Testimony of Michael B. Jones
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Of the House Transportation and Infrastructure Committee
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to Improve Efficiency and Mission Performance"
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Chairman Duncan, Ranking Member Garamendi, Members of the Subcommittee, thank you for the opportunity to be here this morning to address this important topic.   I am Founder and President of **The Maritime Alliance (TMA) –** a non-profit industry association founded in 2007 and based in San Diego.   We are a leading voice for **BlueTech** nationally and internationally. Our Mission Statement is "Promoting Sustainable, Science-Based Ocean & Water Industries". Originally focused on San Diego – the largest U.S. **BlueTech** (ocean and water tech) cluster – we have a growing number of members in the U.S. and abroad. **TMA** has been a multi-year Strategic Partner with the US Dept. of Commerce and we are the organizer of the 1st ever US Maritime Technology Export Initiative working with small to medium-sized companies from across the country. In 2017, we helped form the **BlueTech Cluster Alliance (BTCA)** – the 1st international coalition of **BlueTech** clusters – with 9 leading **BlueTech** clusters from 7 countries.

I am here today to provide an overview of the Blue Economy and **BlueTech** in the U.S. and touch on select company technologies that could provide benefits to the U.S. Coast Guard in its diverse missions.

The State of the Blue Economy and BlueTech

The Blue Economy is enormous and growing rapidly. The 2016 OECD report "The Ocean Economy in 2030" predicted that it will double in size from $1.5 trillion in 2010 to over $3 trillion in 2030 while providing 40 million jobs globally. Special attention is given to emerging ocean-based industries. **BlueTech** companies are providing the innovative tools and services that permit these industries to develop. It is **BlueTech** that allows us to understand ocean problems (coral reef die-off, marine debris, mines, ocean chemistry changes, over-fishing, pollution, plastics, sunken vessels, temperature rise, tsunami generation and propagation, etc.)…and **BlueTech** is critical to develop solutions to these problems. The pace of **BlueTech** development is accelerating due to increased public awareness and attention regionally, nationally and internationally. Some countries and regions have focused heavily on the oceans including China, EU countries, Norway, and others. As an example, Norway adopted an Ocean Strategy in 2017 – the first industry strategy ever developed by Norway. In addition, the United Nations has proclaimed a Decade of Ocean Science for Sustainable Development from 2021-2030, which will provide a common framework to support the achievement of Sustainable Development Goal 14 on the ocean.

The State of the Industry

An increasing reliance on ocean resources (from aquaculture to deep sea mining to offshore wind energy) and the need to improve the way humans interact with the ocean (from more efficient vessel technology to broad environmental stewardship) will drive the Blue Economy and **BlueTech**. The user base is broadening as capabilities increase and prices decrease due to technological advancement, competition and economies-of-scale as market sectors grow. A sector like maritime robotics – platforms and sensors – is very strong in the U.S. due particularly to military, oil & gas and scientific demand, which sets the stage for large export sales – often 50% or greater. Another sector like ship building is supported domestically by the Jones Act and military procurement, but not as competitive internationally, while specialty areas can be quite strong such as high-efficiency turbines and technologies to defend against invasive species in ballast water or on hulls.

Some countries have focused heavily on new ship related technologies. Examples include autonomous vessels, e-navigation, wing sails on vessels, and more. Norway formulated an ambitious, national maritime strategy in 2015 to ensure a competitive regulatory framework, a competent maritime administration, a focus on environmentally friendly shipping, high-quality worker training, and to promote advanced R&D and rapid testing. It promotes synergy between industry sectors (aquaculture, fishing, oil & gas, shipbuilding, vessel automation, etc.) to develop maritime solutions.

The Potential for Blue Technologies to Support USCG Missions
The Maritime Alliance has over 90 members from across the U.S. and internationally – mostly leading edge **BlueTech** companies. In conjunction with **BTCA** cluster partners, we have access to thousands of companies in a growing number of countries. Innovative technologies in the U.S. can be exported as products and services…and innovative technologies abroad can be imported to develop Blue Jobs in the U.S. Following are select maritime issues that **TMA**-**BlueTech** member companies are addressing that may be of benefit to the Coast Guard as it seeks more efficient options to address its core missions.

Autonomy Software and Autonomous Vessels: Multiple **TMA** member companies are involved in autonomy in the air, on and under the water. Boston-based Sea Machines Robotics recently announced a contract with A.P. Moller-Maersk (Maersk), of Copenhagen, Denmark, to trial the world's first AI-Powered Situational Awareness system aboard a container ship by combining computer vision, Light Detection and Ranging (LiDAR) and perception software to augment and upgrade transit operations. San Diego-based Planck Aerosystems' drone intelligence improves real-time situational awareness via autonomous take off & landing from moving vehicles and vessels at sea, which has many uses in the ocean domain from fishing vessels to coastal mapping to spill detection / management to anti-piracy to special forces. Fugro's Houston-based U.S. headquarters is using data telemetry with remote command and control software to provide navigation, positioning and survey services to customers using shore-based command centers, eliminating the need for onboard surveyors (in some cases), while enhancing safety and efficiency.

Big Data (GIS Mapping Software, Location Platforms, Spatial Data Analytics & Weather Prediction):
Enormous amounts of data are being collected by military, NGOs, NOAA, oil & gas, research/scientists, shipping, and other ocean stakeholders. Redlands, CA-based Esri – the world's leading GIS software mapping company – is helping unlock the potential of data to improve operational & business results. San Diego-based XST, Inc. provides Big Data consulting services including high-definition, hyper-local weather prediction for joint, maritime, expeditionary and special warfare operations.

Cybersecurity in the Maritime Domain: This is a rapidly developing concern. In the Port of Antwerp, hackers working with a drug-smuggling gang repeatedly breached digital tracking systems to locate containers holding large quantities of drugs and allowed gang drivers to collect containers ahead of scheduled collection times. A June 2017 cyberattack snarled shipping terminal operations worldwide and cost the shipping giant Maersk upwards of $300 million. Good cyber hygiene, training, and innovative technologies and services are needed to protect the logistics chain from ship to shore.   Philadelphia-based Gnostech helps mitigate cybersecurity risks from sea to shore.

Likewise, jamming and spoofing of GPS is a major concern in maritime. In the last several years we have seen an increase in this activity with container ports idled, AIS safety systems disabled, and ships' positions being reported miles from their actual locations. GPS' vulnerability to disruption is a significant obstacle to safe use of remotely-operated and autonomous systems. One way to address this is by establishing an e-Loran system to complement and backup GPS.

Ocean Observation: The ocean enterprise—for-profit and not-for-profit organizations which support ocean measurement, observation and forecasting—is a critical component of maritime commerce and the Blue Economy. The Integrated Ocean Observing System (IOOS®) is the national-regional partnership that is focused on this important mission and enjoys wide industry support. **TMA** was co-author of "The Ocean Enterprise – A study of U.S. business activity in ocean measurement, observation, and forecasting", the first ever national-scale assessment of the size, scope, and value of the ocean enterprise, which was jointly published by IOOS and NOAA in February 2016. The study identified more than 400 firms in 36 states representing over $7 billion in annual revenue driving innovation across many industry sectors. These companies are important for the economy and critical for the maritime transportation industry.

Pollution Mitigation: San Diego-based Earthwise Sorbents is pioneering high performance, sustainable, recycled, and repurposed underline algae-based sorbents to clean-up oil and chemical spills on land and in water. These sorbents can absorb 9x their weight and are hydrophobic (i.e. do not leach back into water when saturated). Seattle-based Marine Construction Technologies has patented an innovative pile design that reduces noise pollution from impact pile driving by 80-90%. Less pile driving noise equals faster permitting, smaller zones of harassment/harm and fewer project delays thereby saving money and time while being a better ocean steward.

Port & Maritime Efficiency and Security: Durham, NC-based PortCall is a front-end platform for digital ports. It synchronizes vessel scheduling between ports, pilots, agents, and others. San Ramon, CA-based OceanManager develops maritime software to help ship owners and managers operate their vessels safely and efficiently and is now on over 850 vessels worldwide. Richmond, CA-based WAM-V produces a unique watercraft using suspension technology to radically improve seagoing capabilities so the ultra-light, easy-to-assemble/disassemble and crate vessel can perform in sea conditions where an ordinary boat cannot safely operate. It has been used in port security and ship inspection in various configurations including using it like a "mini-aircraft carrier" with quadcopter on the stabilized upper platform and tethered ROV that can work underwater.

Predictive Analytics: Seattle-based ioCurrents gathers real-time data from important assets on commercial vessels such as alarm panels, cargo, engines, generators, PLCs, etc. into a central database on a small, dedicated, low-cost computer to permit automatic onboard analysis with in-the-cloud availability and back-up. This allows operators to predict equipment failures thereby enhancing efficiency and safety of vessels. Failures at sea of even a small component can create high downstream cost that can result in a costly Coast Guard intervention to assist the vessel, downtime for the customer, and reporting requirements about the nature of the failure. By identifying failing assets before failure, the customer may order parts in advance for installation at the next port-of-call and downtime can be minimized.

Recommendations to facilitate U.S. Coast Guard assessment of Blue Technologies
The Coast Guard is a unique, internationally respected, multi-mission, maritime force. Its three major roles – maritime safety, maritime security, and maritime stewardship – span the maritime domain. **TMA** has interfaced with many fine USCG officers and staff and has been honored to have high-level speakers at our events. Following are some ideas we suggest that the Subcommittee consider to enhance USCG ability to identify, observe, test, and incorporate **BlueTech**:
- Increase travel funding to attend events where **BlueTech** is being shown / demonstrated;
- Increase funding to test and evaluate **BlueTech** products and services;
- Enhance the on-ramp to make it easier for innovative technology and services to be presented;
- Enhance the Innovation Council with regional meetings alongside shows to better find **BlueTech**, to avoid the cost/time to organize similar USCG events, and promote more contact with industry;

- Make regional "Tech Scouting" part of someone's role (e.g. Deputy Sector Commander);
- Establish a secondary Innovation center on the U.S. West Coast;
- Promote **BlueTech** collaboration and transfer to and from other U.S. government departments and agencies, operating in the marine domain (Navy and NOAA); and
- Promote **BlueTech** collaboration and transfer to and from other countries forces.

Conclusion

Thank you for the opportunity to testify today. We are grateful to the members of this Subcommittee for focusing on **BlueTech** and how it can help improve efficiency and mission performance. **The Maritime Alliance** stands ready to be a resource to this committee. I would be happy to answer any questions you have.