Homeland Security

Science and Technology

Disaster Assessment at Harbors and Ports: The Unmanned Port Security Vessel

A DHS Science and Technology Center of Excellence Solution

Unmanned Vessel Provides Real-time Detection in Harbors and Ports

Submerged debris and turbid water conditions can make it difficult to assess threats to ports and harbors after catastrophic natural or man-made disasters. It can take days or weeks to clear a port for operations after a disaster.

To assist, the Center for Maritime, Island and Remote and Extreme Environment Security (MIREES) at the University of Hawaii (UH), a Department of Homeland Security (DHS) Science and Technology (S&T) Center of Excellence, has worked with the U.S. Coast Guard (USCG) and the State of Hawaii Harbors Division of the Department of Transportation to develop the **Unmanned Port Security Vessel (UPSV)**. The UPSV integrates multiple sensors for rapid inspection of debris and water conditions in shallow water and port environments.

Cost-effective Technology that Supports Multiple Missions

The low-cost, easily deployable UPSV can map and survey a port or waterway and provide crucial information within minutes to hours, rapidly identifying subsurface hazards. UPSV provides real-time, actionable data that enables harbor managers to more efficiently direct the use of maintenance personnel and commercial divers to specific areas that need closer inspection. This minimizes boat expenses and on-water personnel time.

USCG, harbor masters, and commercial port operators can use the UPSV to conduct multiple missions including:

- Routine subsurface surveys of ports and harbors, including inspection of infrastructure above and below the water line
- Underwater change detection and threat assessments for piers, pilings, and the harbor seafloor
- Post-disaster damage assessments for the recovery of port operations

The Unmanned Port Security Vessel

UPSV Performance Capabilities

- Automated or line-of-sight navigation via GPS-enabled, remote command and control
- Quick disassembly/assembly for helicopter transport and rapid deployment (one-hour breakdown and set-up time) by a two- to three-person support team
- Multiple integrated sensors (e.g., high-resolution bathymetry sonars, high-definition video, low-light and infrared cameras, chemical sensors)

UPSV Physical and Performance Specifications

- Twin-hull catamaran
- 6.6 feet long, 5 feet wide, 160 pounds
- Top speed is 5 knots; six hours continuous survey at 3 knots
- 220 pounds of additional payload capacity
- Real-time communication via 900 MHz wireless with a range of more than 5 miles
- Hot-swappable propulsion batteries

Next Steps

UH and Battelle, a nonprofit research and development organization, recently signed a Memorandum of Understanding (MOU). Through this MOU, UH and Battelle are working to identify technology transition pathways and commercialization opportunities for the UPSV.

To learn more about UPSV, contact DHS S&T Office of University Programs .