Statement of

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"Reauthorizing the Weather Act: Data and Innovation for Predictions"

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INTRODUCTION:

Thank you, Chairman Miller, Ranking Member Ross, and Members of the Environment Subcommittee, for providing me an opportunity to testify today and discuss how the U.S. commercial sector is building, developing, and operating transformative capabilities to collect environmental data that can increase mission effectiveness of Federal agencies – including the National Oceanic and Atmospheric Administration (NOAA).

My name is Richard Jenkins and I am the Founder and Chief Executive Officer of Saildrone, a U.S. company based in Alameda, California, with locations in St. Petersburg, Florida, Fall River, Massachusetts, and Washington, DC. Saildrone is the world leader in providing ocean data solutions with autonomous uncrewed surface vehicles, offering unrivaled payload, range, and reliability. Saildrone uncrewed surface vehicles (USVs) have sailed more than 900,000 nautical miles and spent more than 23,000 days at sea collecting data in support of weather, climate, mapping, and maritime security applications, among others.

Saildrone USVs are: (1) primarily renewable powered, harvesting wind and solar energy for propulsion and power, respectively; (2) scalable in size, ranging from 23 – 65 feet; and (3) purpose-built for different applications, including meteorological and oceanographic data collection, ocean mapping, and maritime domain awareness. Saildrone currently employs more than 200 people and has ongoing global operations supporting missions with NOAA, the U.S. Geological Survey, the U.S. Coast Guard, Customs and Border Protection, the National Geospatial-Intelligence Agency, and the U.S. Navy.

CONTEXT:

Oceans cover over 71 percent of Earth and represent a key domain that impacts nearly every component of the global economy, from food production to weather patterns to energy production to transportation of goods and many, many more. Put simply, Earth is a maritime planet, and the United States is a maritime-dependent nation. However, despite our inextricable dependence on the global ocean system, the Earth's oceans — and even more specifically the United States Exclusive Economic Zone — remain largely unobserved, unexplored, and unsurveyed. This is largely attributable to the fact that collecting data from the ocean is costly and that the ocean is a physically harsh, immensely dangerous, and logistically complex environment in which to operate.

Traditional means of ocean observing have relied upon a combination of remote sensing (e.g., satellites) and *in-situ* (e.g., ships and buoys) environmental monitoring technologies to monitor the oceans. While these capabilities are valuable in their own right — satellites provide the macro picture and ships and buoys are the foundation of oceanography — time has proven that these capabilities alone can't be efficiently scaled, operated, and maintained to meet the challenge of monitoring the ocean surface domain at the temporal and spatial resolution necessary.

From a weather prediction perspective, the importance of the oceans cannot be understated. The top 100 meters of the world's oceans have 40 times the heat capacity of the entire atmosphere, and it is now widely understood that the energy exchanges that occur at the ocean air-sea interface are a key driver of global weather patterns, including hurricanes, the El Niño-Southern Oscillation, atmospheric rivers, etc. As such, any efforts focused toward improving weather prediction capabilities, particularly seasonal-to-subseasonal forecasts and

hurricane forecasts, must consider ways to observe the surface ocean domain better and more efficiently.

COMMERCIAL INNOVATION:

In response to this challenge, the commercial sector is developing and providing cost-efficient, alternative technologies to enable better observation of the surface ocean domain. One such example is Saildrone's uncrewed surface vehicle (USV) technology, which represents a paradigm shift in the ease, efficiency, and cost of ocean monitoring, by performing many of the same jobs as traditional assets, with the same cutting-edge hardware and sensors, but at a fraction of the cost and carbon footprint.

Until recently, the ability of the government to test, adopt, and integrate new observing technologies was made difficult due to the initial large capital expense required to acquire and ready the asset before really providing any value. In contrast, Saildrone USVs are provided as-a-service and do not need to be purchased. Our USVs are piloted and maintained by Saildrone, thereby shifting the burden of operation and risk to the private sector, while the U.S. government customer has direct access to and secure control over the data flow coming off the vehicle. In getting the private sector to pay for the expensive infrastructure and shoulder the operational risk, this type of public-private partnership framework provides great opportunity and value to the government and agencies like NOAA.

Saildrone has been partnering with NOAA since 2014, via "mission-as-a-service" and "data-as-a-service" arrangements, to use Saildrone's USVs to both augment and supplement NOAA's traditional ocean data collection platforms and support operational requirements across all NOAA mission areas. A few notable examples follow.

In both 2021 and 2022, NOAA's Office of Oceanic and Atmospheric Research worked with Saildrone to use USVs to monitor hurricanes at sea, as part of a larger NOAA endeavor to better understand hurricane intensification. This work is important because while the accuracy of hurricane track forecasts has steadily increased since 1990, hurricane intensity forecasts have seen significantly less improvement overall since 1990. Moreover, recent research has found that hurricane intensification rates near the U.S. Atlantic coast have increased significantly over the last 40 years and will likely continue to increase in the future. A look at the statistics of major landfalling hurricanes in the last half-century tells this story in much starker terms: in the last 50 years nine category four and five hurricanes have hit the U.S., with six of those, or 66 percent, making landfall in the last five years.

We specially modified our 23-foot Explorer class USV for the NOAA hurricane mission to be able to withstand the extreme conditions that occur during a hurricane. This enabled Saildrone USVs to sail within miles of the eyewalls of two category 4 hurricanes, Hurricane Sam in 2021 and Hurricane Fiona in 2022. Battling massive waves and winds over 100 mph, the USVs sent back live video footage and real-time meteorological and oceanographic observations from inside the eyes of the storms, providing novel supplementary observations that previously were impossible to collect. This was a world-first for an uncrewed platform. In 2022 alone, five of the seven USVs deployed measured at least tropical storm force winds, and two vehicles transited through or near the eyes of hurricanes.

Similarly, in 2022 Saildrone worked with NOAA's National Data Buoy Center to use two USVs to collect operational meteorological and oceanographic data from two buoy stations in the central Gulf of Mexico, which had operated in the same location for almost fifty years. The pair of Saildrone USVs successfully executed their 90-day missions, collecting data from

Augustto November that was shared in near real-time via the Global Telecommunication System, and further demonstrating the ability for Saildrone USVs to augment – not replace – traditional monitoring networks and ocean-going research platforms operated by NOAA.

RECOMMENDATIONS:

It is now widely accepted that commercial technologies, such as USVs, and commercial data play an important role in helping NOAA meet its ocean-going research and operational mission requirements, including improved weather forecasting. Therefore, as this Subcommittee considers re-authorization of The Weather Research and Forecasting Innovation Act of 2017 (Public Law 115-25), I encourage consideration of the following items.

First, Congress should explicitly authorize a pathway for NOAA to purchase ocean surface data from commercial entities. Again, we know that the surface ocean domain is a key driver of weather patterns on land and one of the most under-observed domains on Earth, and as such more priority ought to be placed on collecting these types of observations. However, less than one percent (and closer to three quarters of one percent) of NOAA's fiscal year 2023 appropriation was made explicitly available for the purchase of commercial weather observations, and presently neither of the two primary programs that administer this funding (i.e., Commercial Data Purchase program or National Mesonet program) are seeking commercial ocean surface data. NOAA ought to replicate the same pathway it is currently executing for commercial space-based data acquisition, where they purchase commercially available satellite data without needing to operate the hardware, for the collection of ocean surface data.

Second, Congress should codify the functions of the Autonomous Uncrewed Technology Operations (AUTO) program to ensure NOAA continues to make best, most cost-efficient use of

commercial, “as-a-service” uncrewed maritime technologies. The AUTO program, which is administered by NOAA’s Office of Marine and Aviation Operations, functions as NOAA’s agency-wide resource sponsor for the use of commercial, “as-a-service” uncrewed maritime systems to augment NOAA’s traditional observing capabilities and support research and operational requirements across all NOAA line offices. Funding for the AUTO program has grown from $12.6 million in fiscal year 2020 to $21.6 million in fiscal year 2023. Of the funding provided in fiscal year 2023, $7.5 million was specifically allocated by Congress for “agency-wide data acquisition from uncrewed maritime systems.” Earlier this month, NOAA and OMAO announced that they would be using this funding to support nine projects in 2023, including five involving Saildrone USVs and three that will support weather prediction. Notably, OMAO received a total of “17 proposals totalling $36.4 million” in requested funding, which is five-fold the amount of funding available and indicative of high demand across NOAA for such services.

The AUTO program has positioned NOAA ahead of many other Federal agencies by providing a clear pathway to utilize commercial, “as-a-service” uncrewed maritime systems in an operational fashion. However, the AUTO program is more-or-less unauthorized at the moment, although some authorities were included via the Commercial Engagement Through Ocean Technology Act of 2018 (Public Law 115-394). Absent an explicit authorization, there is no guarantee that this important program will continue to be administered as it is currently and therefore could benefit from the establishment of proper guardrails that ensure NOAA continues to take best-advantage of the benefits and cost-efficiencies of partnering with the commercial sector in this manner.

I appreciate the opportunity to testify today and express my views on this important

matter on behalf of Saildrone. Thank you for your attention, and I look forward to answering any questions that you have.