

## Unmanned Influence Sweep System (UISS) include Unmanned Surface Vessel (USV) and Unmanned Surface Sweep System

### Executive Summary

- The Unmanned Influence Sweep System (UISS) demonstrated an unmanned, semi-autonomous capability to sweep acoustically and/or magnetically actuated naval mines during November 2019 testing.
- Planned mine clearance levels were not always achieved due to inaccuracies in the planning factors established for system employment in developmental testing.
- Incomplete mission planning capabilities and data contributed to problems in effective employment of UISS for the operational assessment (OA).
- The system lacked adequate capability to inform remote operators of navigation hazards and operational minesweeping status.



### System

- The UISS is an unmanned, self-propelled, semi-autonomous surface vehicle equipped with capability to sweep acoustically and/or magnetically actuated naval mines.
- The UISS is designed to be deployed, operated, and maintained from a Littoral Combat Ship, adequately equipped vessel of opportunity, or from a shore site.
- The principal UISS system components are:
  - Unmanned Surface Vehicle (USV)
  - Unmanned Surface Sweep System (US3) including a power system, magnetic field generator, an acoustic generator, and handling equipment
  - Mine Detonation Detection system
  - Command, Control, Communications, and Computers (C4) suite
  - Obstacle avoidance sensor package including a USV-mounted radar and visual surveillance system

- For vessel of opportunity or shore-based employment, UISS is operated using a Mission Package Portable Control System

### Mission

The U.S. Navy will use the UISS to provide an unmanned, organic, off-board minesweeping capability for use in littoral regions of the ocean. The UISS is the Navy's mine countermeasure asset slated to replace legacy surface ship and airborne minesweeping capabilities for mine clearance in sea lanes, straits, choke points, fleet operating areas, and amphibious objective areas.

### Major Contractor

Textron Systems Corporation – Hunt Valley, Maryland

### Activity

- In November 2019, the Navy's Operational Test and Evaluation Force (OPTEVFOR) conducted an OA using a DOT&E-approved test plan with fleet personnel operating the UISS from a shore site at the South Florida Ocean Measurement Facility, Florida.
- Testing deviated from the approved test plan due to high seas that limited UISS operations and compressed the limited time available for completing the OA. Operational testers completed all planned UISS missions and collected target data by reducing the operational area in order to shorten mission times.
- OPTEVFOR issued an incorrect test directive for mission planning. The UISS mission planner used this test directive to program minesweeping missions against threats with characteristics that differed from the specified threats in the approved test plan.
- The Navy used the preliminary OA results to inform the January 2020 Milestone C decision, which authorized low-rate initial production of the system.

## Assessment

- The UISS demonstrated capability to sweep acoustically and/or magnetically actuated naval mines.
- The mission planning deviation from the approved test plan precluded comparison of the OA results to Navy performance requirements.
- The UISS mission planner was not adequately equipped or trained to effectively plan UISS sweep missions.
  - UISS mission planning software was not complete for the OA. The mission planner had to identify and interpret planning factors (e.g., sweep swath width and actuation probability for threat mines) from hardcopy references and manually enter them into the mission planning system to determine and program UISS sweep tracks.
  - The correct environmental data for the test area were not available in Mine Environmental Decision Aides Library (MEDAL) to support the mission planning for the OA.
  - Lacking information on the actual acoustic environment in the test area, the mission planner used incorrect planning factors for acoustic environment.
- Post-test analysis showed that planned mine clearance levels were not always achieved due to inaccuracies in the planning factors established for system employment in developmental testing.
- The UISS suffered an operational mission failure of the acoustic signal generator during the OA, but the failure was not discovered until after the OA.
- The cameras and radar installed on the USV did not provide sufficient situational awareness to ensure that a remote operator would routinely be able to detect and avoid other surface vessels and obstacles without assistance from safety boats accompanying the USV.
- The OA focused on testing the ability of UISS to sweep mines when pre-positioned at the mine danger area. Testing precluded assessment of the system's sustained area coverage rate since UISS employment for the OA was not operationally realistic. Range safety restrictions prohibited nighttime operation, and the test team had no opportunity to determine the time required to recover, quickly turn around, refuel, and re-launch the USV to continue an ongoing mission.
- The system accrued insufficient operating time during the OA to determine whether it will be able to meet the Navy reliability requirement.

## Recommendations

The Navy should:

1. Complete adequate characterization of UISS sweep capabilities and update mission planning factors to improve sweep mission effectiveness.
2. Complete UISS mission planning capability and add UISS planning factors into MEDAL.
3. Install a sensing capability on the USV or the sweep system to monitor the acoustic signal generator output to increase the likelihood that the operator will recognize failures when they occur.
4. Enhance user training for planning minesweeping missions using UISS.
5. Upgrade the obstacle avoidance sensor package radar and visual surveillance systems to improve remote operator situational awareness of navigation hazards.