

Q-53 Counterfire Target Acquisition Radar System

Executive Summary

- In February 2012, the Army selected Lockheed Martin as the primary contractor for the Q-53 Program of Record. The Army plans to buy 136 Q-53 radars as part of the Program of Record.
- The Army contracted with Lockheed Martin to build 38 Quick Reaction Capability (QRC) radars to support an Urgent Materiel Release. The QRC production buy was completed in March 2012. Five QRC systems are operating in Afghanistan.
- The Army completed the first reliability test of the Program of Record radar. The radar's system abort rate was better than the rate observed in the system demonstration prior to the February 2012 Milestone C update. However, the demonstrated reliability rate is below the predicted rates needed to reach reliability requirements by the IOT&E.

System

- The Army changed the designation of the Enhanced AN/TPQ-36 (EQ-36) radar to the AN/TPQ-53 (Q-53) radar in September 2011.
- The Q-53 is a mobile radar system designed to detect, classify, and track projectiles fired from mortar, artillery, and rocket systems using a 90-degree or continuous 360-degree sector search.
- The radar provides target location of threat indirect fire systems with sufficient accuracy for effective counterfire.
- The Q-53 is designed to operate with the Counter – Rocket, Artillery, Missile (CRAM) system and the future Indirect Fire Protection Capability System.
- The Army intends to field the Q-53 radar to the sensor platoons in Brigade Combat Teams and Fire Brigades to replace the legacy AN/TPQ-36 and AN/TPQ-37 Firefinder Radars.
- The Q-53 is operated by a crew of four Soldiers and transportable by C-17 aircraft, with battlefield mobility provided by two Family of Medium Tactical Vehicle trucks.



- The Army contracted with Lockheed Martin Missile Systems and Sensors to develop and field 38 QRC radars to support an Urgent Materiel Release. Fielding began in 2010 with five systems operating in Afghanistan.
- The Army intends to produce 136 Program of Record Q-53 radars.

Mission

Field Artillery units protect friendly forces by employing the Q-53 radar to determine timely and accurate location of threat rocket, artillery, and mortar systems for defeat with counterfire engagements. Air Defense Artillery units will use the Q-53 radar integrated into the CRAM and Indirect Fire Protection Capability System to warn friendly forces and to engage incoming threat indirect fires.

Major Contractor

Lockheed Martin Missile Systems and Sensors – Syracuse, New York

Activity

- The Army conducted a Milestone C update on February 27, 2012. The Army selected Lockheed Martin as the primary contractor.
- The Army purchased 33 systems as part of the Milestone C update decision.
- The Army intends to purchase an additional 18 systems after the Limited User Test (LUT) scheduled for October 22 through November 8, 2012, and the remaining 85 systems at the 4QFY14 Full-Rate Production decision following the IOT&E in 1QFY14.
- The Army completed the first Program of Record reliability and performance tests at Yuma Proving Ground, Arizona, from May 15 through August 17, 2012. The contractor-operated radars completed 1,662 test hours. The two radars operated continuously in 72-hour cycles and made moves representative of the distances and terrain expected in an operational environment.
- Environmental chamber testing began at White Sands Missile Range, New Mexico, in August 2012. It will be completed by the end of 2012.

ARMY PROGRAMS

Assessment

- Based on developmental testing at Yuma Proving Ground, the radar's reliability has improved since the system demonstration, but is below the growth projections needed to reach the reliability requirement at IOT&E.
- During the system demonstration in 2011, the radar averaged 1 system abort every 30 hours. During 2012 developmental testing, the Program Office made three significant configuration changes to address system aborts.
 - During the first 2 configuration changes, the radars averaged 1 system abort every 103 hours and 1 system abort every 238 hours, respectively.
 - During limited testing of the final configuration (298 test hours), the radars averaged a system abort every 75 hours.
- To reach the reliability threshold, the Program Office expected the radar to average 1 system abort every 257 hours. The Army determined two of the four system aborts during testing of the final configuration were due to problems with the

user manual and training deficiencies, unrelated to the final configuration. The user manual and training will be updated prior to the LUT. The remaining two system aborts were software related and will not be addressed prior to the LUT.

- The radar met performance requirements during limited developmental testing in FY12. More extensive performance testing is planned for the LUT in October and November 2012.

Recommendations

- Status of Previous Recommendations. The Army satisfactorily addressed all of the FY11 recommendations.
- FY12 Recommendations. The Army should:
 1. Conduct future developmental reliability tests with trained civilian crews and limited contractor involvement.
 2. Continue dedicated reliability testing focusing on system aborts.