalf of the nation's atmospheric sciences community and the 104 member universities that comprise the University Corporation for Atmospheric Research (UCAR), I commend your bipartisan efforts on H.R. 2413 the Weather Forecasting Improvement Act of 2013. I am pleased the Committee has made progress on legislation to improve weather forecasting and accelerate research-to-operations within the U.S. weather enterprise. The bipartisan Manager's Amendment under consideration offers a major improvement on earlier versions of the bill and UCAR is grateful for the opportunity we have been given to participate in the development of the manager's amendment. Approval by the full Committee of the manager's amendment will enable the weather enterprise (academic, public, and private sectors) to continue to work with the Congress to further strengthen the bill.

By key measures, U.S. weather forecasting capabilities have slipped behind those of a number of international competitors, including the European Union, United Kingdom, and Japan. The Committee's consideration of weather issues and stewardship of weather legislation over the last nine months are important steps in restoring our international competitiveness in this important scientific arena. The Committee is helping to galvanize the weather community to work together to achieve a more innovative, more robust, and better integrated enterprise that can make the U.S. second to none in weather once again.

Weather authorizing legislation that encourages the entire weather enterprise to strengthen the weather forecast has been long overdue. The last major weather bill that Congress considered was connected to the modernization of the National Weather Service (NWS) in the 1990s, a time when the National Oceanic and Atmospheric Administration (NOAA) essentially was the bulk of the national weather enterprise. Since then, the weather enterprise has evolved and matured into a dynamic national collaboration between the private, academic, and public sectors, each bringing its own contributions and strengths to the service of the nation. The result has been a better weather forecast, which enables us to save lives and protect property in the face of extreme weather as well as make more efficient business and personal decisions around routine weather.

The Weather Forecast Improvement Act pushes the NWS to become more flexible, collaborative, and innovative within the context of the evolving U.S. weather enterprise. With Sec. 3 Weather Innovation and Research Program, the legislation would strengthen the innovation pipeline that advances models, technologies, and products from universities and laboratories to the NWS.

The bill would also dramatically improve the scale and quality of collaboration and coordination between the different parts of the U.S. weather enterprise, including private, academic, and public sectors. The weather enterprise needs better coordination at a high level that will ensure that resources and functions are aligned effectively and efficiently. This is why I support Sec. 12 that would create an interagency coordinating committee in the White House Office of Science and Technology to improve coordination of relevant weather research and forecast innovation activities across the federal government.

When NOAA draws on the best assets of the business and university community, it will produce a better weather forecast. Indeed, many of the breakthrough technologies of the last several decades in meteorology have originated at our

nation's universities. This is why I support the provision in Sec. 3 that calls for at least 30 percent of weather research resources in NOAA's Office of Oceanic and Atmospheric Research to be made available to America's weather industry and the academic community.

Your engagement with key stakeholders in the academic community, including the UCAR, the American Meteorological Society, the Weather Coalition, and the National Academy of Sciences, has resulted in a bill with a broadened perspective that better reflects the full breadth of the weather enterprise. Thank you for your efforts on this legislation, your attention to weather issues, and your engagement with the weather community. As a representative of the broad university community in the atmospheric sciences, I look forward to continuing to work with you as the Weather Forecasting Improvement Act progresses in your Committee and beyond.

Best regards,

Thomas J. Bogdan
President, UCAR

LETTER SUBMITTED BY THE WEATHER COALITION

December 3, 2013

The Honorable Lamar S. Smith
Chairman, Committee of Science, Space and Technology
Committee of Science, Space and Technology
U.S. House of Representatives
Washington, DC 20515 ***Fax 202 226-0113***

The Honorable Eddie Bernice Johnson
Ranking Member, Committee of Science, Space and Technology
Committee of Science, Space and Technology
U.S. House of Representatives
Washington, DC 20515 ***Fax 202 225-3895***

Reference: **H.R. 2413, Weather Forecasting Improvement Act of 2013**

Dear Chairman Smith and Ranking Member Johnson:

The Weather Coalition (http://weathercoalition.org/) represents a broad spectrum of the commercial, academic, and non-profit organizations involved in weather science, services, and technologies; a membership list can be found at http://weathercoalition.org/content/members. The Coalition brings these diverse entities together in an organized effort to undertake, promote, and support programs that will make "second to none" our nation's portfolio of environmental observations and weather forecasting capabilities, including the underpinning research, development, and transition to operations. The intent of the Coalition's efforts is to significantly improve our nation's weather prediction and warning capabilities, resident in both federal agencies and the American weather industry, and so reduce our nation's socioeconomic vulnerability to weather, improve national physical and environmental security, increase protection of life and property, and enhance the global competitiveness of U.S. industry.

The Coalition has been following with keen interest and providing input to staff on the work of the Subcommittee on Environment in the development of H.R. 2413, Weather Forecasting Improvement Act of 2013. We greatly appreciate the Committee's efforts to engage the weather community in its development. To inform your future deliberations, we offer the following observations and recommendations in regard to the proposed Manager's Amendment dated October 18, 2013.

First, the Coalition commends the Committee for addressing – in a bipartisan way -- the issue of improving weather services. While specific natural hazards (e.g., tsunamis and Hurricane Sandy) have had recent congressional attention, the broad area of weather hasn't had serious attention from the Congress since the conclusion of the NWS Modernization in the late 1990s. As demonstrated by the recent impacts of hazardous weather on the well being of our citizens and the growing dependence of important sectors of the national economy on weather information, improving federal weather services has become a national priority.

The Coalition appreciates that the Manager's Amendment recognizes that improvements in the federal weather services are dependent on the involvement and support of the entire national weather enterprise. The Coalition's members -- the academic and private sectors of the national weather enterprise -- have had and continue to have a good working relationship with NOAA, NASA, NSF, and other federal agencies and look forward to a closer working relationship in developing the various plans and programs required in the Amendment.

The Manager's Amendment highlights upfront the need to improve our understanding of how the public receives, interprets, and responds to warnings and forecasts (Section 2.b.2) so as to reduce or mitigate the impacts of hazardous weather events. This need has been documented in many of the NWS Service Assessment reports following major weather events as well as several National Research Council reports. These reports show that to reduce impacts of hazardous weather, many social science questions need to be addressed to improve the effectiveness of warnings and forecasts. The improvements in warnings and forecasts that are the goal of this legislation will require social scientists working hand-in-hand with meteorologists and engineers. However, the various programs laid out in the Amendment focus too narrowly on just improving forecasts versus reducing hazardous weather impacts. **The Weather Coalition urges the Committee to adjust the goals of these programs to one of reducing impacts.**

As mentioned in the Coalition's earlier input to staff, in several places the Amendment is overly prescriptive in both specifying the use of OSSE/OSE and in identifying priority areas of study (e.g., radio-occultation). There is a wide range of both new and traditional observing technologies, as well as data assimilation and numerical modeling systems that need to be evaluated to optimize support to forecast operations. **While the Coalition appreciates the intent, it strongly urges either the elimination of prescriptive language or further softening of this language to allow agency operational and research priorities – informed by broader community input -- to determine specific investigations regarding the value of any observing system.**

The Weather Coalition strongly supports the establishment of an Interagency Committee for Advancing Weather Services. This is an important step in recognizing that ***Weather is a National issue, not just a NOAA issue***.

Finally, while the Coalition recognizes the importance of providing authorized funding levels, it is concerned that the total proposed authorization level could impede significant progress. The Coalition believes the important task of technology transfer will be assisted with targeted funds to facilitate the transition but is unable to comment on the targeted amount.

Representatives of the Weather Coalition are available to discuss the Coalition's comments as you consider further action on this significant legislation --please contact one of the co-chairs listed below.

Thank you for this opportunity to comment on this important legislation.

Sincerely,

Raymond J. Ban
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c:
Dr. Kathryn D. Sullivan, Acting NOAA Administrator
Dr. Robert S. Detrick, Assistant Administrator, Oceanic and Atmospheric Research, NOAA
Dr. Louis W. Uccellini, Assistant Administrator, National Weather Service, NOAA
Dr. Mary E. Kicza, Assistant Administrator, NESDIS, NOAA

Letter submitted by Stein Sture,
Vice Chancellor for Research,
University of Colorado Boulder;

Susan Avery, President and Director,
Woods Hole Oceanographic Institution; and

Margaret Leinen,
Director, Scripps Institution of Oceanography,
Vice Chancellor, University of California-San Diego;

Lisa Graumlich, Dean of the College of the Environment
University of Washington

The Honorable Lamar Smith
Chairman
House Science, Space and Technology Committee
2321 Rayburn House Office Building
Washington, D.C. 20515

The Honorable Eddie Bernice Johnson
Ranking Member
House Science, Space and Technology Committee
394 Ford House Office Building
Washington, D.C. 20515

The Honorable Chris Stewart
House Science, Space and Technology Committee
2321 Rayburn House Office Building
Washington, D.C. 20515

The Honorable Suzanne Bonamici
House Science, Space and Technology Committee
394 Ford House Office Building
Washington, D.C. 20515

December 4, 2013

Dear Chairmen Smith and Stewart and Ranking Members Johnson and Bonamici:

As representatives of the research community and strong supporters of the National Oceanic and Atmospheric Administration (NOAA) Office of Oceanic and Atmospheric Research (OAR), we appreciate this opportunity to express our views on the bipartisan Manager's Amendment under consideration for H.R. 2413, *The Weather Forecasting Improvement Act of 2013*. We would also like to thank Environment Subcommittee Chairman Stewart and Ranking Member Bonamici for their bipartisan efforts to make improvements from the original version of this bill, including recognizing the importance of extramural research and highlighting the value of integrating social science knowledge with weather forecasting and warning processes.

Although we support the intention of this bill to improve weather forecasting, we are concerned that language in Sections 2 and 16 of the bill could be interpreted in such a way to prioritize weather-related research and funding over atmospheric, climate, and oceans research, which we believe would be counterproductive to the goals of the bill. While the recent tornadoes in Oklahoma, floods in Colorado, and Superstorm Sandy highlight the value of improving weather forecasting and prediction in order to reduce the loss of life and property, we know that these extreme events and other life-threatening weather are influenced by large-scale dynamics of the atmosphere and ocean. Improved forecasts require continued research, observations, and modeling of both the atmosphere and the oceans, and NOAA must therefore maintain a balanced portfolio that addresses all aspects of its complex environmental forecasting mission.

We are also concerned that language in Section 3(a) encourages NOAA OAR to shift its current focus from extreme events that develop and occur on a variety of time scales to a focus on short-term events. While "weather" refers to short-term (timescale of days to weeks) local variability in the atmosphere (e.g., temperature, humidity, wind), we know that long-term regional and global processes interact to create the weather we observe each day. OAR supports research across this suite of processes, from short-term weather forecasting to longer-term oceanic, atmospheric, and climate analyses, and models. In fact, the efficacy of NOAA's short-term weather forecasting abilities is heavily dependent on OAR's support of long-term sustained observations of the atmosphere and oceans, and the incorporation of these observations into forecast model initialization. We view any legislation that would shift the balance of NOAA OAR toward a short-term weather-centric set of priorities as detrimental to other similarly important interests that operate over longer time scales of months to years.

We have suggested modifications to each of these sections for your consideration in Attachment A.

Even in these fiscally constrained times, the nation must continue to invest in a balanced portfolio of weather, atmosphere, ocean, and climate research. Transformational advancements in weather and extreme event forecasting depends on an approach that leverages sustained long-term observations, improved global and regional models, and appropriate process studies; and capitalizes on both short- and long-term weather and climate forecasts to increase public safety and the nation's resiliency. As consideration of this bill continues, we hope that it will more clearly recognize these important linkages.

Thank you for you consideration of our views, and we look forward to working with the Committee as the bill progresses.

Sincerely,

Stein Sture
Vice Chancellor for Research
University of Colorado Boulder

Margaret Leinen
Director, Scripps Institution of Oceanography
Vice Chancellor, University of California-San Diego

Susan Avery
President and Director
Woods Hole Oceanographic Institution

Lisa Graumlich
Dean of the College of the Environment
University of Washington

Attachment A – Suggested Language Modifications

Section 2 of the bill, which calls for NOAA to "prioritize weather-related activities, including the provision of weather data, forecasts, and warnings for the protection of life and property and the enhancement of the national economy, in all relevant line offices," could lead to the interpretation that NOAA is being directed to prioritize weather above critical missions and programs. This would limit OAR's flexibility to fund some of the most important research that supports its many missions areas, from providing daily weather forecasts, severe storm warnings and climate monitoring, to ecosystem management, coastal restoration and support of marine commerce. If interpreted to prioritize weather-related activities over other areas of OAR, this provision could severely hinder OAR's long-term ability to ensure that our nation has the best observational tools and models not only in the present but also well into the future. We request the Committee consider:

- Modifying Line 7 in Section 2 to replace "…shall prioritize weather-related activities…" with "…shall engage in weather-related activities, including the atmospheric, climate and oceans research that supports these activities,…"
- Modifying Line 10 in Section 2 to replace "…in all relevant line offices" with "…in relevant line offices."

Section 3(a) of the bill outlines the program to be developed by NOAA that will provide more accurate, timely, and effective forecasts of high impact weather events. A number of weather and climate events, however, have seasonal impacts that occur over multiple years. Some droughts, for example, are slow onset, yet cause massive agricultural disruptions over huge regions of the country. As a result, it is imperative that the new NOAA program be defined as to include long-term weather and climate shifts and events. We request the Committee consider:

- Modifying Section 3(a) to read: "…forecasts of high impact weather events, including long-term weather and climate events and phenomena."

Section 7(2) of the bill, which addresses observation system planning, should include reference to current NOAA initiatives including the Integrated Ocean Observing System and the Global Ocean Observing System. We request the Committee consider:

- Modifying Section 7(2), Line 15 by adding "…and their cost-effectiveness, including as specifically related to the Integrated Ocean Observing System and the Global Ocean Observing System;"

Section 16 of the bill, which designates an amount of funding for weather-related research that must be drawn from "funds made available to operations, research, and facilities in OAR," implicitly prioritizes weather-related research, which in a constrained fiscal environment would result in a reduction of funding for other areas within OAR, including atmospheric, climate, and oceans research, all of which are of great economic and societal value. This redirection of resources within OAR would not only negatively impact the long-term balance of NOAA's research portfolio–which is developed in concert with the NOAA Scientific Advisory Board

(SAB) and external stakeholders–but would also have real negative impacts on NOAA programs supporting the nation's well-being now, including:

- Forecasting and improved understanding of interannual variability in the oceans, including El-Niño and La Niña events;
- Real-time sea level measurements used for tsunami warning systems;
- Sustained global ocean observing programs, which are essential for accurate weather forecasting of hurricanes and typhoons, and satellite calibration and validation;
- Critical Earth system modeling to improve sea-level rise predictions and bolster coastal resiliency efforts;
- Timely and accurate storm surge monitoring;
- Developing improved models of ocean acidification and its impacts on ocean chemistry and biological productivity;
- Provision of data for early drought warning systems used by water and resource managers in decision-making around the country; and
- Research on the roles of climate change and variability on extreme weather events, and other air quality–climate connections.

We request the Committee consider:

- Removing "out of funds made available for operations, research, and facilities in OAR" from Lines 15-16 in Section 16(a), Lines 8-9 in Section 16(b), and lines 20-22 in Section 16(c).

LETTER SUBMITTED BY THE ACSWA EXECUTIVE COMMITTEE

September 10, 2013

The Honorable Lamar Smith
The Honorable Eddie Bernice Johnson
US House of Representatives
Committee on Science, Space & Technology
Washington, DC 20515

Dear Chairman Smith and Ranking Member Johnson:

RE: Support for HR 2413, the ***Weather Forecast Improvement Act of 2013***

This letter comes from the Executive Committee of the American Commercial Space Weather Association (ACSWA) whose members are commercial space weather companies. We are writing to offer our endorsement and support for HR 2413.

We believe this legislation will benefit the country in that:

a) The bill encourages serious review of current and future investments in weather monitoring systems via OSSE's and OSE's, to ensure that tax-payer dollars are spent in the wisest manner, and with the resulting maximum impact on our ability to forecast severe weather, and;
b) The bill further strengthens the ability of commercial ventures to provide services that have previously been the domain of government agencies, such as remote sensing through the use of GPS-RO signals or hyper-spectral imaging from space, and;
c) As a result of enabling commercial firms to provide these services instead of government agencies, the bill will reduce the cost of these services to the budget;
d) Commercial firms will also accelerate the schedule within which these services can be provided, helping to reduce the well-publicized Weather Data Gap that will affect the country over the next several years.

The **American Commercial Space Weather Association** (ACSWA), founded in 2010, is an association of companies that promotes space weather risk mitigation for critical national infrastructure related to national daily life, economic strength, and national security. ACSWA, as an association and in conjunction with its member companies, is playing a vital role by identifying important data and technology gaps that can be filled by private or government actions and by developing value-added products and services for the benefit of human and property safety as well as for vibrant commerce, http://www.acswa.us.

As industry experts on space weather, we suggest that the term "Space Weather" needs to be included when making reference to "high impact weather events" that affect the people and commerce of the United States. Space weather impacts radio signals at all frequencies, including how Global Positioning System (GPS) signals satellites to receivers on the ground, in vehicles such as cars, boats, aircraft, etc.; and UHF radio signals that are transmitted by the DoD to communicate between the ground and satellites for warfighters. It can also produce large radiation doses that may affect airline crews and passengers. The greatest space weather threat facing the country is another *Carrington event* that could potentially cripple the national electrical grid. The problem of space weather is further compounded due to our current inability to adequately monitor and predict against these high impact and destructive events. There is a demonstrated need for improved monitoring and modeling of Space Weather.

As the ACSWA Executive Committee we would be pleased to answer any questions you might have about the American Commercial Space Weather Association and to increase the congressional understanding of Space Weather.

Respectfully,

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LETTER SUBMITTED BY GEOOPTICS

September 16, 2013

The Honorable Lamar Smith
U. S. House of Representatives
Washington, DC 20515

Dear Congressman:

RE: Please Support - H.R. 2413 - the Weather Forecasting Improvement Act of 2013

I am a 40 year Navy veteran (Vice Admiral, USN ret), then served as the Administrator of the National Oceanic and Atmospheric Administration (NOAA) from 2001 – 2007, and am currently CEO and Director of a satellite-based weather data company, GeoOptics. H.R.2413 emanates from a critical need to improve weather forecasting in the United States in response to severe weather events such as tornados and hurricanes, and other costly weather-impacted events.

As a former Administrator of NOAA, I strongly support a renewed emphasis on ensuring the necessary management policies and resources are directed toward improving our ability to forecast and warn in advance of severe weather events of all types from heat waves, floods, forest fires to hurricanes, tornados, and even nation-wide electric power outages caused by space weather initiated at the Sun. The U.S. economy, national security, and daily business demand in a competitive world that the U.S. be the leader in these critical areas. We need to support a renewed emphasis on a balance of research, observations, data gathering, modeling, high performance computing and communications to protect our economy and our people.

As the CEO of a satellite-based weather data company, I strongly support the provisions to require a commercial data buy component that will exert market influences to lower the current costs and development times resulting from the long practice of exclusive use of government developed, owned, and operated weather satellite systems. From my experiences as a DoD cost analyst, manager of the U.S. Navy program and budget, and NOAA executive, I am a strong advocate of competition to lower costs and improve value. After living with and studying the current weather satellite "business" model in government and the private sector, I am convinced that the addition of a commercial data buy component can achieve what to date has been elusive – firm management control over weather satellite costs, schedules, and performance.

Firm legislative direction to ensure an immediate place for commercial data buys of operational weather data will provide the opportunity to transition the current system to a more rational and logical path both for developing satellite technology and ensuring operational weather data continuity without the "theater" that accompanies every new generation of weather satellites.

With your support, the passage of H.R. 2413 can help NOAA save more lives; spur commercial investment in new technologies; and, bolster our economy by creating jobs and enhancing our citizens' quality of life affected by severe weather.

I can be contacted at 5673 Bend Creek Rd, Dunwoody, GA 30338 by mail or on my cell phone at 770-500-9031 if you should have any questions.

Thank you for your consideration.

Sincerely yours,

Conrad C. Lautenbacher, Jr. VADM USN ret.
CEO & Director, GeoOptics, Inc.

LETTER SUBMITTED BY PLANETIQ

PLANETIQ

CRITICAL DATA FOR A SMARTER PLANET

The Honorable Lamar Smith
Chairman
Committee on Science, Space and Technology
2321 Rayburn House Office Building
United States House of Representatives
Washington, D.C. 20515

The Honorable Eddie Bernice Johnson
Ranking Member
Committee on Science, Space and Technology
2468 Rayburn Office Building
United States House of Representatives
Washington, D.C. 20515

Dear Chairman Smith and Ranking Member Johnson:

As the Congressional calendar for 2013 draws to a close, I would like to applaud the progress made by the Science, Space and Technology Subcommittee on the Environment toward passage of the critically important Weather Forecasting Improvement Act and implore you to not let that progress fall prey to partisan divide that can grow with the passage of time. This bill should be scheduled at the earliest possible opportunity for a vote on the floor of the House of Representatives. As I'm sure you are aware the legislation in this Act is critical to the safety of Americans, the wellbeing of businesses nationwide, and the overall stability of the U.S. economy. The passage of this Act is also critically important to the future of the U.S. space industry.

After last year's catastrophic Hurricane Sandy, this year has brought the devastating EF5 tornado that destroyed much of Moore, Oklahoma, and the historic floods that washed out large swaths of Colorado's Front Range. Meanwhile, our nation's forecasting capabilities, already behind those of the Europeans, are on the verge of regressing just when we need them to get better, not worse. This is largely due to a decline in U.S. weather satellite coverage that is already underway and expected to get much worse, and an overall lack of resources devoted to weather forecasting activities.

Your committee has done a superb job of crafting legislation that places appropriate emphasis and resources on developing observational, computing and modeling capabilities that will deliver the required improvements in weather forecasting, especially in prediction of extreme events that pose the biggest risks to life and property. At a time when partisan issues have mired much of our nation's priority legislative initiatives, the Environmental Subcommittee has worked to develop legislation that all can agree will best serve our nation and protect our people and infrastructure.

Importantly, this legislation recognizes and nurtures the role of private industry in data collection and weather forecasting. U.S. companies stand ready to augment our national observing systems in a way that strengthens the global observing system, lowers government costs, and creates high-tech U.S. jobs. The engagement of private industry encouraged by this Act is crucial to maintaining and improving the accuracy of weather forecasts in the years and decades to come, and to establishing U.S. leadership in a new race to space.

Passage of the Weather Forecasting Improvement Act is imperative to our nation's safety and security, and will help better position the U.S. space industry to compete at home and abroad. I encourage you to put this legislation on a track that will capitalize on its current bipartisan support and ensure passage in the House of Representatives within the calendar year. If you have any questions regarding our support for this initiative, please do not hesitate to contact me directly at 240-285-1584, or by e-mail at amiglarese@planetiq.com.

Sincerely,

Anne Hale Miglarese
President & CEO
PlanetiQ

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