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U.S. Army's Maneuver Short-Range Air Defense (M-SHORAD) System

Background

The Army is developing a new maneuver short-range air defense system, or M-SHORAD to perform short-range air defense, or SHORAD. The Army defines the SHORAD mission as

[d]edicated air defense artillery (ADA) and non-dedicated air defense capabilities that enable movement and maneuver by destroying, neutralizing, or deterring low altitude air threats to defend critical fixed and semi-fixed assets and maneuver forces.

In the early 2000s, the Army divested ADA units from Army force structure to free up personnel to create other types of units deemed more mission-critical at the time. The Army supposedly accepted the risk because it believed the U.S. Air Force could maintain air superiority. After 2005, SHORAD force structure was reduced to two battalions of Active Component Avenger systems and Counter-Rocket, Artillery and Mortar (C-RAM) batteries and seven National Guard Avenger battalions.

Renewed Emphasis on SHORAD

Since 2005, there has been a dramatic increase in air and missile platforms that could threaten U.S. ground forces. The use of unmanned aerial systems (UASs) has increased exponentially and UASs have been used successfully in a variety of conflicts, including the current Ukrainian conflict. Given the increase in threat and limited air defense assets available to Army divisions, the Army decided to improve the air defense posture of its maneuver forces.

M-SHORAD Requirement

In response to the growing aerial threat, the Army originally planned to field 144 M-SHORAD Increment 1 systems to four battalions and could field additional battalions in the future. Each M-SHORAD battalion would consist of 40 M-SHORAD systems, support vehicles and equipment, and about 550 soldiers. In April 2021, the 5th Battalion, 4th Air Defense Artillery Regiment received the first four of its M-SHORAD systems, becoming fully equipped by late 2022. In addition to the 144 systems designated for operational units, the Army planned to procure 18 additional systems for training, operational spares, and testing, for a total of 162 systems.

M-SHORAD Variants/Increments

Initially, there were three M-SHORAD variants, or "Increments," planned by the Army.

Figure 1. M-SHORAD Increment 1



Source: <https://www.leonardodrs.com/what-we-do/products-and-services/m-shorad/>.

M-SHORAD Increment 1

M-SHORAD Increment 1 (**Figure 1**) was developed under the Other Transaction Authority contracting process. M-SHORAD uses the M-1126 Stryker combat vehicle as its chassis. The weapons and radar packages are configured by Leonardo DRS and then installed on the Stryker by General Dynamics Land Systems (GDLS), the vehicle's original manufacturer. Leonardo DRS reports the multipurpose unmanned turret includes

- two AGM-114L Longbow Hellfire missiles capable of hitting ground targets;
- four FIM-92 Stinger missiles for aerial targets in a launcher (configured by Raytheon);
- an XM914 30 mm automatic cannon;
- an M-240 7.62 mm machine gun; and
- a multi-mission radar capable of tracking both ground and air targets.

Figure 2. M-SHORAD Increment 2



Source: https://www.army.mil/article/249511/the_army_rapid_capabilities_and_critical_technologies_offices_direct_ed_energy_maneuver_short_range_air_defense_de_m_shorad_rapid_prototyping_effort_is_on_track_to_deliver.

M-SHORAD Increment 2

M-SHORAD Increment 2 (Figure 2) is also referred to as DE (Directed Energy) M-SHORAD and would incorporate a 50 kilowatt (kW) laser as its primary armament to defend against a variety of air and artillery threats. Efforts to develop the 50 kW laser began in 2019, and in 2021, Raytheon was awarded a \$123 million developmental contract after a competitive shoot-off against Northrop Grumman. The Army reports additional testing of the 50 kW laser has enjoyed success against a variety of drones, but according to Army program officials, “challenges remain” in terms of defending against rockets, artillery, and mortars. Army plans called for M-SHORAD Increment 2 to start a user assessment beginning in the fourth quarter of FY2023, running through the first quarter of FY2024. The Army also plans for an additional final contract competition prior to FY2025.

Soldier Observations on DE M-SHORAD Deployed to the Middle East for Testing

Reportedly, according to Army officials, in February 2024 the Army deployed four Stryker-mounted 50 kW laser prototypes to the Middle East for soldiers to test the system’s performance against aerial threats. Initial soldier feedback was characterized as “not overwhelmingly positive,” with officials suggesting “results from the lab environment and test ranges are very different from the tactical environment,” further observing,

What we’re finding is where the challenges are with directed energy at different power levels. That [50-kilowatt] power level is proving challenging to incorporate into a vehicle that has to move around constantly - the heat dissipation, the amount of electronics, kind of the wear and tear of a vehicle in a tactical environment versus a fixed site.

M-SHORAD Increment 3

The Army reportedly plans for M-SHORAD Increment 3 to incorporate the FIM-92 Stinger replacement missile—the Next Generation Short Range Interceptor—into the Increment 1 system. In addition, these plans call for the Increment 1 30 mm automatic cannons to receive the XM 1223 Multi-Mode Proximity Airburst munition (MMPA), which features a multipurpose munition that can be employed against air, ground, and personnel targets. In March 2023, the Army reportedly selected Lockheed Martin and Raytheon Technologies to develop competing prototypes of a Next-Generation Short-Range Interceptor. The Army has indicated it is planning for a technology demonstration in FY2024, an operational demonstration in FY2026, and a production decision by FY2027.

Army Issues a Request for Information for M-SHORAD Increment 4

On May 8, 2024, the Army issued a request for information (RFI) for M-SHORAD Increment 4, stating that this capability is to focus on delivering “air defense capability to support dismounted maneuver.” M-SHORAD Increment 4 is to include capabilities that can be transported on a C-130 aircraft and that are air-droppable and sling load capable. It is also to be capable of integration onto platforms such as the Joint Light Tactical Vehicle (JLTV) and/or a robotic vehicle. The Army has requested RFI responses from industry by July 16, 2024 and that industry

provide solutions that would deliver capabilities in the near term (FY2027 to FY2028), mid term (FY2030 through FY2032), and the far term (beyond FY2035).

FY2025 Budgetary Information

Table 1. FY2025 M-SHORAD Budget Request

	Procurement (\$M)	RDT&E (\$M)	Quantity
M-SHORAD Increment 1	\$69.091	—	—
M-SHORAD Increment 2	—	\$88.480	—
M-SHORAD Increment 3	—	\$204.880	—

Sources: **Procurement:** Department of Defense Fiscal Year (FY) 2025 Budget Estimates, March 2024, Army Justification Book, Volume 1 of 1 Missile Procurement, Army. **RDT&E:** Department of Defense Fiscal Year (FY) 2025 Budget Estimates, March 2024, Army Justification Book Volume 2b of 2 Research, Development, Test & Evaluation, Army RDT&E – Volume II, Budget Activity 4B.

Notes: \$ M = million dollars; RDT&E = Research Development Test & Evaluation; Quantity = procurement quantity.

Considerations for Congress

Oversight questions Congress could consider include the following:

Lessons Learned from the Russo-Ukraine Conflict

The ongoing Ukrainian conflict has featured the use of a variety of military and commercial UASs employed in both kinetic and non-kinetic roles. In addition to both fixed and rotary wing air threats, loitering munitions have also been employed, reportedly with considerable effect. Lessons learned related to the employment of the aforementioned systems may inform current and future development of all four M-SHORAD Increments. Congress may consider what efforts have been undertaken by the Army to incorporate lessons learned into M-SHORAD design.

2024 Army Force Structure Transformation Initiative and M-SHORAD

On February 27, 2024, the Army released a white paper, *Army Force Structure Transformation*, outlining plans to transform the force. Regarding M-SHORAD, the Army stated it would add “four additional M-SHORAD battalions, which counter low altitude aerial threats, including UAS, rotary wing aircraft, and fixed wing aircraft.” According to a 2022 report, the Army originally planned to field four M-SHORAD battalions to selected units and possibly up to an additional five battalions. In view of the Army’s white paper, it now appears that the Army intends to field a total of eight M-SHORAD battalions. Given the Army’s new transformation plans, Congress might seek to clarify the Army’s plans for M-SHORAD, including how many battalions will be created; whether any battalions will be created in the Army National Guard; the timeline for unit activation; requirements for additional M-SHORAD systems; and where M-SHORAD units will be stationed.

Andrew Feickert, Specialist in Military Ground Forces

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