

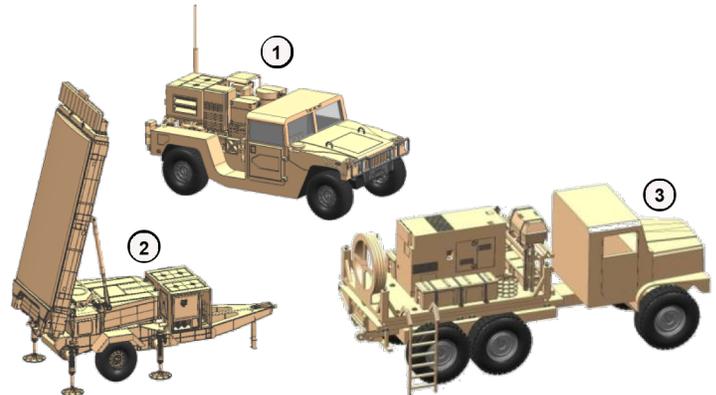
Ground/Air Task Oriented Radar (G/ATOR)

Executive Summary

- The Marine Corps Program Executive Office (PEO) Land Systems (LS) is proceeding with early deployment for a limited number of Ground/Air Task Oriented Radar (G/ATOR) Block 1 and Block 2 systems in FY18. DOT&E endorsed the PEO LS early deployment plans in February 2014. These systems will use a Gallium Arsenide receiver/transmitter configuration.
- In March 2014, PEO LS completed Milestone C and authorized the acquisition of low-rate initial production (LRIP) systems.
- The Block 1 Developmental Test (DT) 1C is complete and the Block 2 DT 1D is underway. A total of four LRIP systems support these tests.
- DT 1C littoral testing at Marine Corps Outlying Field (MCOFL) Atlantic, North Carolina, was limited in scope; however, G/ATOR demonstrated the Block 1 ability to detect and track aircraft targets in the littoral environment and demonstrated its ability to support the intended mission areas.
- During DT 1C, the Program Management Office (PMO) led and the Marine Corps Operational Test and Evaluation Activity (MCOTEA) observed a Cooperative Vulnerability and Penetration Assessment (CVPA) and a limited Adversarial Assessment (AA). Though the CVPA and AA identified cyber vulnerabilities, they were not sufficient to support a full assessment.
- IOT&E of G/ATOR in a new Gallium Nitride receiver/transmitter configuration is scheduled for FY19.

System

- G/ATOR is a short- to medium-range, air-cooled, phased-array radar under development for the Marine Corps. It is intended to replace five current radar systems and augment the AN/TPS-59 long-range radar. A total of 57 G/ATOR systems are planned for procurement.
- The PEO LS is developing G/ATOR in three blocks.
 - Block 1 develops the basic hardware and provides Air Defense/Surveillance Radar (AD/SR) capability. It replaces the AN/UPS-3, AN/MPQ-62, and AN/TPS-63 radar systems.
 - Block 2 adds a ground counterbattery/counter-fire mission capability and replaces the AN/TPQ-46 radar system.
 - Block 3 was a series of enhancements, including Identification Friend or Foe Mode 5/S, that are instead being incorporated into other blocks. The term Block 3 is no longer used.
 - Block 4 replaces the AN/TPS-73 radar system for air traffic control capability, which will be a future development effort.



1 - Communications Equipment Group (CEG)
 2 - Radar Equipment Group (REG)
 3 - Power Equipment Group (PEG) on MTVR pallet
 MTVR - Medium Tactical Vehicle Replacement

- The G/ATOR baseline system configuration is comprised of three subsystems:
 - The Radar Equipment Group consists of the phased-array radar mounted on an integrated trailer. The trailer is towed by a Medium Tactical Vehicle Replacement.
 - The Power Equipment Group includes a 60-kilowatt generator and associated power cables mounted on a pallet. The generator pallet is carried by a Medium Tactical Vehicle Replacement.
 - The Communications Equipment Group provides the ability to communicate with and control the radar and is mounted inside the cargo compartment of a High Mobility Multi-purpose Wheeled Vehicle.
- The first six LRIP systems have receiver/transmitter modules built using Gallium Arsenide. Subsequent systems, representing the majority of the production buy, will have receiver/transmitter modules built using Gallium Nitride, which is more power efficient and reduces system costs.

Mission

The Marine Air-Ground Task Force (MAGTF) commander will employ G/ATOR within the Air Combat Element (ACE) and the Ground Combat Element (GCE). Within the ACE, G/ATOR will provide enhanced situational awareness and additional capabilities to conduct short- to medium-range radar surveillance and air defense, and air traffic control missions. Within the GCE G/ATOR will provide ground weapons locating capability for conduct of counter-battery/counter-fire missions.

Major Contractor

Northrop Grumman Electronic Systems – Linthicum, Maryland

FY17 NAVY PROGRAMS

Activity

- The G/ATOR program completed Milestone B and entered the Engineering and Manufacturing Development phase in August 2005 as an Acquisition Category II program. However, in October 2011, the Navy redesignated G/ATOR as an Acquisition Category IC program due to increases in the amount of Research, Development, Test, and Evaluation funding required to meet mandatory Force Protection requirements.
- In March 2014, PEO LS completed Milestone C for Block 1 and Block 2 and authorized the acquisition of LRIP systems. Northrop Grumman Electronic Systems delivered four G/ATOR LRIP systems in February, April, August, and September 2017, and intends to deliver two more systems before the end of CY17.
- Using a G/ATOR LRIP system, the Marine Corps conducted DT 1C from May 2017 to September 2017 at NASA Wallops Flight Facility, Virginia; Marine Corps Air Station (MCAS) Cherry Point, North Carolina; MCOLF Atlantic, North Carolina; and MCAS Yuma, Arizona.
- The Marine Corps began DT 1D on September 25, 2017, with an expected completion in 2QFY18. DT 1D is being conducted at Yuma Proving Grounds, Arizona; Marine Corps Air Ground Combat Center, Twentynine Palms, California; and White Sands Missile Range, New Mexico.
- The Marine Corps conducted interoperability testing on G/ATOR LRIP systems at Wallops Island and MCAS Cherry Point. Data were also collected in a littoral environment at MCOLF Atlantic.
- During DT 1C, the PMO led and the Marine Corps Information Assurance Red Team performed a CVPA and limited AA.
- Since the Marine Corps was collecting data in an operationally realistic environment, DOT&E approved DT 1C and DT 1D as integrated tests with MCOTEAs observation. Further, DOT&E approved data to be used to support upcoming FY18 operational assessments (OAs).
- The Marine Corps has conducted DT 1C and DT 1D information technology testing to date in accordance with a DOT&E-approved test plan.
- The OA for Block 1 began September 2017 at MCAS Yuma and will support an early deployment decision in 2QFY18.
- The OA for Block 2 is scheduled to begin during 3QFY18 and will support an early deployment decision in 4QFY18.

- IOT&E of G/ATOR Block 1 and Block 2 in a new Gallium Nitride receiver/transmitter configuration is scheduled for FY19.

Assessment

- During interoperability testing with the Composite Tracking Network (CTN) system while integrated into a Cooperative Engagement Capability Network, G/ATOR maintained connectivity. In addition, G/ATOR maintained connectivity with the Phase 2 Common Aviation Command and Control System and CTN while operating within the Tactical Air Operations Center.
- Littoral testing at MCOLF Atlantic was limited in scope, testing G/ATOR with scheduled aircraft sorties as well as aircraft targets of opportunity. G/ATOR was able to detect and track these targets in the littoral environment, demonstrating its support of the following mission areas: surveillance, positive control of friendly aircraft, and intercept of hostile aircraft and missiles.
- The CVPA and limited AA helped to characterize system cyber vulnerabilities. However, they were not conducted under operationally realistic conditions and did not assess operator responses to various cyber-attacks in end-to-end scenarios and therefore cannot support a full assessment.

Recommendations

- Status of Previous Recommendations. As a result of the findings of a Blue Ribbon Panel on the reliability of G/ATOR, the Program Office has re-evaluated the G/ATOR reliability program and the system's reliability growth curves consistent with the prior recommendation.
- FY17 Recommendations.
 1. The PMO should continue to monitor G/ATOR reliability and availability during developmental testing in preparation for the upcoming OAs as well as the IOT&E currently scheduled for FY19.
 2. In order to fully assess G/ATOR capabilities, MCOTEAs should ensure that the Marine Corps Information Assurance Red Team conducts a CVPA and an AA on both the Block 1 and Block 2 systems in an operationally realistic environment in support of IOT&E. The CVPA and AA should also assess operator responses to various cyber-attacks in end-to-end scenarios.