118TH CONGRESS
2D SESSION
H. R. 9498

To direct the use of artificial intelligence by National Oceanic and Atmospheric Administration to adapt to extreme weather, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

SEPTEMBER 9, 2024

Mr. SCOTT FRANKLIN of Florida (for himself and Mr. MULLIN) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

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A BILL

To direct the use of artificial intelligence by National Oceanic and Atmospheric Administration to adapt to extreme weather, 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; TABLE OF CONTENTS.**

4   (a) SHORT TITLE.—This Act may be cited as the

5 "Transformational Artificial intelligence to Modernize the

6 Economy against Extreme Weather Act" or the "TAME

7 Extreme Weather Act".

8   (b) TABLE OF CONTENTS.—The table of contents for

9 this Act is as follows:

SEC. 2. DEFINITIONS.

In this Act:

(1) ADMINISTRATOR.—The term "Administrator" means the Administrator of the National Oceanic and Atmospheric Administration.

(2) ARTIFICIAL INTELLIGENCE.—

(A) IN GENERAL.—The term "artificial intelligence" means a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments, including by using machine-based and human-based inputs—

(i) to abstract such objectives into models through analysis in an automated manner; and

(ii) to use model inferences to generate information or formulate options for action.

1   (B) INCLUSIONS.—The term "artificial in-

2   telligence" includes machine learning, neural

3   networks, and natural language processing.

4   (3) ARTIFICIAL INTELLIGENCE WEATHER

5 MODEL.—The term "artificial intelligence weather

6 model" means a weather model based primarily on

7 artificial intelligence to project future Earth system

8 conditions based on machine learning from an Earth

9 system reanalysis dataset.

10   (4) CURATE.—The term "curate" means to col-

11 lect, maintain, and update periodically a dataset—

12   (A) to ensure and document its quality;

13   and

14   (B) to provide metadata on its provenance.

15   (5) NUMERICAL WEATHER MODEL.—The term

16 "numerical weather model" means a weather model

17 based primarily on coupled Earth system processes

18 and that uses numerical computation to forecast fu-

19 ture Earth system conditions.

20   (6) OBSERVATIONAL DATA.—The term "obser-

21 vational data" means data from actual observations

22 of environmental conditions, including remote sens-

23 ing and in situ platforms.

4

1   (7) OPEN LICENSE.—The term "open license"

2   has the meaning given that term in section 3502(21)

3   of title 44, United States Code.

4   (8) REFORECAST ANALYSIS.—The term "refore-

5   cast analysis" means the assessment of a numerical

6   weather model or artificial intelligence weather

7   model by comparing model output and observational

8   data over a period of time in the past.

9   (9) SYNTHETIC DATA.—The term "synthetic

10   data" means data produced from a model or statis-

11   tical method in order to fill gaps in observational

12   data.

13   (10) TRAINING DATASET.—The term "training

14   dataset" means a dataset used to train an artificial

15   intelligence model.

16   (11) WEATHER ENTERPRISE.—The term

17   "weather enterprise" has the meaning given such

18   term in section 2 of the Weather Research and

19   Forecasting Innovation Act of 2017 (15 U.S.C.

20   8501).

21   (12) WEATHER FORECASTING TRAINING

22   DATASET.—The term "weather forecasting training

23   dataset" means a dataset that contains continuous

24   global observational data and synthetic data for

25   Earth system variables relevant to weather fore-

1 casting, aviation weather, marine weather, and hy-
2 drology or water management, including data from
3 model reanalysis and forecasts initialized through a
4 data assimilation system.

SEC. 3. EARTH SYSTEM FORECASTING AND INFORMATION DELIVERY.

7 (a) IN GENERAL.—Not later than two years after the
8 date of the enactment of this Act, the Administrator, in
9 consultation with the Secretary of Energy, the Adminis-
10 trator of the National Aeronautics and Space Administra-
11 tion, the Director of the National Science Foundation, any
12 appropriate Federal Advisory Committee, and such other
13 technical experts as the Administrator considers appro-
14 priate, shall develop and curate comprehensive weather
15 forecasting training datasets with relevant Earth system
16 data, quality information, and metadata necessary for
17 weather forecasting dataset that develops a long-term
18 record of past weather in support of the following:

19 (1) Furthering the understanding of weather,
20 water, climate, and space weather modeling and
21 data.

22 (2) Advancing the science of weather fore-
23 casting, including seasonal and subseasonal fore-
24 casting.

1 (3) Developing artificial intelligence weather

2 forecasting applications.

3 (b) USE OF EXISTING DATASETS.—In order to speed

4 the development of the weather forecasting training

5 dataset required under subsection (a), the Administrator

6 shall assess, and to the greatest extent practicable build

7 on, existing weather forecasting training datasets of the

8 Federal Government.

9 (c) ARTIFICIAL INTELLIGENCE WEATHER MODEL.—

10 (1) IN GENERAL.—In carrying out this section,

11 the Administrator, in consultation with any appro-

12 priate Federal Advisory Committees, may develop

13 and test a global weather model based on artificial

14 intelligence, to be referred to as an "artificial intel-

15 ligence weather model".

16 (2) WEATHER READY NATION.—In coordination

17 with the activities carried out under paragraph (1),

18 the Administrator may explore using artificial intel-

19 ligence to enhance the dissemination of information

20 and evaluation of effectiveness for improved public

21 understanding, preparedness, and resilience.

22 (3) REPORTS.—Not later than two years after

23 the date of the enactment of this Act and not less

24 frequently than annually thereafter, the Adminis-

25 trator shall submit to the Committee on Commerce,

1 Science, and Transportation of the Senate and the
2 Committee on Science, Space, and Technology of the
3 House of Representatives a report on the activities
4 conducted under paragraph (1).

5 (d) COOPERATIVE INSTITUTES AND CONTRACTING
6 AUTHORITY.—In carrying out this section, subject to the
7 availability of appropriations, the Administrator may com-
8 petitively award contracts and funding opportunities, in-
9 crease the scope of existing cooperative institutes of the
10 National Oceanic and Atmospheric Administration, or
11 competitively award a new cooperative institute.

12 (e) ENVIRONMENTAL IMPACT.—The Administrator
13 shall develop and disseminate best practices to minimize
14 environmental impacts from the use of artificial intel-
15 ligence to carry out this section.

16 (f) CONTINUED SUPPORT FOR OBSERVATIONS, BASIC
17 RESEARCH, AND NUMERICAL WEATHER MODELS.—Not-
18 withstanding the requirements of this section, the Admin-
19 istrator shall continue to support and advance the activi-
20 ties of the National Oceanic and Atmospheric Administra-
21 tion carry out the following:

22   (1) Collect and acquire traditional and novel ob-
23   servational data relevant for artificial intelligence
24   and numerical weather models.

1   (2) Advance research on the Earth system and

2 numerical weather models.

3   (3) Develop and advance numerical Earth sys-

4 tem modeling for predictions.

5   (4) Develop weather model data post-processing

6 techniques.

7   (5) Improve data assimilation techniques.

8 **SEC. 4. ADVANCED ARTIFICIAL INTELLIGENCE APPLICA-**

9   **TIONS FOR WEATHER AND INFORMATION DE-**

10   **LIVERY.**

11   The Administrator shall explore advanced applica-

12 tions of artificial intelligence to improve weather forecasts

13 and information delivery, such as by carrying out the fol-

14 lowing:

15   (1) Improving data assimilation techniques.

16   (2) Using artificial intelligence weather models

17   to quickly emulate running numerical weather mod-

18   els to assess and improve the confidence in and reli-

19   ability of weather forecasts and information delivery.

20   (3) Improving impact-based decision support to

21   diverse users and communities for greater societal

22   benefits based on weather forecasts.

SEC. 5. TECHNICAL ASSISTANCE ON USE OF ARTIFICIAL IN-

TELLIGENCE WEATHER MODELS.

(a) IN GENERAL.—The Administrator shall regularly inventory and assess major non-Federal Government artificial intelligence weather models in order to provide the following:

(1) Technical evaluation and assistance on using such models.

(2) Best practices on providing forecasts based on outputs from both artificial intelligence weather models and numerical weather models, or a combination thereof.

(3) Support for forecasters and social scientists to test and evaluate the use and effectiveness of artificial intelligence models, including within National Oceanic and Atmospheric Administration testbeds.

(4) Support for emergency managers to make operational decisions based on outputs from both artificial intelligence weather models and numerical weather models, or a combination thereof.

(b) REFORECAST ANALYSIS.—

(1) IN GENERAL.—The Administrator shall support the development of a common framework for the assessment of numerical weather models and artificial intelligence weather models through refore-

1 cast analysis and related methodologies as the Ad-

2 ministrator considers appropriate.

3   (2) BEST PRACTICES.—In carrying out this

4 subsection, the Administrator may develop and dis-

5 seminate best practices in collaboration with the fol-

6 lowing:

7   (A) The National Institute for Standards

8   and Technology.

9   (B) The National Aeronautics and Space

10   Administration.

11   (C) The National Science Foundation.

12   (D) The Department of Energy.

13   (E) Academic and research institutions.

14   (F) The private sector.

15   (3) REPORT ON USE OF ANALYSIS TO IMPROVE

16 MODELS.—Not later than one year after the date of

17 the enactment of this Act, the Administrator shall

18 submit to the Committee on Commerce, Science, and

19 Transportation of the Senate and the Committee on

20 Science, Space, and Technology of the House of

21 Representatives a report on the feasibility of using

22 reforecast analysis techniques to improve seasonal

23 and subseasonal models.

24 (c) WEATHER FORECAST OFFICES.—In carrying out

25 this section, the Administrator shall provide technical as-

1 sistance, best practices, and support required under sub-

2 section (a) through weather forecast offices of the Na-

3 tional Oceanic and Atmospheric Administration.

4 (d) INDEPENDENT STUDY ON THE IMPACTS OF ARTI-

5 FICIAL INTELLIGENCE WEATHER, WATER, CLIMATE, AND

6 SPACE WEATHER MODELS.—The Administrator may

7 enter into an agreement with the National Academy of

8 Sciences or any other entity determined appropriate by the

9 Administrator to assess the impacts of artificial intel-

10 ligence weather models on the weather enterprise and

11 make recommendations to improve the integration of such

12 models in operational forecasting.

13 **SEC. 6. FIRE ENVIRONMENT MODELING PROGRAM.**

14 (a) IN GENERAL.—Not later than one year after the

15 date of the enactment of this Act, the Administrator, in

16 coordination with the Secretary of the Interior, the Sec-

17 retary of Agriculture, and the Secretary of Homeland Se-

18 curity, and in consultation with the Administrator of the

19 National Aeronautics and Space Administration, the Sec-

20 retary of Energy, the Director of the National Science

21 Foundation, any appropriate Federal Advisory Commit-

22 tees, and such other technical experts as the Adminis-

23 trator considers appropriate, shall develop a program to

24 use artificial intelligence to analyze available observational

1 data and synthetic data on the built and natural environ-

2 ments in order to carry out the following:

3   (1) Warn at-risk communities, firefighters, and

4   other responders, including by integrating social

5   science informed research and development.

6   (2) Predict and detect wildfires to the max-

7   imum extent practicable.

8   (3) Forecast wildland and built environment

9   fire propagation and potential impacts based on an

10   analysis of the elements influencing fire behavior,

11   weather conditions, terrain, and observations of the

12   fire environment.

13   (4) Detect, monitor, and forecast smoke and

14   other hazards associated with wildfires.

15 (b) TRAINING DATASET.—In carrying out this sec-

16 tion, the Administrator may acquire observational data

17 and synthetic data on the built and natural environments

18 collected across the United States to develop and curate

19 a related artificial intelligence-ready training dataset for

20 purposes of training the artificial intelligence used in fur-

21 therance of this section.

22 (c) DATA ACQUISITION.—In carrying out this section,

23 the Administrator may enter into contracts to acquire rel-

24 evant data referred to in this section.

1   (d) WEATHER INTEGRATION.—In carrying out this
2 section, the Administrator shall integrate outputs from
3 weather and other environmental models and observational
4 data and synthetic data referred to in subsection (a).

5   (e) ENVIRONMENTAL IMPACT.—The Administrator
6 shall develop and disseminate best practices to minimize
7 environmental impacts from the use of artificial intel-
8 ligence to carry out this section.

9 **SEC. 7. EMISSIONS MONITORING AND ANALYSIS PROGRAM.**

10   (a) IN GENERAL.—Not later than one year after the
11 date of the enactment of this Act, the Administrator, in
12 consultation with the Administrator of the Environmental
13 Protection Agency, the Administrator of the National Aer-
14 onautics and Space Administration, the Secretary of En-
15 ergy, the Director of the National Science Foundation,
16 any appropriate Federal Advisory Committees, and such
17 other technical experts as the Administrator considers ap-
18 propriate, shall develop a program to use artificial intel-
19 ligence to analyze global atmospheric observations in order
20 to carry out the following:

21   (1) Improve atmospheric transport, dispersion,
22   and atmospheric chemistry models.

23   (2) Improve prediction and modeling of green-
24   house gas emissions from data collected through the
25   National Oceanic and Atmospheric Administration's

1 Global Greenhouse Gas Reference Network, the En-
2 vironmental Protection Agency's Greenhouse Gas In-
3 ventory, and other voluntary reporting datasets.

4 (3) Detect, monitor, and forecast emissions
5 from wildfires and other natural disasters.

6 (4) Identify significant changes in global emis-
7 sions of greenhouse gases and other pollutants.

8 (5) Improve data assimilation techniques.

9 (b) TRAINING DATASET.—In carrying out this sec-
10 tion, the Administrator may acquire observational data
11 and synthetic data on the atmosphere and its chemical
12 components to develop, curate, and regularly update a
13 global atmospheric chemistry training dataset for pur-
14 poses of training artificial intelligence used in furtherance
15 of this section.

16 (d) DATA ACQUISITION.—In carrying out this sec-
17 tion, the Administrator may enter into contracts to ac-
18 quire relevant data referred to in this section.

19 (c) ENVIRONMENTAL IMPACT.—The Administrator
20 shall develop and disseminate best practices to minimize
21 environmental impacts from the use of artificial intel-
22 ligence to carry out this section.

SEC. 8. PARTNERSHIPS FOR TRANSFORMATIONAL INNOVA-

  TION.

(a) IN GENERAL.—The Administrator shall explore novel structures for partnerships with private entities and academic entities for transformative innovation in weather forecasting and other environmental forecasts in order to carry out the following:

  (1) Further the understanding of weather, water, climate, and space weather, and associated societal impact.

  (2) Advance the science of weather and water forecasting, including seasonal and subseasonal forecasting.

  (3) Develop, evaluate, and transition artificial intelligence weather, water, and hazard forecasting applications for operations.

(b) CO-INVESTMENT.—In carrying out this section, subject to applicable law, the Administrator shall consider and adopt novel co-investment strategies with the private sector and academic sector, including the following:

  (1) Non-Federal Government contributions to resource and support high-risk, high-return research and development in environmental forecasting, data science, artificial intelligence, and related fields.

1 (2) Shared rights to intellectual property from
2 research and development activities under this sec-
3 tion.

4 (3) Other approaches to sharing resources and
5 results under this section.

6 **SEC. 9. FEDERAL GOVERNMENT WORKFORCE EXPERTISE.**

7 (a) IN GENERAL.—The Administrator, to the max-
8 imum extent practicable, shall develop, recruit, and sus-
9 tain a professional and diverse workforce for weather fore-
10 casting applications of artificial intelligence.

11 (b) COLLABORATION.—The Administrator shall le-
12 verage robust public-private partnership models to collabo-
13 rate with private sector experts and provide employees
14 with access to training, experience, and long-term develop-
15 ment of workforce and infrastructure in order to utilize
16 artificial intelligence to improve weather forecasts.

17 **SEC. 10. DATA ACCESS.**

18 (a) IN GENERAL.—The Administrator may make
19 available to the public, as the Administrator determines
20 appropriate, at no cost and with no restrictions on copy-
21 ing, publishing, distributing, citing, adapting, or otherwise
22 using under an open license, any data or code developed
23 under this Act.

24 (b) ACCOMMODATIONS.—The Administrator may
25 make such accommodations as the Administrator con-

1 siders appropriate to ensure that the public release of any

2 model, information, documentation, or data pursuant to

3 this Act does not jeopardize any of the following:

4   (1) National security.

5   (2) Intellectual property or redistribution

6   rights, including under titles 17 and 35, United

7   States Code.

8   (3) Any trade secret or commercial or financial

9   information subject to section 552(b)(4) of title 5,

10 United States Code.

11   (4) Any models or data that are otherwise re-

12 stricted by contract or other written agreement.

13   (5) The mission of the National Oceanic and

14 Atmospheric Administration to protect lives and

15 property.

16 (c) RULE OF CONSTRUCTION.—Nothing in this Act

17 may be construed to supersede any other provision of law

18 governing the protection of the national security interests

19 of the United States.

○