TESTIMONY OF
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BEFORE THE
U.S. HOUSE SUBCOMMITTEE ON COAST GUARD AND MARITIME TRANSPORTATION

May 8, 2018

Mr. Chairman and distinguished members of the Committee, I am honored to testify today regarding the use of new maritime technologies to improve the efficiency and mission performance of the US Coast Guard. As CEO of ASV Global, the world's largest and most experienced unmanned surface vehicle company, I can speak as to where unmanned vessel technology is now and where it is going. However, before I do so, let me commend the work of the Coast Guard and this Subcommittee for its long history of outstanding service. The Coast Guard is saving lives, fighting crime, and defending our country on a daily basis, and the citizens of this country should never take this for granted.

Unmanned surface vehicles, or USVs, are unmanned boats. Like unmanned aerial vehicles (UAVs) and unmanned underwater vehicles (UUVs), unmanned surface vessels are revolutionizing the world we live in. Our company alone has delivered more than 100 USVs to military and commercial users across the globe. These USVs have ranged up to 40 feet in length, up to 1000 horsepower, and endurance in excess of 30 days. However, we currently have several inquiries, both commercial and military, for unmanned vessels in the 80' to 200' range with an endurance of up to three months. Leidos Corporation recently built a 132' USV, while the Norwegians and the Chinese are starting to build USVs up to 260' in length.

In addition to USVs that cannot accommodate personnel, ASV Global as well as others in the industry have built dozens of new optionally unmanned vessels. Optionally unmanned allows the asset to be deployed with a full crew onboard, a reduced crew, or no crew at all, and it allows the execution of unmanned missions as well as manned missions. Finally, ASV Global has upgraded several existing vessels to optionally unmanned. By upgrading to optionally unmanned, existing assets can experience the progression to unmanned without losing existing capabilities.

Unmanned vessels are being used for a variety of applications. In the military sphere, USV technology is being leveraged in mine hunting, mine sweeping and mine disposal, anti-submarine warfare, intelligence, surveillance, and reconnaissance (ISR), electronic warfare, and UAV

operations. From a commercial perspective, USVs are used for hydrographic and oceanographic surveys, underwater positioning and communications, marine mammal detection, oil spill dispersant deployment, oil spill boom towing, maritime firefighting, fish stock assessment, regional security, asset inspection, seismic operations, limited ROV operations, deployment of unmanned underwater vehicles, and deployment of aerial drones. Within the next few years, we will see larger USVs with longer endurance supporting much wider missions.

Just as driverless cars have a steering wheel and driver's seat, the current pragmatic approach to driverless vessels is to allow them to drive autonomously while remotely supervising their operation over a radio or satellite telemetry link. Situations requiring high speeds in high traffic areas are being avoided completely. At the same time, COLREG collision avoidance software continues to mature, so that remote supervision can eventually be phased over to full autonomous control.

Economics is the driving force towards the use of unmanned vessels. When you go from manned to unmanned ships, you don't need a galley and mess area. You don't need bunk rooms, hallways, heads, washing machines, dishwashers, freezers, stairways, workshops, a meeting room, or a full bridge. In a sense, an unmanned vessel is a hull with diesel tanks, engines, and a rack of computers and sensors. While I don't want to trivialize what is necessary for unmanned vessel operations, the capital cost of an unmanned vessel can be far less than that of its manned equivalent.

In addition to reduced capital costs, unmanned vessels can offer reduced daily operating costs as vessel personnel are condensed to those remotely supervising operations and those maintaining the unmanned vessels while in port. Maintenance of unmanned vessels is less than that of their manned counterpart as there is no personnel support equipment (such as refrigerators) to break. Finally, CONOPS such as offshore stationing can substantially reduce operational costs.

Unmanned vessels can be applied in two general ways. First, as force multipliers, where they are deployed and monitored from a manned mother ship. Second, they can work independent of other vessels, leaving port and transiting over the horizon to operate for weeks at a time while being monitored from a command center via satellite. Both methods are proven.

A byproduct of unmanned vessel technology is the bridge aid which would include COLREG collision avoidance software and the associated collision avoidance sensors. The bridge aid can be used to advise the ship's captain on navigation maneuvers, or, if necessary, it can be set to override manual systems to insure a collision is avoided.

Potential applications of unmanned vessel technology to the USCG are widespread. USVs can offer persistent maritime domain awareness, where unmanned, or optionally unmanned vessels, large and small, can remain on station for weeks at a time while providing intelligence, surveillance, and reconnaissance, as well as interception, and to a degree, interdiction. For example, ASV Global recently converted a 38' offshore patrol craft to optionally unmanned. That vessel will be able to patrol a region for up to two weeks at a time, as well as investigate suspect vessels.

With long endurance unmanned patrol craft stationed for long periods offshore, Coast Guard personnel at land-based command centers can dispatch deployed unmanned vessels to intercept and assess. VHF radios on the USVs can be accessed by the command centers via satellite relay to provide communications and two-way hailing options with intercepted vessels. Non-lethal weapons, such as prop / net entanglement systems can be deployed by USVs to stop suspect vessels until manned Coast Guard vessels can arrive and apprehend. Offshore stationed USVs can be used for drug vessel interdiction, illegal fishing interdiction, border protection, collision investigations, search and rescue, pollution incident investigations, and investigation of the numerous reported suspect vessels in distress.

Launches and rigid hull inflatable boats (RHIBs) installed on Fast Response Cutters, Offshore Patrol Cutters, and National Security Cutters can be upgraded to optionally unmanned giving the ship's officer the choice of dispatching these small boats with or without personnel.

Smaller USVs can be deployed from land or sea and programmed to replace missing channel markers and buoys by self-anchoring on location. Smaller USVs can also provide waterborne patrols of critical maritime infrastructure, harbor security, and swimmer detection.

Coast Guard vessels of all sizes are candidates for upgrades with collision avoidance bridge aids to mitigate maritime collisions. Future ship build programs should certainly consider fully unmanned, partially unmanned, and optionally unmanned ships.

These are just a few of the many applications of unmanned surface vessel technology that can be considered by the US Coast Guard. While additional appropriations are necessary for the Coast Guard to capitalize on unmanned technology, the economic and strategic advantages are likely to be overwhelmingly positive as they are with other unmanned technologies in the military and commercial sectors.

I would be happy to answer any questions you may have.