Use and Regulation of Autonomous and Experimental Maritime Technologies

Testimony of

Sean T. Pribyl, Esq.
Partner, Holland & Knight LLP

And

Member, Committee for *Leveraging Unmanned Systems for Coast Guard Missions: A Strategic Imperative* (2020), the National Academies of Sciences, Engineering, and Medicine
Transportation Research Board

Before the

Subcommittee on Coast Guard and Maritime Transportation
Committee on Transportation and Infrastructure
U.S. House of Representatives

Tuesday, September 19, 2023, 2:00 p.m. ET
2253 Rayburn House Office Building

Chairman Webster, Ranking Member Carbajal, and Members of the Subcommittee, I appreciate the opportunity to appear before you today to testify about the Transportation Research Board's (TRB) consensus study report on "Leveraging Unmanned Systems for Coast Guard Missions: A Strategic Imperative" (2020)[1] (the "Report" or "Study") and issues of regulation of autonomous and experimental maritime technologies germane to that Report.

I served on the study committee that developed the TRB report, although I was also invited by this Subcommittee to offer my comments on notable developments in the Coast Guard's use and regulation of autonomous and experimental maritime technologies since that Report's publication in 2020. By way of additional background, I am a business attorney and Partner at the law firm of Holland & Knight LLP in Washington, DC where I practice within our Transportation and Infrastructure Group and International Trade Practice and support our Autonomous Transportation Team. The focus of my practice is on maritime regulatory matters, international trade, coastwise trade (the Jones Act), autonomous transportation, civil litigation, and maritime environmental compliance. I have a background with more than 25 years of combined experience as an international maritime and trade attorney, international Protection and Indemnity (P&I) Club lawyer in Norway, U.S. Coast Guard officer and attorney (JAG), U.S. Department of Justice Special U.S. Attorney, and merchant mariner deck officer with the American Maritime Officers union following graduation from the U.S. Merchant Marine Academy (Kings Point). I am also a widely published author in treatises and publications on matters related to maritime law and autonomy, as well as a regular speaker at international legal and industry conferences and seminars. Outside my law practice I am, *inter alia*, a Member of

[1] National Academies of Sciences, Engineering, and Medicine. 2020. Leveraging Unmanned Systems for Coast Guard Missions. Washington, DC: The National Academies Press. https://doi.org/10.17226/25987.

the National Academies of Sciences Marine Board and serve as Chair of the Autonomous Ships and Smart Marine Technology Committee in the U.S. Maritime Law Association ("MLA"), where I am a Proctor in Admiralty. My testimony today is on behalf of the TRB and in my personal capacity and thus any views and opinions expressed are my own and do not necessarily represent the views or positions of Holland & Knight LLP.

Study Scope and Process

Congress requested the TRB report in Section 812 of the Frank LoBiondo Coast Guard Authorization Act of 2018 (the "Act") which called on the National Academies of Sciences, Engineering, and Medicine (the National Academies) to "prepare an assessment of available unmanned, autonomous, or remotely controlled maritime domain awareness technologies for use by the U.S. Coast Guard." The Act called for a study of the U.S. Coast Guard's existing and prospective use of unmanned systems (UxS)[2] to fulfill its many critical and often unique missions. The Act implied an interest in a range of technology-based concepts, from aerial, surface, and underwater vehicles that have no human occupants or controllers to vehicles that may have a crew but have some level of remote, automated, or autonomous control, as well as systems that are not vehicles such as intelligent decision aids. The legislative request further called for a review of the then-current and emerging capabilities of these systems; their affordability, reliability, and versatility; and any realignments in Coast Guard policies, procedures, and protocols that may be necessary to exploit them more fully and effectively.

To conduct the study, which was undertaken under the auspices of the TRB and its Marine Board, the National Academies appointed a committee of 10 experts in the fields of automation and control; systems research, acquisitions, and integration; Coast Guard operations and mission support; naval engineering and architecture, cybersecurity, field applications of unmanned systems; and relevant legal, regulatory, and policy issues. Overall, the study committee recognized that the Coast Guard has many important, complex, varied, and demanding missions, although its fleet and operational forces are being increasingly taxed. However, unmanned systems are being used today—and increasingly since the Report's publication in 2020—with high utility across the public and private sectors. Therefore, recognizing that the technologies that enable and underpin these systems are advancing rapidly, the study committee was struck by the magnitude and breadth of opportunity that lies ahead for the Coast Guard to pursue UxS in its multiple operational domains and across its many missions. To reach that potential, the study committee determined that a major realignment of the Coast Guard's UxS approach was warranted and concluded that to remain responsive and fully relevant to its many missions, it was imperative that the Coast Guard take a more strategic and accelerated approach to exploit the capabilities of existing and future unmanned systems. Moreover, legal and policy considerations remain critical to the Coast Guard's missions as a user of emerging technologies and notably, as a regulator of unmanned systems aboard commercial vessels.

[2] The Report used the term "unmanned" systems, although since 2020, nomenclature has moved to adopt the term "uncrewed" or "optionally crewed." Notably the Coast Guard still uses the description "Manning Requirements" in 46 CFR Part 15, and thus there is not uniform acceptance of gender neutral "crew" in lieu of "manning."

Informed by the input from experts and collective knowledge of its members, the study committee made five critical recommendations to the Coast Guard, provided here in kind, along with relevant updates given the passage of time since the publication of the Report.

1. Issue a High-Level UxS Strategy

The study committee recommended that the Commandant issue a high-level UxS strategy that would articulate a compelling rationale for UxSs, set forth agency-critical goals that these systems should further, and outline the Coast Guard's approach for achieving them. The strategy would articulate a vision for the use of these systems across mission areas, setting strategic goals and objectives for achieving that vision, and establishing appropriate organizational structures and lines of authority to introduce and integrate UxSs across the force structure.

Since the Report's publication, in March 2023 the Coast Guard promulgated its Unmanned Systems Strategic Plan[3] which appears to have addressed this recommendation.

2. Designate a Senior UxS Champion

In light of the institutional responsiveness required to support the strategic commitment to UxSs and given the attendant scope and scale of the requisite responses that will be required, the study committee recommended that the Commandant designate a top Coast Guard official, at the Flag Officer or Senior Executive Service levels, to advocate for and advance the Service's UxS strategy. This top official would be responsible for identifying, promoting, pushing for, coordinating, and facilitating the changes that will be needed across the organization to further the Commandant's strategic goals and objectives for UxSs.

To date, and to my knowledge, the Coast Guard has not designated that level of senior official for that purpose, however, they have appointed CAPT Thom Remmers, P.E. as Unmanned Systems Lead, which should be viewed as a positive step that meets the intent of this recommendation. This is all the more relevant given the promulgation of the Unmanned Systems Strategic Plan by Deputy Commandant for Operations, VADM Peter W. Gautier while CAPT Remmers served in that role as Unmanned Systems Lead.

3. Stand Up a UxS Program Office

Given the many changes in Coast Guard priorities, practices, and procedures that will be required to more fully exploit UxSs—from systems acquisition to personnel hiring and training—the study committee recognized that no single directorate or subunit could be expected to initiate and implement them all. However, the committee concluded that a dedicated program office, in concert with a high-level UxS advocate, could play a vital leadership and coordinating role in sustaining and expanding the use of UxSs across Coast Guard operational forces. The study committee therefore recommended that the Commandant establish a UxS program office that will work in concert with the top official charged with advancing the Service's UxS strategy to plan out, coordinate, assess, and promote UxS activities across the Service and to leverage

[3] US Coast Guard Unmanned Systems Strategic Plan (2023), *available at* https://www.dco.uscg.mil/Portals/9/DCO%20Documents/2023%20Unmanned%20Systems%20Strategic%20Plan.pdf.

relevant activities and capabilities from outside the Service. The committee advised that an early initiative of the program office should be to develop a "roadmap" that translates the high-level UxS strategic goals and objectives into an actionable plan to accomplish them, which should specify tasks needing priority attention, time frames for completion, and performance metrics and milestones.

To my knowledge, the Coast Guard has not established a UxS program office. The Coast Guard has, however, formulated a multi-program office autonomous policy committee referred to as the "AutoPoCo" which meets at certain intervals to discuss the prevailing issues and attempt to offer a unified view. The AutoPoCo, however, is not an avenue to which the public has direct access, and thus commercial entities are still expected to approach a multitude of offices to understand the parameters of lawful operations, ranging from Sector, District, and Headquarters offices.

4. Expand and Normalize UxS Experimentation

Experimentation with UxS capabilities on a limited basis, in partnership with other military services and DHS agencies, is vital to expanding and transitioning UxSs across the Coast Guard and to meet its diverse and demanding missions in the face of resource constraints. Budgetary limits are a crucial factor in the Coast Guard's need to be a "fast follower" that leverages and adapts technologies developed by others. Therefore, the Coast Guard must be attuned to, and experiment with, technology developments elsewhere in the military and government and in the commercial sector.

To build on and reinforce its naturally innovative culture, the study committee recommended the Coast Guard expand and normalize efforts to ensure ample and systematic operations-related experimentation with low-cost UxSs. The committee concluded that encouraging experimentation with low-cost UxS technologies will not only help to identify beneficial uses, but also nurture a technology-curious and -proficient workforce across the ranks.

Since the Report's publication, the Coast Guard appears to have taken some steps in this regard. Indeed, U.S. Navy has continued to aggressively experiment with unmanned vessels and has aims for a future fleet that incorporates unmanned surface vessels (USV)(*Mariner*; *Ranger*; *Sea Hunter*; *and Seahawk*) and systems, and the Coast Guard has participated in joint exercises like the Rim of the Pacific Exercise (RIMPAC) with such USVs which are purportedly able to comply with the International Regulations for Preventing Collisions at Sea 1972 (COLREGS). The Coast Guard has also used Saildrone uncrewed vessels or vehicles in support of research and development, although it is less clear if these are vessels that are required to comply with the COLREGS, and if so, whether those capabilities are met. This is an important distinction discussed later as the COLREGS apply to all vessels, and thus are critical to the Coast Guard as both a user and regulator of unmanned vessels.

5. Get a Fix on UxS Funding Needs

The committee made its recommendations intent on expanding and accelerating the Coast Guard's investigation and implementation of UxSs for new concepts of operation. The committee recognized, however, that for the Coast Guard to act on these recommendations would require ample and sustained funding, and a commitment to continually increasing funding

over time. To incorporate UxSs into the fleet and force structure, the Coast Guard will need to invest in R&D, acquisitions, field experimentation, strategic planning, systems integration, evaluation, cybersecurity, legal analyses, personnel recruitment and training, and many other field and mission support functions and requirements. While the committee was not able to estimate and advise on how much additional funding would be required for these investments, it recommended the development of a detailed assessment of investment needs.

Legal and Policy Considerations with Respect to UxS Use and Regulation

While the Report assessed all domains for UxS—air, surface, and subsurface/underwater—the advent of emerging unmanned vessel (UMV) technology has raised the most pressing legal and operational questions, in particular as the U.S. Coast Guard is both a user and regulator of UMVs. Indeed, while the Coast Guard possesses extensive statutory authorities to execute its regulatory mission and can be expected to rely and build on these authorities, continued technological capabilities are offering new UMV use opportunities that are outpacing existing legal frameworks.

In support, the Report provided analysis of prevailing legal authorities and policy issues to serve as guidance and a primer upon which the Coast Guard can rely to fully assess UMV capabilities and develop next steps for its legal framework, to include a survey of relevant precedent, guidance, and resources to support legal and policy assessments and decision making. The Report notes that the Coast Guard's legal and policy program offices will need to determine whether existing laws, regulations, and policies allow for the safe and effective use of UMVs across the full range of envisaged operations. If they do not, the Coast Guard will need to identify the additional authorities and processes that can fill the gaps, and if appropriate, work to bring them about. In the near term, this effort may require the drafting of legal and policy memoranda. The Report cited the Coast Guard's August 11, 2020 "Request for Information on Integration of Automated and Autonomous Commercial Vessels and Vessel Technologies into the Maritime Transportation System,"[4] although I am unaware of any further developments that resulted from the RFI.

Essentially, UMV technology has outpaced the relevant regulations because existing legal regimes generally contemplated manned ship operations, or at least with a "human in the loop," when they were initially developed, such as the COLREGS, Inland Navigation Rules, and United Nations Convention for the Law of the Sea (UNCLOS). This legal conundrum is compounded by the dearth of current precedent related to UMV operations on which operators could otherwise rely for guidance. Consequently, stakeholders and scholars continue to assess the use of UMV operations under the existing regulations, laws, treaties, and conventions, and they have yet to reach universal consensus, although collegial dialogue is ongoing.

"Vessel" Determination and Status

Indeed, one of the most prevalent operational considerations is whether an envisaged platform or watercraft will be deemed a "vessel" because such determination involves questions of fact, law, and policy. Therefore, a threshold matter is determining a respective UMV platform's "legal

[4] Docket No. USCG-2019-0698 (85 Fed. Reg. 48548, Aug. 11, 2020): https://www.govinfo.gov/content/pkg/FR-2020-08-11/pdf/2020-17496.pdf.

status" because there are numerous types of platforms that vary in size and capabilities with different designations. Furthermore, whether a given UMV is deemed a "vessel" also depends on a review of the context of the purpose, classification, design, and operating characteristics of a respective UMV.

Of the relevant international conventions, the most formative ones appear to be the COLREGS that apply "to all vessels upon the high seas and in all waters connected therewith navigable by seagoing vessels," including warships. Notably, while the COLREGS do not specifically preclude operation of UMVs, a Coast Guard UMV would be expected to the general maritime law requiring the exercise of good seamanship in all respects. In other words, the COLREGS need to be translated into programming code when integrated into a UMV. Such programming could conceivably achieve compliance with certain COLREGS, perhaps through a method which factors in both the strict conformity with the obligatory decision making and historical dependency on human common sense in executing rules in all circumstances. In fact, the study committee was aware of several technological developers who take the position that compliance with the COLREGS is indeed achievable through programming that allows a UMV to understand and act on a codified set of navigational requirements.

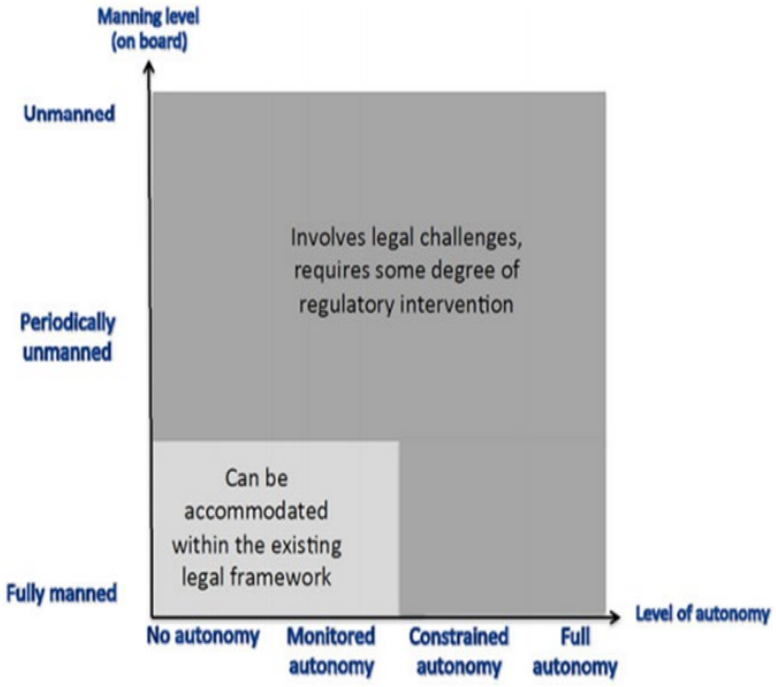
In order to determine legal rights and obligations when operating a particular UMV, a threshold issue will be how to characterize the UMV given the language in key domestic statutes, regulations, and international laws, which primarily govern operations by "vessels" or "ships." Efforts toward compliance with governing legal authorities has invariably raised issues of fact, policy, and law, including the critical question of "is it a vessel?" Thus, to best assess risk and make well-informed decisions, the Coast Guard could develop legal and policy opinions contemplating the legal parameters for each prospective UMV, including how the Coast Guard will ensure legal compliance and whether provisions may be available for exemptions and equivalencies under mandatory instruments, taking into account the applicability and processes related to making, amending, and interpreting treaties. Such determinations remain a case-by-case threshold "legal status" determination of the respective platform to address the "is it a vessel?" conundrum that considers the size and type of platform, how the platform is utilized, and where the platform is utilized. Of critical importance to such an analysis is an assessment of whether a UMV can navigate in a demonstrably safe and prudent manner and whether technical noncompliance is deemed a reasonable legal risk.

The issue of "what is a vessel" is not a novel matter for the Coast Guard. In fact, in its Legal Determination on Vessel Status of Paddleboard (Oct. 3, 2003), the Coast Guard Boating Safety Division (CG-5422) promulgated a determination on whether the Coast Guard considers a "paddleboard" to be a vessel. In that determination, the Coast Guard established a five-pronged test for determining whether any given watercraft is capable of being classified as a "vessel," provided here in relevant part:

1. Whether the watercraft is "practically capable" of carrying persons or property,
2. Whether the useful operating range of the device is limited by the physical endurance of its operator,
3. Whether the device presents a substantial hazard to navigation or safety not already present,

4. Whether the normal objectives sought to be accomplished by the regulation of a device as a "vessel" are present, and
5. Whether the operator and/or cargo would no longer be safe in the water if the device became disabled.

As the Coast Guard acknowledged in that determination, the criteria outlined above will not be applicable to every watercraft for which there is a question of status, and there is no set formula for making vessel determinations—each determination must be made on an individual basis. Adding to the complexity of this legal status determination, industry and military services alike have been developing a range of terminology used in describing UMVs, often depending on the degree of autonomy the vehicle has, whether it is used in combat, and whether it is below, on, or above the surface of the water. To illustrate, the literature supporting this report has revealed there is no universally accepted name for an UMV, and the general position in the governmental, scientific, legal, and technical communities has yet-to-be aligned. To this end, a key legal consideration will be whether the Coast Guard procures and operates a platform characterized or classified as a vessel, vehicle, or system, taking into account the level of autonomy (or advanced automation) at which the UxS intends to operate since this will be relevant to how a respective platform fits into the prevailing legal framework. Observations on the "legal challenge involved" are illustrated in the Report, Annex E, Figure E-4:



Besides international law and conventions, the Coast Guard may rely on domestic statute, regulation, and policy in formulating determinations as to the legal status of a respective asset or platform. For example, under U.S. statute, the word "vessel" includes every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water. (1 U.S.C. § 3). This definition does not distinguish between manned and unmanned watercraft. The Supreme Court has further established "reasonable observer test" in

that a watercraft does not fall within the 1 U.S.C. § 3 definition of a "vessel" unless a "reasonable observer," looking to the structure or watercraft's physical characteristics and activities, would consider it designed to a practical degree for carrying people or things over water.[5]

However, the study committee recognized the disparities that may develop in a respective assessment of whether a watercraft is a "vessel"—and thus subject to Coast Guard jurisdiction and authority—or not, and by example cited to a pilot program for marine domain awareness that was being undertaken with Saildrone unmanned surface vehicles (USVs) in footnote 12[6] of the Report. The Report referred to a Saildrone vehicle that:

> "…weighs 750 kg and has a narrow 7 meters long hull, 5 meters tall wing, and a keel with a 2.5 meters draft. The system combines wind-powered propulsion technology that enables mission durations of up to 12 months (sailing on average 100 km per day) and solar-powered meteorological… It operates either under the constant supervision of a human pilot via satellite or can navigate autonomously from prescribed beginning and end points within a user-defined safety corridor."

By way of comparison, the study committee understood that the Coast Guard had generally accepted the classification of a Saildrone as a "vehicle" (and thus outside the COLREGS and other vessel requirements) while previously determining a paddleboard to be a "vessel" subject to the COLREGS and certain regulatory requirements. Also, the cited article in the Report indicated that the Saildrone can "navigate autonomously," although the study committee did not receive any clarification as to how such navigation capability assessments were conducted.

To my knowledge, the Coast Guard has not promulgated any formal public guidance on their process for making a "vessel" determination. However, relevant to the study committee's recommendation to expand and normalize UxS experimentation, it is notable that on February 16, 2022 the Coast Guard promulgated CG-CVC Policy Letter 22-01 (Guidelines for Human-Supervised Testing of Remote Controlled and Autonomous Systems on Vessels).[7] CG-CVC Policy Letter 22-01 provides useful guidelines for testing, under human supervision, of remote controlled and autonomous systems on vessels, although that Policy Letter does not allow for reduction of vessel manning prescribed by law or regulations, including manning that is less than the minimums in 46 U.S.C. § 8301 and 46 CFR part 15, and pursuant to the COLREGS, at all times must maintain a proper look-out by sight and hearing.

Notably, since the Report was issued, the Coast Guard, Navy, and Marine Corps in March 2022 published the Commander's Handbook on the Law of Naval Operations (COMDTPUB P5800.7A)(the "Handbook"),[8] approved by Rear Admiral Melissa Bert, USCG (Judge Advocate

---

[5] *Lozman v. City of Riviera Beach*, 568 U.S. 115 (2013).
[6] Saildrone. "Eyes and Ears at Sea: US Coast Guard to Test Saildrone Autonomous MDA Capabilities." https://www.saildrone.com/news/uscg-test-maritime-domain-awareness-solution. ("Congress has tasked the United States Coast Guard (USCG) with examining the feasibility, costs, and benefits of improving maritime domain awareness in the remote Pacific Ocean using a low-cost unmanned surface system.")
[7] https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/CG-5PC/CG-CVC/Policy%20Letters/2022/CVC%20PL%2022-01%20Testing%20of%20remote%20and%20autonomous%20systems.pdf.
[8] https://usnwc.libguides.com/ld.php?content_id=66281931.

General and Chief Counsel), which determined that "unmanned systems constituting vessels will be governed by the COLREGS," and that unmanned systems may be under the commanded "by remote or other means." Thus, that Handbook seemed to affirm that an unmanned "vessel" will be subject to the COLREGS, hence the critical importance of the aforementioned "vessel or vehicle" distinction. The Handbook also determined that unmanned vessels and aircraft owned or operated by a State only on government, noncommercial service are entitled to sovereign immunity and may be used by States to exercise belligerent rights at sea.

International Efforts

Such legal questions on whether shipping regulations can keep pace with developing technology served as the basis for the International Maritime Organization (IMO) Maritime Autonomous Surface Ships (MASS) Regulatory Scoping Exercise (RSE) and legal surveys promulgated by the Comité Maritime International (CMI) to several national maritime law associations, through which the IMO and the CMI sought assessments on the applicability of MASS to certain conventions and domestic laws, and more generally. Since the Report's publication in 2020, the Maritime Safety Committee (MSC) of the IMO, at its 103rd session in May 2021, completed the RSE to analyze relevant ship safety treaties, in order to assess how MASS could be regulated,[9] and agreed to develop a goal-based MASS instrument in the form of a voluntary "MASS Code," due to take effect in 2025, to address the various gaps and themes identified by the RSE. The CMI national maritime law association for the United States, the US MLA, has since established a standing committee on Autonomous Ships and Smart Marine Technology.

Testing and Comity

In its Report, the study committee also recognized that the Coast Guard could utilize testing opportunities to clarify to what extent UMVs are subject to and comply with the COLREGS, how legal risk and allocation of responsibilities for gaining relevant use permissions is being obtained, what privileges and immunities are afforded the UMV and operator (e.g., "public vessel"), and which party is responsible for the handling of the data collected. To this end, the Report suggested that the U.S. Navy could be a useful indicator of these issues given their continued growth in the testing of UMVs, and since the Navy has also granted exemptions from regulatory and certification requirements for a discrete number of unmanned surface vehicles under 33 U.S.C. § 1605 "with respect to the number, position, range, or arc of visibility of lights, with respect to shapes, or with respect to the disposition and characteristics of sound-signaling appliances."

The Report had also recognized that "legal questions and challenges linked to autonomous shipping, as well as the solutions needed to resolve them, will differ depending on what choices are made in relation to manning, crew location, and autonomy level."[10] Generally, the Coast Guard has considered the statutes that govern the manning requirements for vessels to require a human onboard and that the Coast Guard cannot independently waive statutory manning requirements or the COLREGS absent Congressional authorization. This was addressed in more

[9] IMO MSC Circular.1/1638, Outcome of the Regulatory Scoping Exercise for the Use of Maritime Autonomous Surface Ships (MASS).

[10] Annex E, fn. 3, citing Henrik Ringbom. 2019. Regulating Autonomous Ships—Concepts, Challenges and Precedents, Ocean Development & International Law. DOI: 10.1080/00908320.2019.1582593.

detail in the more recent National Academies' study on "New Coast Guard Authorities"[11], recently briefed to this Subcommittee and on which I served as a committee member, in which it was recognized that Congress authorized an "at-sea recovery operations pilot program" that expressly permits the Secretary (e.g., Coast Guard) "to allow remotely controlled or autonomous vessel operations to proceed…including navigation and manning laws and regulations" and "modify or waive applicable regulations … to allow remote and autonomous vessel at-sea operations." [12] Subject to certain considerations, this otherwise seems to answer the question in the affirmative of whether Congress can indeed waive the manning requirements and the navigation laws (i.e., COLREGS), and that waiver authority presents an important precedent for the Coast Guard as a user and regulator of UxS.

Unmanned Underwater Vehicles and Aircraft Systems

Lastly, and as addressed in the Report, subsurface operations generally fall outside the purview of the COLREGS, and thus the study committee found few perceived legal impediments to such operations. However, the Coast Guard could still conduct an operational assessment for such types of subsurface and tethered remotely operated vehicle operations to review the varying levels of risk. And, as the U.S. Navy and National Oceanic and Atmospheric Administration (NOAA) are currently utilizing prototype unmanned underwater vessels/vehicles (UUVs), maintaining a collaborative approach and close communications with these entities could benefit the Coast Guard as a way to leverage lessons learned and best practices in development of the means to meet legal compliance. Similarly, in the case of unmanned aircraft systems (UAS), the use of UAS generally falls under Federal Aviation Administration (FAA) authorities and in parity with Department of Defense instructions. In all cases, however, the issue of budget and acquisition authority remains of vital consideration as the Coast Guard lags other services in the ability to rapidly acquire and deploy unmanned systems.

Coast Guard Acquisition Authorities and Models

The study committee assessed the challenges the Coast Guard faces when selecting the most timely and cost-effective acquisition authority and model. Although some acquisition authorities and models will be better suited to UxSs than others, the rapid pace of UxS advancements could require even more streamlined and nimble options to quickly respond to available opportunities and partnerships. The committee suggested that perhaps the most efficient way to acquire and accelerate the transition of UxS platforms and payloads to desired operations would be to identify and prioritize tested and proven technologies, and then adapt those systems for specific requirements. For example, mature technologies that are relatively inexpensive to operate, outfitted with operator-friendly control systems, and readily configured for multiple missions and payloads could be the primary focus of early transitions.

[11] National Academies of Sciences, Engineering, and Medicine. 2023. The Coast Guard's Next Decade: An Assessment of Emerging Challenges and Statutory Needs. Washington, DC: The National Academies Press. https://doi.org/10.17226/27059.

[12] James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, Pub. L. 117–263, div. K, title CXV, §11504, Dec. 23, 2022, 136 Stat. 4131; *see* At-Sea Recovery Operations Pilot Program § 11504(d)(1)-(2).

Several acquisition authorities are available to the Coast Guard, and selection of the most appropriate procurement mechanism for UxS is dependent on the scale and scope of the asset to be acquired:

- Federal Acquisition Regulation
- Level 3—Non-Major Acquisition Program
- Coast Guard Research, Development, Test, and Evaluation (RDT&E) Program
- Memoranda of Understanding
- DHS Cooperative Research and Development Agreements (CRADAs)
- Other Transaction Authority (OTA) (Research OTAs and Prototype OTAs)
- Silicon Valley Innovation Program
- DHS S&T Small Business Innovation Research Program
- Unsolicited Proposals
- Defense Innovation Unit (DIU)

As referenced in the Report, programmatic and technical specifications need to be addressed as part of the procurement decision making. Successful identification of acquisition programs requires a coordinated effort between the sponsor, resource, acquisition, and other stakeholders within the Coast Guard.

***

In conclusion, I want to thank you—Chairman Webster, Ranking Member Carbajal, and this Subcommittee—for the opportunity to testify.