AN/WLD-1(V)1 Remote Mine-hunting System (RMS)

Executive Summary
- The Remote Mine-hunting System (RMS) came under DOT&E oversight in April 2006.
- The system underwent an operational assessment in August 2006.
- The mine-hunting vehicle demonstrated improved reliability compared to prior testing results.
- Performance of the AQS-20A sonar and the system's ability to locate and classify mine-like objects could not be determined based on the most recent testing.

System
- RMS is a naval mine detection system.
- RMS includes an unmanned, diesel-powered, semi-submersible vehicle called the remote mine-hunting vehicle (RMV) that tows a variable depth sensor.
- The RMV is launched and controlled remotely from select DDG 51 Flight IIA class ships that are outfitted with a launch and recovery subsystem and from Littoral Combat Ships (LCS) equipped with a mine warfare mission package.
- A data link subsystem provides continuous, real-time communications between the host ship and the RMV for command and control and transmission of sensor data.
- Missions are planned and controlled and data are processed, displayed, and recorded using a remote mine-hunting functional segment integrated into the host ship's combat system.

Mission
- A ship equipped with RMS will employ it to detect, classify, and identify moored and bottom mines in shallow and deep

water, allowing host ships to determine whether potential sea routes and operating areas contain mines.
- An RMS-equipped ship gives the Maritime Component Commander some organic or "in-stride" mine countermeasures capability. Mine avoidance decisions may be possible without waiting for dedicated mine countermeasures ships or helicopters.

Activity
- The RMS program was redesignated an Acquisition Category 1C program from Acquisition Category II in April 2006 due to increased development spending. The program came under DOT&E oversight at that time.
- The system underwent operational assessment in August 2006 in accordance with a DOT&E-approved test plan. The Test and Evaluation Master Plan (TEMP) was approved by the Navy prior to RMS coming under DOT&E oversight.
- The Navy approved a low-rate initial production (LRIP) procurement of four additional RMS units in September 2006. Three other LRIP units were previously authorized.
- IOT&E is scheduled for June 2007.

Assessment
- The testing during the operational assessment was adequate. Objectives were primarily related to operational availability and reliability of the RMV.
- The operational assesssment demonstrated that the RMV Engineering Development Model (EDM) improved operational availability and reliability compared to that documented in pre-oversight test reports. The first LRIP RMV will be ready in early 2007 and will be used for IOT&E in June 2007.
- Ground truth regarding the location of some mine shapes placed for the test was suspect. As a result, the true performance of the AN/AQS 20A sonar sensor and the

system's ability to locate and classify objects could not be accurately assessed. Test planning for IOT&E will require a higher level of detail than previous RMS testing.

- Examination of the program documents indicates that some critical mine warfare related requirements must be clarified or specified. In particular, the Operational Requirements Document (ORD) does not detail conditions under which achieved search level and achieved search rate are to be measured. These parameters refer to the confidence that all expected mines were located as well as the speed of the search, based on what kind of mines are expected. They are inversely related and can be influenced by the test design.
- The ORD does not specify a maximum false classification density, or the number of non-mine-like objects erroneously classified as mine-like per square mile. Without an upper limit, the RMS can satisfy its requirements even if it falsely classifies too many objects as possible mines, potentially causing a Maritime Commander to avoid an area unnecessarily. The high false classification density observed during the operational assessment may have been attributed to operator training as well as system deficiency.
- The ORD states that RMS will be operated from select DDG 51 class ships. The Navy intends to make the Littoral

Combat Ship the primary host for RMS. The recent operational assessment employed fleet operators aboard a surrogate vessel, but IOT&E must be conducted from a commissioned ship to be adequate.
- The TEMP for this program must be updated before additional testing takes place.

Recommendations
- Status of Previous Recommendations. There was no FY05 report submitted on RMS.
- FY06 Recommendations. The Navy should:
  1. Ensure future test planning includes sufficient time and resources to establish ground truth positions of mine shapes and other objects in the test area before testing, as well as to reconfirm positions afterward.
  2. Clarify the ORD to state the condition under which achieved search level and achieved search rate are to be measured and assign threshold and objective values for the false classification density.
  3. Update the TEMP for OSD approval to reflect future testing, including IOT&E and possible follow-on testing.