

Statement of
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Science, Space, and Technology Committee
U.S. House of Representatives

Hearing on
“Beneath the Waves: The Science and Technology of Deep-Sea Mining”

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INTRODUCTION:

Chairman Franklin, Ranking Member Amo, and Members of the Environment Subcommittee, I appreciate the opportunity to testify before you today. My name is Brian Connon, and I am the Vice President of Ocean Mapping at Sairdrone. I am honored to represent the nearly 300 Sairdrone employees who are dedicated to building, developing, and operating transformative uncrewed capabilities to support our mission of delivering persistent presence at sea and providing essential data, intelligence, and firepower to achieve strategic maritime superiority.

Sairdrone is a US company based in Alameda, California, with locations in St. Petersburg, Florida, and Washington, DC, and ongoing global operations supporting missions with NOAA, the US Coast Guard, the US Navy, and partner Countries. Sairdrone is the world leader in providing defense and oceanographic survey solutions with long-endurance autonomous uncrewed surface vehicles (USVs). Operational since 2014, Sairdrone USVs have sailed more than two million nautical miles and spent over 60,000 days at sea collecting meteorological, oceanographic, seafloor mapping, and maritime security data for US Government and commercial customers.

Today, I am pleased to offer my thoughts on how public-private partnerships with maritime technology companies like Sairdrone can provide the most expeditious and economical way to identify areas of the ocean seafloor most likely to contain marine minerals. My testimony will highlight a few observations based on my experience and offer ideas that might help this subcommittee identify policy and legislative solutions to accelerate the transition from innovation to adoption.

CONTEXT:

The world's oceans cover more than 71 percent of the planet and play a critical role in the global economy, influencing food production, weather, energy, and the movement of goods. Specific to today's discussion, the ocean is also the United States' largest and most mineral-rich frontier. 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 more specifically the United States Exclusive Economic Zone (EEZ)—remain largely unsurveyed by modern sonar methods. Only 54% of the US EEZ has been mapped, leaving nearly 1.8 million sq nm of sovereign US territory unexplored. This is largely attributable to the fact that traditional means of mapping the ocean are costly and that the ocean is a vast, physically harsh, immensely dangerous, and logistically complex environment in which to operate.

This lack of ocean mapping data was acknowledged in 2019 via a Presidential Memorandum titled “Ocean Mapping of the United States Exclusive Economic Zone and the Shoreline and Nearshore of Alaska¹.” As a result, the National Ocean Mapping, Exploration, and Characterization Strategy (NOMECS)² was published, outlining a strategy to map the US EEZ and deploy new and emerging science and technologies at scale, and doing so in partnership with private industry, academia, and nongovernmental organizations. This was driven by the lack of capacity in government survey assets and was further addressed in the 2024 Implementation Plan

¹ White House, *Memorandum on Ocean Mapping of the United States Exclusive Economic Zone and the Shoreline and Nearshore of Alaska*. November 2019. <https://trumpwhitehouse.archives.gov/presidential-actions/memorandum-ocean-mapping-united-states-exclusive-economic-zone-shoreline-nearshore-alaska/>.

² Ocean Policy Committee, *National Strategy for Mapping, Exploring, and Characterizing the United States Exclusive Economic Zone*. June 2020. <https://www.noaa.gov/sites/default/files/2022-07/NOMECSStrategy.pdf>.

Update for the National Strategy for Ocean Mapping, Exploring, and Characterizing the United States Exclusive Economic Zone³, which stated, “At the current pace, NOMECS Strategy mapping goals are unlikely to be met by 2030 for waters deeper than 40 meters.” The necessity of mapping undersea resources and accelerating data collection and characterization was once more emphasized by Executive Order (EO) 14285⁴, issued on April 24, 2025, which charged the Department of Commerce, acting through NOAA, to “develop a plan to map priority areas of the seabed, such as those with abundant or accessible undersea resources, in order to accelerate data collection and characterization, prioritizing areas within the United States Outer Continental Shelf.”

Since the age of sailing ships, ocean mapping and exploration have relied upon crewed vessels. Luckily, we have progressed a long way from manually lowering a leadline to the bottom to measure water depths; today, we use advanced multibeam sonars capable of producing high-resolution maps of the seafloor. Modern ocean survey ships are highly capable platforms, but they also require significant time, people, and investment to build, operate, and maintain. History has proven they can’t be efficiently scaled, operated, and maintained to meet the challenge of exploring, mapping, and characterizing the ocean at the pace necessary to meet the demands placed on them. Data collected from these ships support a variety of requirements from safety of navigation and habitat characterization to ocean modeling and marine mineral discovery. Ships are uniquely configured and capable of conducting more exquisite operations for exploration and characterization by launching and recovering autonomous underwater and

³ National Ocean Mapping, Exploration, and Characterization (NOMECS) Council, *2024 Implementation Plan Update for the National Strategy for Ocean Mapping, Exploring, and Characterizing the United States Exclusive Economic Zone*. December 2024. https://www.noaa.gov/sites/default/files/2025-01/2024%20NOMECS%20Implementation%20Plan_FINAL.pdf.

⁴ White House. Executive Order 14285: *Unleashing America's Offshore Critical Minerals and Resources*. April 2025. www.whitehouse.gov/presidential-actions/2025/04/unleashing-americas-offshore-critical-minerals-and-resources/.

remotely operated vehicles, but they no longer need to spend valuable time mapping large areas of the ocean to identify smaller areas of interest. This task can now be accomplished by long-endurance USVs outfitted with the same sonar technology used by those ships, allowing them to focus their valuable time on operations that require personnel and unique equipment. Mapping these large offshore areas through USV reconnaissance surveys provides critical information such as depth, seafloor slope, and bottom characteristics that can be analyzed to identify areas of high likelihood for marine mineral deposits—all without the need for a crew. Think of ocean mapping as the due diligence phase of real estate. Just as one would perform a land survey and home inspection to help determine the worthiness of an investment, ocean mapping can reveal which areas of the deep sea have the greatest potential.

COMMERCIAL INNOVATION:

The commercial sector has long been developing and providing cost-efficient, alternative technologies to better map the ocean. The majority of these systems are focused on shallow waters near shore due to the challenges faced when mapping remote ocean areas. Long transits, sparse service locations, and difficult environmental conditions have restricted the use of USVs for remote mapping missions—until now. Saildrone’s USV technology represents a significant advancement in ocean-mapping capability, providing the same high-quality data collected by conventional survey assets while operating far more efficiently and at considerably lower cost. The Saildrone Surveyor, a 65-foot USV, was designed specifically for deep-ocean mapping in remote areas of the world, utilizing commercial-off-the-shelf mapping systems, high-speed satellite communications, and autonomous navigation to safely conduct these missions. Built at Austal USA in Mobile, Alabama, the Surveyor USV has received full classification by the American Bureau of Shipping, an internationally recognized standard for safety, design integrity,

and operational reliability. It is unmatched in endurance, capability, and reliability.

Until recently, the ability of the government to test, adopt, and integrate new mapping technologies was made difficult due to the initial large capital expense required to acquire and ready the asset before 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 US government customer has direct access to and secure control over the data flow coming off the vehicle. Leveraging private capital expenditure and 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 are:

In 2023, a Saildrone Surveyor USV completed a months-long survey around Alaska’s Aleutian Islands and off the coast of California as part of a multi-agency public-private partnership with the Ocean Exploration Cooperative Institute funded by NOAA and the Bureau of Ocean Energy Management to address ocean exploration gaps in remote areas. For 52 days between August and October, the Surveyor mapped 4,738 square nautical miles of unknown seafloor around the Aleutian Islands. After transiting 2,000 nautical miles back to San Francisco, the Surveyor mapped an additional 8,665 square nautical miles of the US EEZ off the California coast and discovered a previously unknown seamount standing approximately 3300 ft high from the seabed.

In 2023 and 2024, two Saildrone Voyager-class USVs surveyed 1,122 sq nm in the north-

central Gulf of Maine for NOAA's Northeast Fisheries Science Center, National Centers for Coastal Ocean Science, and the Office of Habitat Conservation's Deep-sea Coral Program to gather high-resolution seafloor mapping data that will lead to habitat characterization and inform responsible offshore development and fisheries management.

In 2025, Saildrone completed mapping of the undisputed portions of the Cayman Islands EEZ, over 26,000 square nautical miles. This project was philanthropically funded and shows the power of public-private partnerships. The Cayman Islands are now one of only a few countries in the world with a completely mapped EEZ, setting the stage for their blue economy efforts.

Today, a Saildrone Surveyor USV is mapping the US EEZ for NOAA's Office of Ocean Exploration in the vicinity of the Mariana Islands. Data collected in this project will inform future decision making by NOAA's Office of Ocean Exploration on expeditions and provide high-quality data in an area of interest for marine mineral exploitation. This project is funded through NOAA's Autonomous Uncrewed Technology Operations (AUTO) program.

Many more areas of potential marine mineral exploration, both within and outside the US EEZ, remain unexplored and unmapped. Uncrewed maritime systems such as the Saildrone Surveyor offer the opportunity to deploy a proven, scalable, and technologically equivalent alternative to ships, which can deliver immediate, meaningful increases in mapping capacity to quickly and efficiently identify the most promising sites for further exploration and characterization.

RECOMMENDATIONS:

It is now widely accepted that commercial maritime technologies, such as USVs, and commercially sourced maritime data will continue to play an ever-increasingly important role in helping federal agencies, including NOAA, meet their ocean-going research and operational

mission requirements, including exploring and mapping the US EEZ. Therefore, as this Subcommittee explores and considers policy and legislative action concerning deep-sea mining, I encourage consideration of the following items.

First, Congress should codify the functions of the AUTO program to ensure NOAA continues to make the 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 operational requirements across all NOAA line offices. Due to strong, bipartisan congressional support, the AUTO program’s funding has increased in recent years, growing from \$12.6 million in Fiscal Year (FY) 2020 to \$24 million in FY 2026. This \$24 million annual allocation includes approximately \$11 million dedicated to partnerships with commercial “as-a-service” providers of uncrewed maritime systems. This funding level is currently supporting a total of five projects throughout 2026.

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 currently lacks explicit authorization. Without proper legal authorization, there is no assurance that this program will continue in its present form. Implementing such guardrails would ensure that NOAA can consistently leverage the benefits and cost-efficiencies gained from commercial partnerships in this program.

Second, NOAA’s reliance on a crewed, ship-centric model cannot keep pace with today’s need for the US to characterize its seabed at scale and speed. Relying solely, or even primarily, on vessels for ocean mapping creates a bottleneck that prevents the US from mapping its

territory at the required speed. A 2024 Government Accountability Office report⁵ underscored this vulnerability, noting that fleet size and workforce challenges have cut NOAA's available days-at-sea to roughly half of what is required.

Bridging this gap requires a fundamental shift in how the agency deploys resources. By adopting a framework that better balances investment in both scalable, emerging technologies, like USVs, and traditional, high-cap-ex assets, such as ships, NOAA can overcome these logistical constraints.

Finally, Section 3(a)(iii) of EO 14285 charged NOAA to create a plan to map priority seabed areas to accelerate data collection on undersea resources. Today, nearly a year later, this plan is not publicly available. Urging for the prompt completion and release of this plan would allow industry to better understand the scope and scale of deep-sea mineral opportunities and accelerate planning and alignment of private investment to meet this critical national imperative.

Today, we find ourselves at one of the most exciting technological tipping points in ocean exploration, that is, a time when it is both cost-effective and feasible to rapidly explore, map, and characterize the US EEZ. We assess that in three years or less, a concerted effort between government and industry could map and characterize our nation's largest unknown frontier and do so for roughly the same cost of building one new ship—achieving in 36 months what would have previously taken decades.

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.

⁵ U.S. Government Accountability Office, *NOAA Mariner Recruitment and Retention: Actions Needed to Develop a Strategic Workforce Planning Process*, GAO-24-106958. July 2024. <https://www.gao.gov/products/gao-24-106958>.