

113<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION

# H. R. 2413

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## 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:

*Clerk.*



113<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION

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## AN ACT

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