

Abrams M1A2 System Enhancement Packages (SEPs) and Active Protection System (APS)



The Army announced in September 2023 that it will end the M1A2 SEPv4 program and instead develop the Abrams M1E3 Main Battle Tank (MBT) modernization program. The Abrams M1A2 System Enhancement Package version 4 (SEPv4) was intended to be an incremental upgrade to the Abrams M1A2 SEPv3 to improve lethality and survivability. The Army tested the TROPHY Active Protection System (APS) installed on Abrams M1A2 SEPv3 tanks in FY22 to inform an urgent materiel release (UMR) in May 2023. The TROPHY APS intercepted most of the incoming threats, and the Abrams tank base armor provided adequate force protection.

SYSTEM DESCRIPTION

The Abrams M1A2 MBT is a tracked, land combat, assault

weapon system equipped with a 120-mm main gun offering shoot-on-the-move firepower and joint interoperability. When compared with SEPv3, units equipped with the Abrams SEPv4

are intended to have increased survivability, lethality, and maneuverability with the ability to respond to hostile entities on the battlefield by engaging or avoiding them before they become a threat.

The Army was continuously upgrading the Abrams M1A2 MBT through engineering change proposals, each significant upgrade is reflected in the version of the system enhancement package. SEPV2 upgrades the M1A2 by providing improved communication capabilities, target detection, recognition, and identification. SEPV3 provides increased crew survivability. SEPV4 was intended to provide improved lethality. The Abrams M1E3 MBT is intended to make the capability improvements needed to fight against future threats on the battlefield of 2040 and beyond.

TROPHY APS is an add-on kit to Abrams M1A2 SEPV2 and SEPV3 tanks, designed to detect, identify, track, and degrade enemy rocket and missile threats. The TROPHY APS adds approximately 5,000 pounds to the tank.

MISSION

Commanders employ units equipped with the Abrams M1A2 MBT to maneuver across the full range of military operations and destroy the enemy by fire. MBTs equipped with APS offer additional defense against enemy rocket and missile threats.

PROGRAM

The Abrams M1A2 is an Acquisition Category IC program. The Army was incrementally upgrading the tank design through engineering change proposals. The Army announced in September 2023 that it will end the M1A2

SEPV4 program and instead develop the Abrams M1E3 MBT modernization program.

The Army has pre-positioned TROPHY APS kits for installation on Abrams SEPV2 and SEPV3 tanks, fulfilling two directed requirements signed in October 2016 and March 2018 by the Army's Deputy Chief of Staff, G8. DOT&E published a classified early fielding report in March 2023 to inform the urgent materiel release decision in May 2023.

» MAJOR CONTRACTORS

- General Dynamics Land Systems – Sterling Heights, Michigan
- Leonardo DRS, Inc. and Rafael Advanced Defense Systems Ltd. partnership – St. Louis, Missouri

TEST ADEQUACY

DOT&E approved the Abrams SEPV4 Test and Evaluation Master Plan in March 2023. With the announcement to terminate the SEPV4 effort and proceed with the M1E3, the working level integrated product team will reconvene to update the test and evaluation strategy. The Army completed integrated testing of the 3rd generation forward looking infrared system as integrated on the tank in October 2022 to assess the system's capability to detect, recognize and identify targets. The Army initiated automotive and safety developmental testing in 3QFY23.

The Army conducted TROPHY APS Phase III testing with Abrams SEPV3 tanks in FY22 at Army Test Centers in accordance with DOT&E-approved test plans and observed by DOT&E. Testing was adequate to assess operational effectiveness and survivability. The test scope focused on verifying the performance envelope and capability demonstrated with Abrams SEPV3 tanks equipped with APS. Testing included live fire flight tests with inert and live threats fired against a fully functional Abrams SEPV3 tank.

PERFORMANCE

» EFFECTIVENESS, SUITABILITY, AND SURVIVABILITY

TROPHY APS effectively detects, identifies, tracks, and intercepts incoming threats with exceptions for certain range conditions and engagement profiles. The Abrams SEPV2 and SEPV3 base armor configurations provide adequate force protection against the threat and countermeasure debris generated by a successful intercept. The system, as installed on SEPV3, demonstrated similar capabilities and deficiencies as the system installed on SEPV2.

Additional details can be found in DOT&E's two classified reports on TROPHY APS. The first report, published in June 2020, assessed the performance of Abrams M1A2 SEPV2 equipped with TROPHY APS. The second report, published in March 2023, assessed the

performance of Abrams M1A2
SEPV3 equipped with TROPHY APS.

RECOMMENDATION

The Army should:

1. Address recommendations in the DOT&E classified reports for Abrams SEPV2 and SEPV3 equipped with TROPHY APS published in June 2020 and March 2023, respectively.



Abrams Live Fire Qualifications at Udairi Multi Purpose Range Complex, Kuwait, August 2023