Initial Maneuver Short-Range Air Defense

Executive Summary
- The Army is acquiring Initial Maneuver Short-Range Air Defense (IM-SHORAD) in response to a 2018 Directed Requirement to provide a short-range air defense capability in support of Operation Atlantic Resolve.
- On September 2, 2020, the Chief of Staff of the Army made the acquisition decision for 32 IM-SHORAD vehicles prior to operational testing.
- The Army plans to conduct an operational assessment (OA) at White Sands Missile Range (WSMR), New Mexico, from October 26 to December 18, 2020.
- An Expeditionary Operational Assessment after fielding is planned for FY22 in Germany.
- The Army conducted a cooperative vulnerability and penetration assessment (CVPA) from August 31 to September 4, 2020, and an adversarial assessment (AA) from October 26 to November 6, 2020.
- The Army started the live fire testing and evaluation of IM-SHORAD in February 2020. The survivability and lethality testing is expected to complete in 1QFY21.
- DOT&E will publish a report summarizing the OA, live fire, and cybersecurity assessment findings in 3QFY21.

System
- The IM-SHORAD system of systems integrates Stinger and Longbow HELLFIRE missile interceptors onto a Reconfigurable Integrated Weapons Platform (RiWP) with a 30-mm cannon, 7.62x39 coaxial machine gun, and electro-optical sight system. The system includes a Multi-Hemispheric Radar (MHR) to provide onboard sensing capabilities. The RiWP and MHR combined are the Mission Equipment Package, which is mounted to a Stryker Double-V Hull A1. IM-SHORAD uses Forward Area Air Defense Command and Control.
- Each IM-SHORAD Stryker vehicle is an independent fire unit. IM-SHORAD platoons consist of four vehicles. IM-SHORAD battalions include 36 vehicles, broken into 3 batteries, each with 3 platoons. Each IM-SHORAD battery has a single AN/MPQ-64 Sentinel radar as its primary sensor.
- The 2018 Directed Requirement authorizes the Army to purchase additional IM-SHORAD vehicles.

Mission
The Joint Force Commander and Ground Maneuver Commander employ IM-SHORAD to protect other maneuvering combat units in Armored Brigade Combat Teams and Stryker Brigade Combat Teams from fixed-wing, rotary-wing, and Group 3 (medium-sized) unmanned aerial systems. One IM-SHORAD battery provides protection for a brigade-sized maneuver element.

Major Contractors
- Vehicle: General Dynamics Land Systems – Detroit, Michigan
- Mission Equipment Package: DRS Sustainment Systems – St. Louis, Missouri
- Stinger Vehicle Universal Launcher: Raytheon Missiles & Defense – Tucson, Arizona

Activity
- The original Army desire was to conduct an IOT&E to determine the operational effectiveness, operational suitability, and survivability of the IM-SHORAD.
- In February 2020, the Army and DOT&E agreed upon an OA to support the evaluation of the directed requirements.
- The Army plans to conduct the IM-SHORAD OA from October 26 to December 18, 2020, at WSMR. This consists of a Search & Track (S/T) phase to assess the radar and command and control performance, a Missile Flight Test (MFT) to assess Longbow HELLFIRE performance and lethality, and a Sustainment phase in which soldiers operate the system while conducting 72-hour simulated combat operations.
- The Army conducted Weapon Safety and Performance Testing from April 14 to August 6, 2020, at WSMR; Redstone Arsenal, Alabama; and Aberdeen Proving Ground, Maryland, in support of a safety release for the OA. Following this testing, the Army conducted a series of Special Test Cases to demonstrate fulfillment of the directed requirements.

The Army halted these tests due to problems with the Stinger Vehicle Universal Launcher and MEP software on May 13, 2020, and restarted the testing on July 21, 2020, with updated MEP software. The Army continued to improve the software to resolve integration prior to the OA.

- Prior to operational testing, the Chief of Staff of the Army made a decision to purchase 32 of the IM-SHORAD vehicles.
- The Army conducted a CVPA from August 31 to September 4, 2020, and plans to conduct an AA from October 26 to November 6, 2020, as part of the operational assessment.
- The Army developed an LFT&E Strategy, which DOT&E approved in February 2020 as adequate to evaluate the survivability of IM-SHORAD against operationally representative kinetic threats.
- The Army started survivability testing of IM-SHORAD in February 2020 and expects to complete it in 1QFY21.
- The Army is developing a Live Fire Lethality Test Design Plan to support the evaluation of IM-SHORAD lethality against operationally representative targets.
- Due to the coronavirus (COVID-19) pandemic, Mode 5 Identification of Friend or Foe (IFF) compatibility testing, which was planned for late April 2020, was not completed. IFF testing is expected to be complete in 1QFY21. A compatibility certificate is required for fielding and will ensure IM-SHORAD can accurately identify allied or threat aircraft, reducing the chance of fratricide or misidentification. IFF testing was not part of developmental or operational testing.

Assessment

- The Army intends to assess the IM-SHORAD against a directed requirement; the Army G2 did not accredit the targets used during the OA as threat representative, hindering the ability to evaluate the effectiveness and lethality of IM-SHORAD against operationally representative targets for the HELLFIRE Longbow missile.
- The OA was not executed in an operationally representative electromagnetic spectrum contested environment with threat-representative electronic warfare systems attacking the system. Operationally relevant electronic attacks test the IM-SHORAD's ability to be effective on the battlefield. DOT&E will work with the Army to include realistic electronic warfare/electronic attack in future operational testing.
- DOT&E will publish results of the CVPA and AA as part of the OA report in 3QFY21.
- The IM-SHORAD fire units used during the OA were prototypes that will require retrofitting prior to fielding. The Army has not yet funded future operational testing with production-representative vehicles.
- The HELLFIRE Longbow missile lethality assessment versus fixed- and rotary-wing targets is reliant on accurate air target signature models, which are currently of low fidelity and need to be adequately verified, validated, and accredited.
- Although there is no reliability requirement for IM-SHORAD, the Army intends to collect reliability data during the OA. The Army will include reliability incidents in its report.
- DOT&E will publish a report summarizing the OA, live fire, and cybersecurity assessment findings in 3QFY21.

Recommendations

The Army should:

1. Conduct an IOT&E assessing system performance with production-representative vehicles against accredited threats supporting both Armor Brigade Combat Team and Stryker Brigade Combat Teams in a realistic hostile electronic environment.
2. Improve credibility of the HELLFIRE Longbow missile lethality assessments against fixed- and rotary-wing targets through adequate accreditation of air target signature models.
3. Consider assessing system reliability during developmental and operational testing.