

# Trophy Active Protective System

A required capability

by GySgt Christopher R. Boyette

**Problem Statement: “[The Marine Corps] current and future ground combat vehicles lack the capability to detect incoming anti-armor threats and defeat the threats before impact. There is a need to engage incoming projectile threats both vertically and horizontally. Passive and Active Protection Systems will improve the survivability by detecting and defeating Anti-Tank Guided Missiles (ATGMs), Rocket Propelled Grenades (RPGs), high-angle incoming air-to-surface missiles, mortars, low angle trench fired/other close-in munitions, and Unmanned Aerial Vehicles (UAVs).”**

**—D-UNS for VPS 15218DB, 6 August 2015**

In this article, we examine which Marine Corps initiatives are in the works relative to an active protective system (APS), specifically, Trophy. On the modern battlefield, the adversary’s ability to employ ATGMs, RPGs, and recoilless rifles poses a significant threat to U.S. ground combat vehicles, up to and including the main battle tank. This advancement in threat capability highlighted the need to add an APS capability to existing passive protective measures to defend against these threats. The Marine Corps’ participation in the U.S. Army Expedited APS program is the most rapid and effective means to field an APS capability in the near term. The Marine Corps is currently testing the Trophy APS on the M1A1 Main Battle Tank (MBT) in order to fill this capability gap for the

tank and explore APS issues in general for all ground combat vehicles.

## Trophy’s Background

Russia was the first nation on record to employ an APS in combat, fielding the Drozd system in Afghanistan during the 1980s, following over a decade of development and testing. During the same period of time, Israel accelerated the development of its own APS in response to tank and armored vehicle losses during the Yom Kippur War and later in the second Lebanese War of 2006. Israel began the development of the Trophy

APS in the early 1990s, finally fielding it in 2009 on their Merkava MK-IV tanks.

After two years of active employment, the first recorded use of the Trophy APS in combat demonstrated the successful interception of an RPG. Later, in 2014, during Operation PROTECTIVE EDGE, Israeli Merkava MK-IV tanks located near the central Gaza Strip were fired upon by Hamas anti-tank teams on multiple occasions, using various anti-armor weapon systems. Over the course of these engagements, Israeli forces reported zero casualties.

After decades of independent testing and development, the DOD determined that the Israeli Trophy system met U.S. military requirements as a commercial off-the-shelf hard-kill system. For the Marine Corps, the Trophy APS provides added protection through a layered vehicle protection system approach in conjunction with the USMC M1A1 MBT passive armor.

## How Trophy Works

APS technology, while new to U.S. ground platforms, has been in use by aircraft and naval forces for decades. Trophy uses sensors to detect and identify incoming anti-armor threats and automatically intercepts and neutralizes these threats by launching countermeasures without any input from the vehicle crew members. Multiple countermeasure launchers and a quick reload capability also enable the system to neutralize multiple threats simultaneously. Additionally, Trophy alerts the crew to the direction of the attack, increasing situational awareness and enabling offensive action.

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## Employment Considerations

Understanding the success and durability of the Trophy system has led to its implementation and other upgrades to the Marine Corps' M1A1 MBT. Given that Trophy is an APS, this may create risk to dismounted infantry operating within close proximity to tanks employing any APS. Current doctrine outlines the interdependence of infantry and tanks when operating within an urban environment for the purpose of mutual security and support. In order to mitigate the risk of fratricide to infantry operating alongside tanks outfitted with the Trophy system, adjustments to certain tactics, techniques, and procedures (TTP) employed by our GCE may be necessary. However, it should be noted that the Israelis' combat experience, with tank/infantry TTP similar to the Marine Corps', did not have to adjust those TTP when Trophy was employed alongside their GCE.

The importance of a developing increased protection against modern anti-armor weapons was made apparent during recent conflict in Syria between ISIS and the Turkish Armed Forces. During Operation EUPHRATES SHIELD, Turkey lost approximately ten German-built Leopard 2A4 tanks, with 60 percent damaged and/or destroyed by anti-armor threats. These tanks were not equipped with an APS, highlighting the risk to modern armored vehicles in a threat environment laden with advanced anti-armor threat capabilities.

Although Trophy has the ability to address many of the current advanced anti-armor threats being employed, the current battlefield still poses additional risks to armored ground vehicles. Planners must take into consideration all of the possible adversarial tactics and weapons, to include the employment of anti-tank mines and improvised explosive devices, while the Marine Corps continues to close its capability shortfalls.

## Potential Transportation Challenges

Any APS employed by a Marine Corps ground combat vehicle would ideally maintain the capability to be expeditionary, especially via ship-to-shore connectors. As currently configured,



***The Trophy active protective system would give our M1A1 tanks the ability to defeat anti-tank missiles and RPGs. (Photo by LCpl Timothy Lutz.)***

the Trophy APS, when installed on the Marine Corps M1A1, increases overall turret width. This increase in width may prevent the use of the M1A1 deep water fording kits as well as the use of current landing craft utility ship-to-shore connectors. Another potential restraint is that the increased weight of the M1A1 may not allow for the use of LCAC when both Trophy and a front-end attachment, such as the track-width mine plow, is installed. Making the vehicle wider and heavier could adversely impact the expeditionary and amphibious capability of the Marine Corps M1A1. The Trophy APS can only be applied to the M1A1 because of the system's size, weight, and power constraints and will not be applied to other ground com-

bat vehicles. Although less than ideal in its current state, the Marine Corps continues to improve the integration design for Trophy on the M1A1 in an effort to mitigate these challenges while considering alternate methods of employment. Furthermore, to transport Trophy aboard Navy amphibious ships, a Weapon System Explosive Safety Review Board approval for countermunitions and further testing of the ARG's capacity to transport the system would be required.

## Fielding and Future

In fiscal year 2017 (FY17), the Marine Corps began testing the Trophy APS on the Marine Corps M1A1, setting the conditions for a future pro-



***The Marine Corps is looking at the Trophy APS for our M1A1 MBTs. (Photo by Sgt Kassie McDole.)***



gram of record. In FY18–19, the Marine Corps will continue to improve the integration design and procure up to nine systems for continued testing, TTP development, experimentation, system optimization, and integration into the GCE. The Marine Corps currently plans to procure a total of 56 APS special mission kits, capable of outfitting four Marine Corps tank companies.

The M1A1 Trophy APS is a rapid interim solution to the capability shortfall and represents the first increment in this nascent technology. As integration and development progress, the Marine Corps plans to consider additional capabilities, like enhanced situational awareness, laser detection, soft kill, and threat information sharing in an effort to create a more comprehensive vehicle protection system to be integrated with the APS capability. The lessons learned on this effort will mature the technology and create opportunities for the application of like systems on



*The Trophy system (not shown) would increase the width and weight of the M1A1, thereby impacting loading on the LCAC. (Photo by LCpl Timothy Lutz.)*

other ground vehicles in the future. As ATGMs and RPGs continue the rate of proliferation that has occurred over the last decade, APS is essential to any lay-

ered protection strategy to protect our ground combat vehicles against a wider array of advanced threats employed by potential adversaries.



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