

Abrams M1A2 System Enhancement Program (SEP) Main Battle Tank (MBT)

Executive Summary

- DOT&E approved an updated Abrams M1A2 System Enhancement Program (SEP) version 3 (v3) Test and Evaluation Master Plan (TEMP) on December 28, 2018. The updated TEMP included revisions to planned Production Qualification Test (PQT) events and the FOT&E scope.
- The Army conducted the Abrams M1A2 SEpv3 FOT&E at Fort Hood, Texas, April 22 through May 11, 2019.
- In FY19, the Army concluded the M1A2 SEpv3 full-up system-level (FUSL) live fire testing. To complete the survivability assessment of the M1A2 SEpv3, the Army needs to execute the remaining live fire test series focused on addressing combat-induced vulnerabilities of stored ammunition and the modeling and simulation (M&S) effort focused on characterizing armor effectiveness across the operational envelope. The Army expects to complete the M1A2 SEpv3 LFT&E program in 1QFY20.
- DOT&E plans to publish an operational and live fire test report in 2QFY20 to support the program's scheduled materiel release decision in 3QFY20.

System

- The Abrams M1A2 Main Battle Tank (MBT) is a tracked, land combat, assault weapon system equipped with a 120-mm main gun designed to have significant survivability, shoot-on-the-move firepower, and joint interoperability (for the exchange of tactical and support information). The Abrams MBT possesses a high degree of maneuverability with the ability to respond to hostile entities on the battlefield by engaging or avoiding them before they become a threat.
- The M1A2 SEpv2 is currently fielded. It upgrades the M1A2 by providing increased memory and processor speeds; full color tactical display; digital map capability; compatibility with the Army Technical Architecture; improved target detection, recognition, and identification through incorporation of second-generation Forward-Looking Infrared technology and electronics; Common Remotely Operated Weapon Station (CROWS)-Low Profile (LP); and crew compartment cooling through the addition of a thermal management system.
- M1A2 SEpv3 fielding is planned for FY20. The M1A2 SEpv3 is an upgrade to the M1A2 SEpv2. The upgrades include:



- Power generation and distribution to support the power demands of future technologies
- Compatibility with joint battle command network
- Survivability enhancements including Next Evolution Armor and reduction in vulnerability to IED threats
- Reduction in vulnerability to remote-controlled IEDs
- Improved lethality by providing the ability for the fire control system to digitally communicate with the new large caliber ammunition through use of an ammunition datalink
- Energy efficiency (sustainment) due to the incorporation of an auxiliary power unit
- Improved silent watch capability

Mission

- Commanders employ units equipped with the M1A2 SEP MBT to close with and destroy the enemy by fire and maneuver across the full range of military operations.
- The Army intends the M1A2 SEP MBT to defeat and/or suppress enemy tanks, reconnaissance vehicles, infantry fighting vehicles, armored personnel carriers, anti-tank guns, guided missile launchers (ground- and vehicle-mounted), bunkers, dismounted infantry, and helicopters.

Major Contractor

General Dynamics Land Systems – Sterling Heights, Michigan

Activity

- The Army conducted operational and live fire testing in accordance with DOT&E-approved test plans.
- The Army updated the Abrams M1A2 SEpv3 TEMP in FY19. The TEMP update includes revisions to the PQT and

FOT&E plans as a result of positive performance during Production Prove-out Test events and programmatic changes. DOT&E approved the updated TEMP on December 28, 2018.

FY19 ARMY PROGRAMS

- The Army conducted the Abrams M1A2 SEPv3 FOT&E at Fort Hood, Texas, April 22 through May 11, 2019. The test unit consisted of Armored elements from the 1st Brigade, 1st Cavalry Division. The test included offensive and defensive tactical scenarios conducted over three 24-hour periods. The Army conducted a cybersecurity Adversarial Assessment.
- The Abrams M1A2 SEP v3 PQT started in 4QFY18 and is ongoing.
- In FY19, the Army completed FUSL testing to assess the survivability of a combat-ready tank against IEDs, mines, and direct- and indirect-fire. The FUSL test series included 20 tests on 3 production-representative tanks.
- Ammunition Compartment testing began in 4QFY19 and will complete in 1QFY20. These tests examine threats that perforate the tank armor and strike the ammunition compartment to assess the reaction of the stowed ammunition, and any resulting impacts to the crew.
- The Abrams M1A2 SEPv3 survivability evaluation across operational engagement conditions will depend on live fire test data and M&S data. The Army is working on the validation and verification of the M&S tools critical to this evaluation.
- DOT&E plans to publish an operational and live fire test report in 2QFY20 to support the program's scheduled materiel release decision in 3QFY20.

Assessment

- The Abrams M1A2 SEPv3 does not have a unique requirements document to specify expected survivability and force protection capabilities. The M1A2 Operational Requirements Document from 1994 is the overarching requirements document the Army uses for all M1A2 variants.
- DOT&E continues to collect and assess available live fire test data to characterize the protection provided by the M1A2 SEPv3 against expected operational threats. DOT&E will use M&S to support the final assessment, if the Army demonstrates the credibility of the pertinent M&S tools.

Recommendations

The Army should:

1. Ensure future Abrams tank upgrades are supported by a comprehensive set of requirements that accurately reflect the current and future operational challenges.
2. Complete the planned validation and verification activities of the pertinent survivability models in accordance with the DOT&E-approved plans.
3. Consider the findings of the DOT&E and Army LFT&E SEPv3 evaluation reports to enhance the survivability of future Abrams tank upgrades