

**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-

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

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

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

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

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

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

23 (B) aerial weather observing systems;

24 (C) high performance computing and infor-
25 mation 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 administrator 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.”.

