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119TH CONGRESS
1ST SESSION

H. R. 4141

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

JUNE 25, 2025

Mr. MILLER of Ohio (for himself and Mrs. FOUSHEE) introduced the following bill; which was referred to the Committee on Natural Resources, and in addition to the Committee on Science, Space, and Technology, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

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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.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Advanced Weather Model Computing Development Act''.

SEC. 2. COMPUTING RESEARCH INITIATIVE.

(a) IN GENERAL.—Section 108 of the Weather Research and Forecasting Innovation Act of 2017 (15 U.S.C. 8518) is amended by striking subsection (a)(3)(C) and all that follows through subsection (b)(7) and inserting the following:

''(b) ARTIFICIAL INTELLIGENCE INVESTMENTS.—The Under Secretary shall leverage artificial intelligence and machine learning technologies to facilitate, optimize, and further leverage advanced computing to accomplish critical missions of the National Oceanic and Atmospheric Administration.

''(c) CENTERS OF EXCELLENCE.—The Under Secretary may expand, and where applicable establish, centers of excellence to aid the adoption of next-generation artificial intelligence and machine learning enabled advanced computing capabilities. Each such center may carry out activities that include the following:

''(1) Leveraging robust public-private partnership models to provide access to training, experience, and long-term development of workforce and infrastructure.

''(2) Developing and optimizing tools, libraries, algorithms, data structures, and other supporting software necessary for specific applications on high performance computing systems.

''(3) Applying modern artificial intelligence, deep machine-learning, and advanced data analysis technologies to address current and future mission challenges.

''(4) To the maximum extent practicable, exploring quantum computing and related application partnerships with public, private, and academic entities to improve the accuracy and resolution of weather predictions.

''(d) MULTI-YEAR CONTRACTS.—The Under Secretary may enter into multi-year contracts in accordance with section 3903 of title 41, United States Code, and shall ensure compliance with all contract clauses provided in such section to support operations, research, and development related to high performance and cloud computing infrastructure or systems with an unfunded contingent liability in the event of cancellation.

''(e) REPORT.—

''(1) IN GENERAL.—Not later than two years after the date of the enactment of this subsection, the Under Secretary, in collaboration with the Secretary of Energy shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on

Energy and Natural Resources of the Senate a report evaluating the following:

"(A) A best estimate of the overall value of high-resolution probabilistic forecast guidance for hazardous weather or water events using a next-generation weather forecast and warning framework.

"(B) The needs for cloud computing, quantum computing, or high-performance computing, visualization, and dissemination collaboration between the Department of Energy and the National Oceanic and Atmospheric Administration.

"(C) A timeline and guidance for implementation of the following:

"(i) High-resolution numerical weather prediction models.

"(ii) Methods for meeting the cloud computing, quantum computing, or high-performance computing, visualization, and dissemination needs identified under subparagraph (b).

"(2) HAZARDOUS WEATHER OR WATER EVENTS DEFINED.—In this subsection, the term 'hazardous weather or water events' means weather or water

events that have a high risk of loss of life or property, including the following:

"(A) Severe storms, such as hurricanes and short-fused, small-scale hazardous weather or hydrologic events produced by thunderstorms, including large hail, damaging winds, tornadoes, and flash floods.

"(B) Winter storms, such as freezing or frozen precipitation (including freezing rain, sleet, and snow), or combined effects of freezing or frozen precipitation and strong winds.

"(C) Other weather hazards, such as extreme heat or cold, wildfire, drought, dense fog, high winds, and river, coastal, or lakeshore flooding.".

(b) STRATEGIC PLAN ON HIGH-PERFORMANCE COMPUTING AND DATA MANAGEMENT NEEDS.—

(1) IN GENERAL.—The Under Secretary shall make publicly available not later than one year after the date of the enactment of this Act, and update every five years thereafter until 2035, a 10-year strategic plan that outlines the high-performance computing and data management requirements and needs of the National Oceanic and Atmospheric Ad-

ministration and actions and strategies to address such requirements and needs.

(2) PLAN ELEMENTS.—At a minimum, the strategic plan required by paragraph (1) shall include the following:

(A) A 10-year prospective outlook of computing resources and upgrades needed to meet the mission needs of the National Oceanic and Atmospheric Administration for fisheries management, oceanographic forecasting, and ecological forecasting missions.

(B) A discussion of the following:

(i) Computing and processing resources of the Administration and a 10-year projected need for such resources, disaggregated by line office of the Administration.

(ii) Facilities, commercial contracts, and partnerships (with other Federal agencies or other institutions or entities) of the Administration that are providing computing and data management support or capacity as of such date.

(iii) The use by the Administration of cloud computing and other emerging tech-

nologies, such as artificial intelligence and machine learning.

(iv) Additional technologies that have the potential to increase effectiveness and efficiency for data storage and processing power, including challenges to access and use of such technologies.

(v) The distribution of computing resources among the operations and research functions of the Administration.

(vi) Products and services of the Administration that have not become available to the public because of a lack of computing resources.

(vii) Current and future workforce development needs, such as information technology and software engineering, of the Administration.

(viii) The high-performance computing requirements of the Administration, with a special focus on requirements that are common across line offices of the Administration.

(C) Timelines, and performance measures for assessing progress toward attaining goals for the following:

(i) Computing infrastructure and architecture of the Administration (including facilities, hardware, and software).

(ii) Use by the Administration of technologies that will increase effectiveness and efficiency for data storage and processing power, including challenges to access and use of such technologies.

(D) A 10-year life cycle analysis of the management of facilities, hardware, and engineering involved in the strategic plan that includes the following:

(i) Program formulation for project conception, implementation, and closure.

(ii) Technical infrastructure, products, processes, data, and personnel resources required to achieve defined cost, schedule, and performance objectives.

(E) If appropriate, a description of actions taken to implement the previous plan.

(3) PUBLIC INVOLVEMENT.—In developing the strategic plan required by paragraph (1), the Under

Secretary shall invite comments and other feedback from the public to inform the strategic plan.

(4) ANNUAL BRIEFINGS.—

(A) IN GENERAL.—Not later than one year after the date of the enactment of this Act and annually thereafter until 2030, the Under Secretary shall brief Congress on the progress made toward the objectives of the strategic plan required by paragraph (1).

(B) ELEMENTS.—Each briefing required by subparagraph (A) shall include the following:

(i) An evaluation of the progress made in implementing the strategic plan.

(ii) Such updates to the strategic plan as the Under Secretary considers appropriate.

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