



## SUBCOMMITTEE ON ENVIRONMENT

### HEARING CHARTER

#### *“Reauthorizing the Weather Act: Data and Innovation for Predictions”*

**Tuesday, March 28, 2023**

**10:00 a.m.**

**2318 Rayburn House Office Building**

#### **Purpose**

The purpose of the hearing is to examine improvements in the fields of weather modeling and forecasting. This hearing will have testimony from leading private sector companies in the U.S. Weather Enterprise on the data and services they can provide to benefit the National Oceanic and Atmospheric Administration. This will be the first hearing in a series that looks at legislation to reauthorize the Weather Research and Forecasting Innovation Act of 2017.

#### **Witnesses**

- **Mr. Richard Jenkins**, Founder & CEO, Saildrone Inc.
- **Ms. Meredith Bell**, Atmospheric Program Manager, FLYHT Inc.
- **Dr. Antonio J. Busalacchi Jr.**, President, University Corporation for Atmospheric Research.
- **Mr. Michael Eilts**, General Manager for Weather and Earth Intelligence, Spire Global.

#### **Overarching Questions**

- How has the Weather Research and Forecasting Innovation Act of 2017 advanced the United States’ weather prediction, modeling, and forecasting capabilities? Where does the U.S. currently stand globally?
- What types of public-private partnerships result in models and forecasts that best protect lives and property?
- Has NOAA fully utilized the tools, data, and services that the private sector offers to improve federal forecasts and models? Has NOAA enabled the participation of a diverse set of partners?

## Background

### Legislative History

The Weather Research and Forecasting Innovation Act of 2017 (Public Law 115-25), known simply as the Weather Act, was signed into law in April 2017, capping a bipartisan, bicameral legislative effort that began in 2013 in the House Science Committee.<sup>1</sup> It was widely viewed as the first comprehensive weather authorization since the National Oceanic and Atmospheric Administration Authorization Act of 1992.<sup>2</sup>

The main goals of the Weather Act were to improve NOAA's weather research through investments in observational, computing, and modeling capabilities; to support improvement in weather forecasting and prediction of high impact weather events; and to expand commercial opportunities for the provision of weather data. Many sections of the bill were inspired by recommendations from reports authored by experts in the U.S. weather enterprise, including a National Academy of Sciences report published in 2012 entitled *Weather Services for the Nation: Becoming Second to None*<sup>3</sup> and a National Academy of Public Administration report published in 2013 entitled *Forecast for the Future: Assuring the Capacity of the National Weather Service*.<sup>4</sup>

Recognizing the immediate and impactful advances in the accuracy and timeliness of weather forecasting that the Weather Act prompted, the National Integrated Drought Information System (NIDIS) Reauthorization Act of 2018 (Public Law 115-423) was signed into law just two years later in January 2019.<sup>5</sup> The bipartisan NIDIS Reauthorization Act extended authorizations and improved several key programs from the Weather Act. Some of the programs, such as the agriculture weather provisions and NOAA's Office of Oceanic and Atmospheric Research, were extended with gradual increases in authorization of appropriations until FY 2023. Other provisions, like NOAA Computing Resources, were simply updated with revised focus based on stakeholder and community feedback since the signing of the Weather Act.

### Commercial Weather Data

One of the most significant provisions in the Weather Act, and extended in the NIDIS Reauthorization Act, was language that formally codified a commercial weather data program at NOAA that incorporates private sources of satellite-based data into the nation's weather forecasting system. Now known as the Commercial Weather Data Pilot Program (CWDP),

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<sup>1</sup> P.L. 115-25

<sup>2</sup> P.L. 102-567

<sup>3</sup> National Research Council, *Weather Services for the Nation: Becoming Second to None*, THE NATIONAL ACADEMIES PRESS (2012), <https://doi.org/10.17226/13429>.

<sup>4</sup> National Academy of Public Administration, *Forecast for the Future: Assuring the Capacity of the National Weather Service*, NAPA (2013), <https://www.weather.gov/media/ooe/ForecastfortheFuture-AssuringtheCapacityoftheNationalWeatherService.pdf>.

<sup>5</sup> P.L. 115-423

NOAA was required within three years to pilot incorporating private sources of data into the National Weather Service's operational weather models and forecasts.<sup>6</sup>

In Round 1 of the CWDP (2016 to 2018), NOAA awarded contracts to GeoOptics and Spire Global.<sup>7</sup> However, GeoOptics did not have satellites in orbit in time to deliver any data and Spire only partially succeeded in delivering data to meet their contract deliverables. Based on this result, NOAA concluded that the commercial sector was not yet able to provide the quality and quantity of radio occultation data required for use in operational weather forecasting.<sup>8</sup> However, it showed potential and, as capabilities grew, further examination was warranted.

In Round 2 of the CWDP (2018 to 2019), NOAA awarded contracts to three vendors — GeoOptics, Spire Global, and PlanetiQ.<sup>9</sup> GeoOptics and Spire delivered data to fulfill their contract requirements. PlanetiQ did not launch their first satellite in time to deliver any data. Based on the results of the technical evaluation of data provided by these two vendors in the CWDP Round 2 Pilot, NOAA concluded that the commercial sector was now capable of providing the quality of data needed to help support NOAA's operational weather forecasting needs.<sup>10</sup>

As a result, NOAA proceeded with plans to acquire commercial radio occultation data for operational use and continues to do so today. Currently NOAA's Commercial Data Program successfully engages with the commercial sector through pilots and acquisition of operational satellite data-as-a-service to help improve weather forecasts and provide risk reduction to the overall observing system. The program includes two lines of effort: Commercial Weather Data Pilot demonstrations of the quality and impact of commercial data on weather forecast models; and Commercial Data Purchase in support of operational weather forecasting.<sup>11</sup>

NOAA is currently soliciting information on existing or planned commercial satellite environmental data and related capabilities that will be available in the FY 2023 through FY 2030 timeframe, and that may help NOAA meet its diverse mission objectives.<sup>12</sup> NOAA is interested in commercially-provided data and related capabilities to augment capabilities in the

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<sup>6</sup> *Supra* note 1.

<sup>7</sup> National Oceanic and Atmospheric Administration, *NOAA Awards Commercial Weather Data Pilot Contracts*, COMMERCE.GOV (Sep. 15, 2016), <https://www.space.commerce.gov/noaa-awards-commercial-weather-data-pilot-contracts/>.

<sup>8</sup> National Oceanic and Atmospheric Administration, *Commercial Weather Data Pilot (CWDP) Round 2 Summary*, COMMERCE.GOV (Jun. 2020), <https://www.space.commerce.gov/wp-content/uploads/2020-06-cwdp-round-2-summary.pdf>.

<sup>9</sup> National Oceanic and Atmospheric Administration, *NOAA Awards Commercial Weather Data Pilot Round 2 Contracts*, COMMERCE.GOV (Sep. 17, 2018), <https://www.space.commerce.gov/noaa-awards-commercial-weather-data-pilot-round2-contracts/>.

<sup>10</sup> *Supra* note 8.

<sup>11</sup> National Oceanic and Atmospheric Administration, *Business with NOAA: Commercial Data Program*, COMMERCE.GOV, <https://www.space.commerce.gov/business-with-noaa/commercial-weather-data-pilot-cwdp/> (last visited Mar. 20, 2023).

<sup>12</sup> National Oceanic and Atmospheric Administration, *Request for Information: NOAA Commercial Satellite Data (Including Weather and Space Environmental Data)*, NOAA-2022-OSAAP-GRFI (Sep. 15, 2022), <https://sam.gov/opp/415104c5fcdd40bfbe5cd5cd27e9c7ee/view>.

areas of Atmosphere; Cryosphere; Land and Surface Hydrology; Oceans, Freshwater, and Coasts; and Space.

### Forecasting Innovations

In addition to data, the private sector can also provide instruments, tools, and technology that increase the accuracy and timeliness of weather predictions. One established avenue for this is the Earth Prediction Innovation Center (EPIC) authorized by the NIDIS Reauthorization Act. EPIC is a facilitating organization to improve operational weather and climate forecast systems through scientific and technical innovation via model co-development with government, industry, and academia.<sup>13</sup>

EPIC will improve the global weather element of the Unified Forecast System (UFS), advancing global 7-10 day weather forecasts by incorporating contributions from the external research and modeling community.<sup>14</sup> EPIC will also invite partnerships with other agencies, academia, industry, and the international community and support a user-friendly, well-supported modeling code base from which innovation can flourish. Simply put: EPIC is a one stop shop for public-private collaborations that improve weather models and forecasts.

Another example of private sector innovation is the development of uncrewed systems. Rather than create their own systems from scratch, NOAA's Uncrewed Systems Research Transition Office is supporting collaborations with the private sector, academia, state governments, and other Federal Agencies in testing and development of technologies to better understand the composition of the atmosphere, monitor and manage protected resources such as marine mammals, improve forecasting of severe weather, and better understand the climate.<sup>15</sup>

One partner in these efforts is Sairdrone, which is a world leader in providing ocean data solutions with autonomous surface vehicles, collecting data that provides intelligence for climate, mapping, and maritime security applications. Sairdrone recently received 5 of 9 newly announced awards through NOAA's Office of Marine and Aviation Operations to expand uncrewed systems applications for NOAA missions.<sup>16</sup> These awards will contribute to a range of data collection, from seafloor mapping to observing conditions within active hurricanes.

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<sup>13</sup> National Oceanic and Atmospheric Administration, *EPIC: Who We Are*, NOAA.GOV, <https://epic.noaa.gov/who-we-are/> (last visited Mar. 20, 2023).

<sup>14</sup> National Oceanic and Atmospheric Administration, *EPIC Program Details*, NOAA.GOV, <https://epic.noaa.gov/about-epic/epic-program-details/> (last visited Mar. 20, 2023).

<sup>15</sup> National Oceanic and Atmospheric Administration, *Uncrewed Systems Research Transition Office: Overview*, NOAA.GOV, <https://uxsrto.research.noaa.gov/About/Overview> (last visited Mar. 20, 2023).

<sup>16</sup> National Oceanic and Atmospheric Administration, *NOAA announces \$7.5 million in uncrewed marine system public-private partnerships*, NOAA.GOV (Mar. 9, 2023), <https://www.oma.noaa.gov/oma/news-media/article/noaa-announces-75-million-uncrewed-marine-system-public-private-partnerships>.