

113TH CONGRESS
2^D SESSION

H. R. 2413

IN THE SENATE OF THE UNITED STATES

APRIL 2, 2014

Received; read twice and referred to the Committee on Commerce, Science,
and Transportation

AN ACT

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.

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

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Weather Forecasting
5 Improvement Act of 2014”.

6 **SEC. 2. PUBLIC SAFETY PRIORITY.**

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

14 **SEC. 3. WEATHER RESEARCH AND FORECASTING INNOVA-**
15 **TION.**

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

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

1 (1) Improving the fundamental understanding
2 of weather consistent with section 2, including the
3 boundary layer and other atmospheric processes af-
4 fecting high impact weather events.

5 (2) Improving the understanding of how the
6 public receives, interprets, and responds to warnings
7 and forecasts of high impact weather events that en-
8 danger life and property.

9 (3) Research and development, and transfer of
10 knowledge, technologies, and applications to the
11 NWS and other appropriate agencies and entities,
12 including the American weather industry and aca-
13 demic partners, related to—

14 (A) advanced radar, radar networking
15 technologies, and other ground-based tech-
16 nologies, including those emphasizing rapid,
17 fine-scale sensing of the boundary layer and
18 lower troposphere, and the use of innovative,
19 dual-polarization, phased array technologies;

20 (B) aerial weather observing systems;

21 (C) high performance computing and infor-
22 mation technology and wireless communication
23 networks;

24 (D) advanced numerical weather prediction
25 systems and forecasting tools and techniques

1 that improve the forecasting of timing, track,
2 intensity, and severity of high impact weather,
3 including through—

4 (i) the development of more effective
5 mesoscale models;

6 (ii) more effective use of existing, and
7 the development of new, regional and na-
8 tional cloud-resolving models;

9 (iii) enhanced global weather models;

10 and

11 (iv) integrated assessment models;

12 (E) quantitative assessment tools for meas-
13 uring the impact and value of data and observ-
14 ing systems, including OSSEs (as described in
15 section 8), OSEs, and AOAs;

16 (F) atmospheric chemistry and interactions
17 essential to accurately characterizing atmos-
18 pheric composition and predicting meteorolog-
19 ical processes, including cloud microphysical,
20 precipitation, and atmospheric electrification
21 processes, to more effectively understand their
22 role in severe weather; and

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

1 (4) A technology transfer initiative, carried out
2 jointly and in coordination with the Assistant Ad-
3 ministrator for NWS, and in cooperation with the
4 American weather industry and academic partners,
5 to ensure continuous development and transition of
6 the latest scientific and technological advances into
7 NWS operations and to establish a process to sunset
8 outdated and expensive operational methods and
9 tools to enable cost-effective transfer of new methods
10 and tools into 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 (d) REPORT.—The Under Secretary shall transmit to
25 Congress annually, concurrently with NOAA’s budget re-

1 quest, a description of current and planned activities
2 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 listed 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 listed 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;

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

12 (E) prediction of storms that have the po-
13 tential to cause extreme precipitation and flood-
14 ing lasting from 6 hours to 1 week; and

15 (2) shall be conducted in cooperation with other
16 appropriate entities within NOAA, other Federal
17 agencies, the American weather industry, and aca-
18 demic partners to ensure the technical and scientific
19 merit of OSSE results.

20 (b) REQUIREMENTS.—OSSEs shall quantitatively—

21 (1) determine the potential impact of proposed
22 space-based, suborbital, and in situ observing sys-
23 tems on analyses and forecasts, including potential
24 impacts on extreme weather events across all parts
25 of the Nation;

1 (2) evaluate and compare observing system de-
2 sign options; and

3 (3) assess the relative capabilities and costs of
4 various observing systems and combinations of ob-
5 serving systems in providing data necessary to pro-
6 tect life and property.

7 (c) IMPLEMENTATION.—OSSEs—

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

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

16 (d) PRIORITY OSSES.—Not later than June 30, 2014,
17 the Assistant Administrator for OAR shall complete
18 OSSEs to assess the value of data from both Global Posi-
19 tioning System radio occultation and a geostationary
20 hyperspectral sounder global constellation.

21 (e) RESULTS.—Upon completion of all OSSEs, re-
22 sults shall be publicly released and accompanied by an as-
23 sessment of related private and public sector weather data
24 sourcing options, including their availability, affordability,
25 and cost effectiveness. Such assessments shall be devel-

1 oped in accordance with section 50503 of title 51, United
2 States Code.

3 **SEC. 9. COMPUTING RESOURCES PRIORITIZATION REPORT.**

4 Not later than 12 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 NWS, shall produce and make publicly available a report
9 that explains how NOAA intends to—

10 (1) aggressively pursue the newest, fastest, and
11 most cost effective high performance computing
12 technologies in support of its weather prediction mis-
13 sion;

14 (2) ensure a balance between the research re-
15 quirements to develop the next generation of re-
16 gional and global models and its highly reliable oper-
17 ational models;

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

24 (4) identify opportunities to reallocate existing
25 advanced computing resources from lower priority

1 uses to improve advanced research and operational
2 weather prediction; and

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

6 **SEC. 10. COMMERCIAL WEATHER DATA.**

7 (a) AMENDMENT.—Section 60161 of title 51, United
8 States Code, is amended by adding at the end the fol-
9 lowing: “This prohibition shall not extend to—

10 “(1) the purchase of weather data through con-
11 tracts with commercial providers; or

12 “(2) the placement of weather satellite instru-
13 ments on cohosted government or private payloads.”.

14 (b) STRATEGY.—

15 (1) IN GENERAL.—Not later than 6 months
16 after the date of enactment of this Act, the Sec-
17 retary of Commerce, in consultation with the Under
18 Secretary, shall transmit to the Committee on
19 Science, Space, and Technology of the House of
20 Representatives and the Committee on Commerce,
21 Science, and Transportation of the Senate a strategy
22 to enable the procurement of quality commercial
23 weather data. The strategy shall assess the range of
24 commercial opportunities, including public-private
25 partnerships, for obtaining both surface-based and

1 space-based weather observations. The strategy shall
2 include the expected cost effectiveness of these op-
3 portunities as well as provide a plan for procuring
4 data, including an expected implementation timeline,
5 from these nongovernmental sources, as appropriate.

6 (2) REQUIREMENTS.—The strategy shall in-
7 clude—

8 (A) an analysis of financial or other bene-
9 fits to, and risks associated with, acquiring
10 commercial weather data or services, including
11 through multiyear acquisition approaches;

12 (B) an identification of methods to address
13 planning, programming, budgeting, and execu-
14 tion challenges to such approaches, including—

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

17 (ii) how data may be acquired through
18 commercial experimental or innovative
19 techniques and then evaluated for integra-
20 tion into operational use;

21 (iii) how to guarantee public access to
22 all forecast-critical data to ensure that the
23 American weather industry and the public
24 continue to have access to information crit-
25 ical to their work; and

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

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

11 **SEC. 11. WEATHER RESEARCH AND INNOVATION ADVISORY**
12 **COMMITTEE.**

13 (a) ESTABLISHMENT.—The Under Secretary shall es-
14 tablish a Federal Advisory Committee to—

15 (1) provide advice for prioritizing weather re-
16 search initiatives at NOAA to produce real improve-
17 ment in weather forecasting;

18 (2) provide advice on existing or emerging tech-
19 nologies or techniques that can be found in private
20 industry or the research community that could be in-
21 corporated into forecasting at NWS to improve fore-
22 casting;

23 (3) identify opportunities to improve commu-
24 nications between weather forecasters, emergency
25 management personnel, and the public; and

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

4 (b) COMPOSITION.—

5 (1) IN GENERAL.—The Under Secretary shall
6 appoint leading experts and innovators from all rel-
7 evant fields of science and engineering that inform
8 meteorology, including atmospheric chemistry, at-
9 mospheric physics, hydrology, social science, risk
10 communications, electrical engineering, and com-
11 puter modeling.

12 (2) NUMBER.—The Advisory Committee shall
13 be composed of at least 12 members, with the chair
14 of the Advisory Committee chosen by the Under Sec-
15 retary from among the members.

16 (3) RESTRICTION.—The Under Secretary may
17 not appoint a majority of members who are employ-
18 ees of NOAA-funded research centers.

19 (c) ANNUAL REPORT.—The Advisory Committee
20 shall transmit annually to the Under Secretary a report
21 on progress made by NOAA in adopting the Advisory
22 Committee’s recommendations. The Under Secretary shall
23 transmit a copy of such report to the Committee on
24 Science, Space, and Technology of the House of Rep-

1 representatives and the Committee on Commerce, Science,
2 and Transportation of the Senate.

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

7 **SEC. 12. INTERAGENCY WEATHER RESEARCH AND INNOVA-**
8 **TION COORDINATION.**

9 (a) ESTABLISHMENT.—The Director of the Office of
10 Science and Technology Policy shall establish an Inter-
11 agency Committee for Advancing Weather Services to im-
12 prove coordination of relevant weather research and fore-
13 cast innovation activities across the Federal Government.
14 The Interagency Committee shall—

15 (1) include participation by the National Aero-
16 nautics and Space Administration, the Federal Avia-
17 tion Administration, NOAA and its constituent ele-
18 ments, the National Science Foundation, and such
19 other agencies involved in weather forecasting re-
20 search as the President determines are appropriate;

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

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

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

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

11 **SEC. 13. OAR AND NWS EXCHANGE PROGRAM.**

12 (a) IN GENERAL.—The Assistant Administrator for
13 OAR and the Assistant Administrator for NWS may es-
14 tablish a program to detail OAR personnel to the NWS
15 and NWS personnel to OAR.

16 (b) GOAL.—The goal of this program is to enhance
17 forecasting innovation through regular, direct interaction
18 between OAR’s world-class scientists and NWS’s oper-
19 ational staff.

20 (c) ELEMENTS.—The program shall allow up to 10
21 OAR staff and NWS staff to spend up to 1 year on detail.
22 Candidates shall be jointly selected by the Assistant Ad-
23 ministrators for OAR and the Assistant Administrator for
24 NWS.

1 (d) REPORT.—The Under Secretary shall report an-
2 nually to the Committee on Science, Space, and Tech-
3 nology of the House of Representatives and to the Com-
4 mittee on Commerce, Science, and Transportation of the
5 Senate on participation in such program and shall high-
6 light any innovations that come from this interaction.

7 **SEC. 14. VISITING FELLOWS AT NWS.**

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

12 (b) GOAL.—This program shall be designed to pro-
13 vide direct interaction between forecasters and talented
14 academic and private sector researchers in an effort to
15 bring innovation to forecasting tools and techniques avail-
16 able to the NWS.

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

20 **SEC. 15. DEFINITIONS.**

21 In this Act:

22 (1) AOA.—The term “AOA” means an Anal-
23 ysis of Alternatives.

1 (2) NESDIS.—The term “NESDIS” means
2 the National Environmental Satellite, Data, and In-
3 formation Service.

4 (3) NOAA.—The term “NOAA” means the Na-
5 tional Oceanic and Atmospheric Administration.

6 (4) NWS.—The term “NWS” means the Na-
7 tional Weather Service.

8 (5) OAR.—The term “OAR” means the Office
9 of Oceanic and Atmospheric Research.

10 (6) OSE.—The term “OSE” means an Observ-
11 ing System Experiment.

12 (7) OSSE.—The term “OSSE” means an Ob-
13 serving System Simulation Experiment.

14 (8) UNDER SECRETARY.—The term “Under
15 Secretary” means the Under Secretary of Commerce
16 for Oceans and Atmosphere.

17 **SEC. 16. AUTHORIZATION OF APPROPRIATIONS.**

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

20 (1) \$83,000,000 to OAR to carry out this Act,
21 of which—

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

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

1 (2) out of funds made available for research
2 and development in NWS, an additional amount of
3 \$14,000,000 for OAR to carry out the joint tech-
4 nology transfer initiative described in section
5 3(b)(4).

6 (b) ALTERNATIVE FUNDING FOR FISCAL YEAR
7 2014.—If the Budget Control Act of 2011 (Public Law
8 112–25) is repealed or replaced with an Act that increases
9 allocations, subsection (a) shall not apply, and there are
10 authorized to be appropriated for fiscal year 2014—

11 (1) \$96,500,000 to OAR to carry out this Act,
12 of which—

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

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

17 (2) out of funds made available for research
18 and development in NWS, an additional amount of
19 \$16,000,000 for OAR to carry out the joint tech-
20 nology transfer initiative described in section
21 3(b)(4).

22 (c) FISCAL YEARS 2015 THROUGH 2017.—For each
23 of fiscal years 2015 through 2017, there are authorized
24 to be appropriated—

1 (1) \$100,000,000 to OAR to carry out this Act,
2 of which—

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

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

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

10 (d) LIMITATION.—No additional funds are author-
11 ized to carry out this Act, and the amendments made by
12 this Act.

Passed the House of Representatives April 1, 2014.

Attest:

KAREN L. HAAS,

Clerk.