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H. R. 1715

[Report No. 118-]

To direct the Department of Energy and the National Oceanic and Atmospheric Administration to conduct collaborative research in order to advance numerical weather and climate prediction in the United States, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MARCH 22, 2023

Mr. MILLER of Ohio (for himself and Ms. ROSS) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

APRIL --, 2023

Committed to the Committee of the Whole House on the State of the Union, and ordered to be printed

A BILL

To direct the Department of Energy and the National Oceanic and Atmospheric Administration to conduct collaborative research in order to advance numerical weather and climate prediction in the United States, 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 “Advanced Weather
5 Model Computing Development Act”.

6 **SEC. 2. DEFINITIONS.**

7 In this Act:

8 (1) DEPARTMENT.—The term “Department”
9 means the Department of Energy.

10 (2) NATIONAL LABORATORY.—The term “Na-
11 tional Laboratory” has the meaning given such term
12 in section 2 of the Energy Policy Act of 2005 (42
13 U.S.C. 15801).

14 (3) SECRETARY.—The term “Secretary” means
15 the Secretary of Energy.

16 (4) ADMINISTRATOR.—The term “Adminis-
17 trator” means the Administrator of the National
18 Oceanic and Atmospheric Administration.

19 **SEC. 3. DEPARTMENT OF ENERGY AND NATIONAL OCEANIC**
20 **AND ATMOSPHERIC ADMINISTRATION RE-**
21 **SEARCH AND DEVELOPMENT COORDINA-**
22 **TION.**

23 (a) IN GENERAL.—The Secretary and Administrator
24 shall carry out collaborative research and development ac-
25 tivities in artificial intelligence and high performance com-

1 putting focused on the advancement of climate models and
2 operational numerical weather prediction relevant to agen-
3 cy missions.

4 (b) MEMORANDUM OF UNDERSTANDING.—The Sec-
5 retary and Administrator shall carry out the activities
6 under subsection (a) through the establishment of a
7 memorandum of understanding, or other appropriate
8 interagency agreement. Such memorandum or agreement,
9 as the case may be, shall require the use of a competitive,
10 merit-reviewed process, which considers applications from
11 Federal agencies, National Laboratories, institutions of
12 higher education, nonprofit institutions, and other appro-
13 priate entities.

14 (c) ACTIVITIES.—In carrying out the activities under
15 subsection (a), the Secretary and Administrator may—

16 (1) conduct collaborative research to develop
17 new methods and optimization of modeling and sim-
18 ulation, machine learning, data assimilation, large
19 scale data analytics, and predictive analysis tech-
20 niques;

21 (2) explore options for performance portability
22 of the optimized weather model codes between the
23 operational computing systems of the National Ocea-
24 nic and Atmospheric Administration and the De-
25 partment's high performance computers;

1 (3) develop methods to accommodate large data
2 sets of weather and climate information;

3 (4) to the maximum extent practicable, and in
4 compliance with national security policies, promote
5 collaboration, open community-based development,
6 and data sharing between Federal agencies, National
7 Laboratories, institutions of higher education, non-
8 profit institutions, and other appropriate entities by
9 providing the necessary access and secure data
10 transfer capabilities; and

11 (5) support maintenance of and improvements
12 to scientific computing infrastructure that the Sec-
13 retary and Administrator determine appropriate.

14 (d) COORDINATION.—In carrying out the activities
15 under subsection (a), the Secretary and Administrator are
16 authorized to—

17 (1) carry out reimbursable agreements between
18 the Department, the National Oceanic and Atmos-
19 pheric Administration, and other entities in order to
20 maximize the effectiveness of research and develop-
21 ment; and

22 (2) collaborate with other Federal agencies as
23 appropriate.

24 (e) REPORT.—Not later than two years after the date
25 of the enactment of this Act, the Secretary and Adminis-

1 trator shall submit to the Committee on Science, Space,
2 and Technology of the House of Representatives, and the
3 Committee on Commerce, Science, and Transportation
4 and the Committee on Energy and Natural Resources of
5 the Senate, a report detailing the following:

6 (1) Interagency coordination between each Fed-
7 eral agency involved in the research and development
8 activities carried out under this section.

9 (2) Potential opportunities to expand the tech-
10 nical capabilities of the Department and the Na-
11 tional Oceanic and Atmospheric Administration.

12 (3) Collaborative research achievements.

13 (4) Areas of future mutually beneficial gains as
14 a result of the activities described in subsection (c).

15 (5) Continuation of coordination between the
16 Department and the National Oceanic and Atmos-
17 pheric Administration on activities described in sub-
18 section (c).

19 **SEC. 4. CLIMATE AND WEATHER PREDICTION ON HIGH**
20 **PERFORMANCE COMPUTERS INITIATIVE.**

21 (a) **IN GENERAL.**—The Administrator, in collabora-
22 tion with the Secretary, shall carry out an initiative, which
23 may leverage Department high performance computers or
24 expertise, to run advanced models in order to conduct
25 proof of concept scenarios in comparison with current

1 issued forecasts and models. The Secretary and Adminis-
2 trator shall carry out the initiative through a competitive,
3 merit-reviewed process, and consider applications from
4 Federal agencies, National Laboratories, institutions of
5 higher education, nonprofit institutions, and other appro-
6 priate entities.

7 (b) COMPONENTS.—In carrying out the initiative
8 under subsection (a), the Administrator shall prevent du-
9 plication and coordinate research efforts in artificial intel-
10 ligence, high performance computing, modeling and sim-
11 ulation, machine learning, data assimilation, large scale
12 data analytics, and predictive analysis across the Depart-
13 ment, and may—

14 (1) run real-time weather forecast scenarios to
15 conduct comparative research between National
16 Weather Service issued forecasts to forecasts devel-
17 oped through the use of operational models run on
18 high performance computers;

19 (2) share relevant modeling system and applica-
20 tions innovations developed through the initiative,
21 including Unified Forecast System-based applica-
22 tions, through community-based activities; and

23 (3) leverage related weather and climate efforts
24 and data from the National Science and Technology
25 Council, the Interagency Council for Advancing Me-

1 teorological Services, and other relevant interagency
2 entities.

3 (c) REPORT.—Not later than two years after the date
4 of the enactment of this Act, the Administrator shall sub-
5 mit to the Committee on Science, Space, and Technology
6 of the House of Representatives and the Committee on
7 Commerce, Science, and Transportation and the Com-
8 mittee on Energy and Natural Resources of the Senate
9 a report evaluating the following:

10 (1) The effectiveness of the initiative under sub-
11 section (a), including applied research discoveries,
12 and advanced modeling improvements achieved.

13 (2) Potential opportunities to expand the high
14 performance computing capabilities of the Depart-
15 ment and the National Oceanic and Atmospheric
16 Administration.

17 (d) SUNSET.—The authority under this section shall
18 terminate five years after the date of the enactment of
19 this section.

20 **SEC. 5. RESEARCH SECURITY.**

21 The activities authorized under this Act shall be ap-
22 plied in a manner consistent with subtitle D of title VI
23 of the Research and Development, Competition, and Inno-
24 vation Act (enacted as division B of the CHIPS Act of
25 2022 (Public Law 117–167; 42 U.S.C. 19231 et seq.)).