GROUND BASED AIR DEFENSE

Ground Based Air Defense (GBAD)

Program Background

The Marine Corps' organic Ground Based Air Defense (GBAD) capabilities are centered on the Low-Altitude Air Defense (LAAD) Battalions of Marine Air Wings (MAW). LAAD battalions currently use the Stinger missile, originally fielded in 1981 and upgraded since to Block I configuration, as its primary weapon system for air defense. It is expected that the Stinger missile will be the primary GBAD asset for the near future, and the missile is currently undergoing a Service Life Extension Program (SLEP) to maintain its operational effectiveness and longevity. An Analysis of Alternatives (AoA) for the GBAD Next Generation Weapon System (NGWS) has recently completed and will result in a Capability Development Document by the end of FY18. In addition to the AoA, there is the GBAD On-the-Move (OTM) FNC project. This program seeks to develop an agile and cost-effective, detect and-engage capability against low-altitude, observable, and low-radar cross-section air threats. Programs and projects included in the GBAD portfolio are:

- Stinger Missile SLEP
- Advanced Man-Portable Air Defense (A-MANPADS) System Increments 0 & 1
- Stinger Night Sight Replacement
- Identification Friend or Foe (IFF) Mode IV Replacement
- GBAD NGWS

Program Status

Stinger Missile SLEP

A Stinger Missile SLEP began in FY14 and is scheduled to complete delivery in FY18. The SLEP is essential and required to meet the War Reserve Munitions Requirement and to provide sufficient training rounds after 2019. The SLEP is a joint effort with the Army's Program Executive Officer – Missile System to prolong the life of the Stinger Missile by replacing aging components such as the flight motors and missile energetics.

Advanced Man-Portable Air Defense (A-MANPADS) Increments 0 & I

A-MANPADS was designated an Abbreviated Acquisition Program (AAP) in 2005 and is executing a single-step to full capability acquisition strategy by integrating commercial off-the-shelf (COTS) and NDI subsystems. The concurrence to pursue the full Approved Acquisition Objective for Increment I of 38 Section Leader Vehicles (SLV) and 143 Fire Unit Vehicles (FUV) was received in 2015. A-MANPADS Increment I vehicles contain hardware and software for a tactical data link capability, which allows the LAAD BN to connect to various C2 agencies to receive an air picture down to the LAAD Fire Teams. The

fielded datalink capability is supported by a Joint Range Extension Sustainment contract that was awarded in September 2013 for five years. An Engineering Change Proposal (ECP) has been approved for all A-MANPADS FUVs, which will be transitioning to a HMMWV Prime Mover platform to rectify obsolescence and operational deployability of the current chassis. Included in this ECP is the replacement solution for the Harris Communication secure tactical wireless capability, SECNET-11, which has reached obsolescence and is being replaced with the AN/PRC-152A radio. A follow on ECP is planned to transition the current SLV capability to the same HMMWV Prime Mover platform.

Stinger Night Sight Replacement

The AN/PAS-18 Stinger Night Sight is being replaced by the AN/PAS -13V(2) updating the software to contain the stinger reticle. The future optic will be replaced with a state-of-the-art, high-definition Focal Plane Array (FPA), providing greater target resolution and detection capability against the full spectrum of threats to include UASs.

IFF ModeV

GBAD plans to procure a replacement IFF system in a joint acquisition with the Army to meet a Joint Requirements Oversight Council requirement to be Mode V capable and compliant by 2020. The effort will replace the current AN/PPX-3B analog interrogator with a new digital Mode V interrogator, which can operate with Stinger Missile or Army Avenger system. Efforts will include AIMS box level and platform integration testing.

GBAD FWS

The GBAD Program Office is currently investigating potential kinetic and non-kinetic capability to counter the full spectrum of threats to include UASs. Efforts include the GBAD On-the-Move (OTM) Future Naval Capability program, funded by the Office of Naval Research and developed by Naval Surface Warfare Center, Dahlgren, VA. This effort is investigating the feasibility of hosting a directed energy solution on tactically relevant vehicles such as the Joint Light Tactical Vehicle (JLTV) or High Mobility Multipurpose Wheeled Vehicle (HMMWV).

GBAD's Top Technical Issues

1. Counter Unmanned Aircraft System (UAS)

Based on the proliferation of inexpensive Low, Slow, and Small (LSS) Unmanned Aircraft System (UAS); a cost effective kinetic and/or non-kinetic counter UAS capability is required to negate the threat at the system's weapon keep out or sensor ranges. The counter UAS system should provide a low cost per shot system with a high probability of kill against a group 1 UAS.

2. Stinger Night Sight Replacement

Enabling technologies are needed to produce a lightweight, compact night sight, compatible with the stinger missile and suitable to achieve detection and identification of thermal targets (i.e. Type 1-3 UAS, rotary/fixed aircraft) at ranges suitable for man-portable air defense operation. Technologies required are 1) lightweight, quiet, and efficient micro chiller that can be incorporated into a hand held Mid Wave IR (MWIR) thermal sight; 2) High Density Focal Plane Array (FPA) (16:9 ratio of 1280 or 1920 horizontal pixels) with small 12 micron or smaller pixel pitch; and 3) lightweight compact optical zoom that provides a 20-degree Field of View (FOV) for missile engagement and narrow FOV for target identification.

GBAD

AAP IN 2005

Description A-MANPADS provides low altitude air defense against fixed/rotary wing, cruise missile and emerging UAS threats. It utilizes the Joint Range Extension Application Protocol (JREAP) capability to provide a tactical air picture for the LAAD gunner's defense of MAGTF High Value Assets (HVAs). The Fire Unit Vehicle (FUV) and Section Leader Vehicle (SLV) comprise primary mobile platforms for the system.

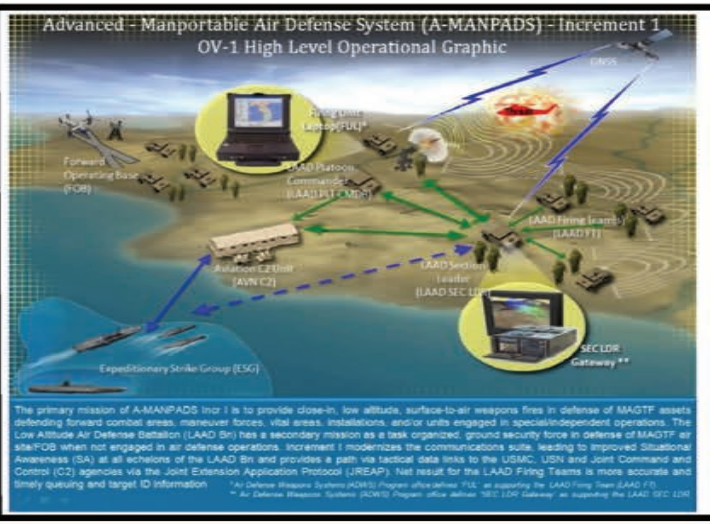
Key Events

- Designated an AAP in 2005
- IOC DEC 2012
- Tracking Head Trainer initial production 2QFY17
- FUV PCA 3QFY17
- Delivery of first M1114 FUV production systems 4QFY17
- STINGER SLEP missile delivery FY18
- FOC 1Q FY20

Program Status

Status

- **FUV:** Meeting performance metrics and NSWC Crane meeting the adjusted M1114 FUV fielding schedule. Schedule was adjusted to incorporate ECPs.
- **SLV:** M1114 SLV development schedule delayed 10 months as a result of adjustments to the FUV fielding schedule.
- **Stinger Missile:** Stinger Blk I missiles undergoing Army sourced Service Life Extension Program (SLEP) to bridge the gap in assets until a more capable GBAD Future Weapon System is fielded.



The primary mission of A-MANPADS Incr I is to provide close-in, low altitude, surface-to-air weapons fires in defense of MAGTF assets defending forward combat areas, maneuver forces, vital areas, installations, and/or units engaged in special/independent operations. The Low Altitude Air Defense Battalion (LAAD Bn) has a secondary mission as a task organized, ground security force in defense of MAGTF air site/FOB when not engaged in air defense operations. Increment I modernizes the communications suite, leading to improved Situational Awareness (SA) at all echelons of the LAAD Bn and provides a path via tactical data links to the USMC, USN and Joint Command and Control (C2) agencies via the Joint Extension Application Protocol (JREAP). Net result for the LAAD Firing Teams is more accurate and timely queuing and target ID information

PROGRAM	PRIOR	FY17				FY18				FY19				FY20				FY21				FY22				FY23			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Milestones & Phases																													
SETR Reviews	A-MANPADS FUV/SLV PMD																												
	FNC ATD																												
Test Events		▼																											
Contract Events	Datalink			▼																									
	Stinger SLEP																												
	A-MANPADS FUV/SLV																												
	Aerial Targets																												
	IFF			▼																									
	Optics	▼																											
	Datalink																												
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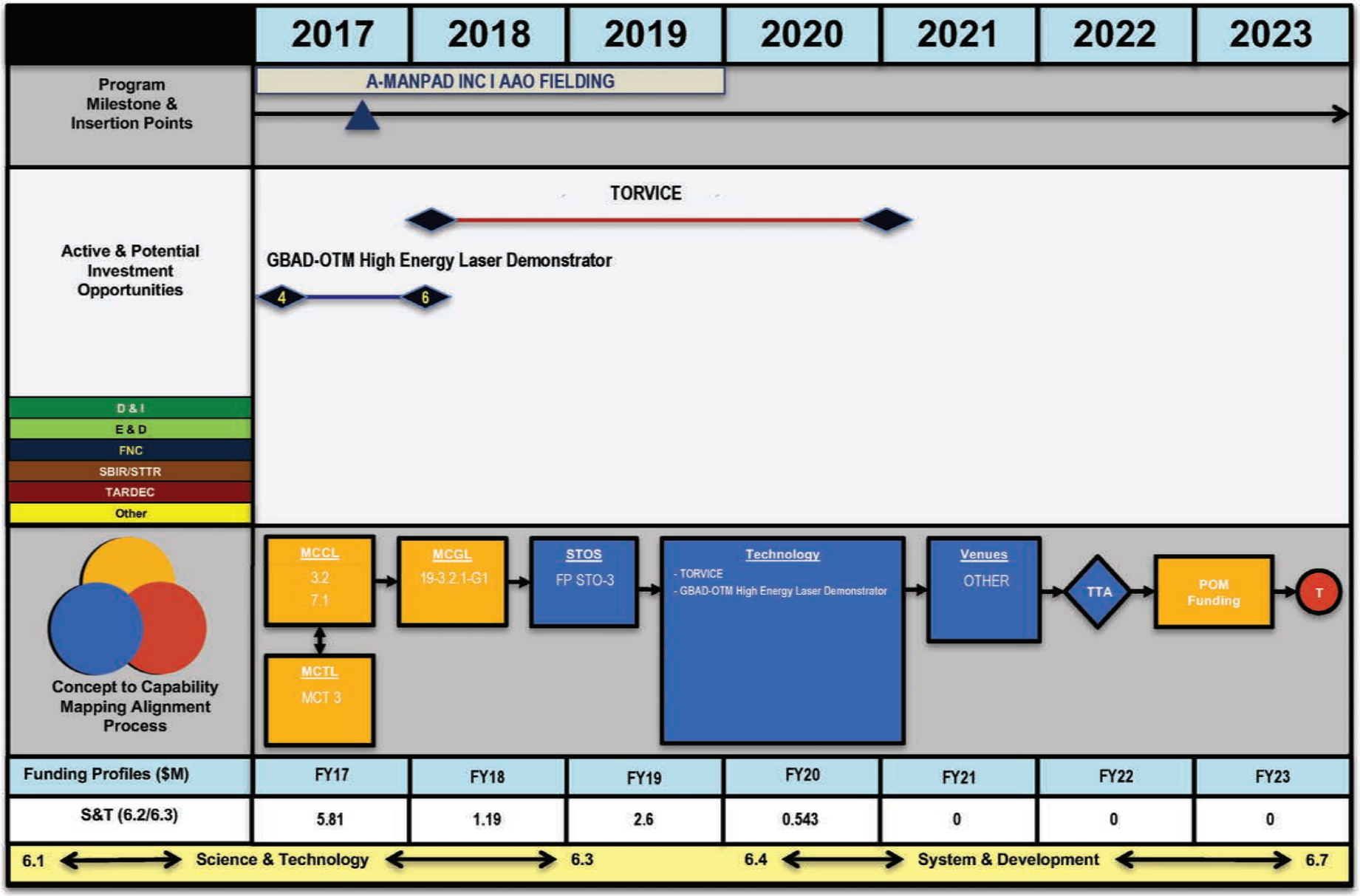
	A-MANPADS FUV/SLV																												
	Aerial Targets																												
	IFF																												
	Optics																												

GBAD Technical Issue #1 Counter Unmanned Aircraft System (UAS)



Funding Profiles ($M)	FY17	FY18	FY19	FY20	FY21	FY22	FY23
S&T (6.2/6.3)	5.81	1.19	2.6	0.543	0	0	0

6.1 ⟷ Science & Technology ⟷ 6.3 6.4 ⟷ System & Development ⟷ 6.7

GBAD Technical Issue #2 Stinger Night Sight Replacement