Section 7.10

LIGHTWEIGHT 155MM HOWITZER

Lightweight 155mm Howitzer (LW155)

Program Background

A cornerstone of the PM Towed Artillery Systems (PM TAS) portfolio is the "Triple Seven," or the M777A2 Lightweight 155mm Howitzer. Assembled by BAE Systems in Hattiesburg, MS, the Lightweight 155 is a Marine Corps led joint program with the Army. The M777A2 replaced the Marine Corps' outdated M198 155mm weapon.

The M777A2 is capable of firing standard (unassisted) projectiles to a range of 15 miles (24 kilometers), assisted projectiles to 19 miles (30.5 kilometers), and the Excalibur munitions to ranges in excess of 25 miles (40 kilometers).

The world's first artillery weapon to make widespread use of titanium and aluminum alloys, the lightweight M777A2 can be air-lifted into remote high-altitude locations inaccessible by ground transportation and is capable of being transported by the Marine Corps' V-22 Osprey, as well as medium and heavy-lift helicopters.

Program Status

The M777 Program has commenced activities to "refresh" the system's digitized fire control system. Described as a leap-ahead, towed artillery technology, the digital fire control has transformed how Marines employ artillery. As part of the refresh effort, a new Gunners and Assistant Gunners Display (GD/AGD) has been fielded. Using recent advances in display technology, the display has greater reliability along with greatly improved sunlight readability

at a lower overall cost. Other ongoing refresh initiatives include a new Mission System Computer, Chief of Section Display, and power supply which commenced fielding in 2017.

LW 155's Top Technical Issues

1. Navigation in a GPS Denied Environment

The navigation systems for the digitized howitzers are dependent on GPS assistance to maintain full operational capability. GPS denial would degrade howitzer operational tempo and adversely impact delivery of timely fire in support of maneuver. Innovative approaches to counter or mitigate GPS denial at minimum SWaP are required. The technologies could be items such as anti-jam antennas, sensor fusion schemes to leverage other available sensors, or other technologies to establish howitzer location to better than 4m accuracy in a GPS-denied environment.

2. Safe and Transportable Battery High Capacity Technology

The M777A2 howitzer powers its electronics with onboard (rechargeable) batteries. The current platforms have power requirements in excess of 2 KWH. Current High Capacity Battery technologies are mainly Lithium Ion based, which requires extensive regulatory qualification testing when the power pack exceeds 1 KWH. As a result, towed artillery Program Managers seeking improved battery performance are required to execute significant development efforts (at significant expense) to design and qualify "system specific" power packs. To mitigate this, PMs request that industry invest in safe and transportable battery technology that could be implemented into weapons systems in a modular fashion, without the need for "system specific" power packs and the extensive regulatory qualification requirements that come with them.

3. On System Power Generation and Conservation

The M777A2 howitzer powers its electronics with onboard (rechargeable) batteries. The current platforms have power requirements in excess of 2 KWH. Due to the current limitations of high capacity batteries, the PM requests alternative innovative technologies that would provide power to the electronics on the howitzer and extend runtime over the existing configuration. Alternatively, the PM requests investment by industry in displays, computers, and other electronic components with a decreased power consumption. Either solution, or a combination of both, would be used to increase operational capability.

4. Secure Wireless: Ruggedized/Low Energy

Communications between interfacing components of the M777A2 digital fire-control systems is accomplished over physical wires. The required cabling constrains the solution space and introduces points of failure, particularly for cables that need to flex or be moved as part of normal operations. A short-haul, low-energy wireless data transmission can eliminate use of physical wires. Although commercial standards exist, a ruggedized solution using a dongle-like device is required. The solution should be adaptable to enable either serial or Ethernet wireless communications between components. This technology may be incorporated into future devices such as wearable devices and onboard sensors.

5. Weight Management

As a result of various product improvements and corrections to field issues, the M777A2 weight has increased closer to the Joint Operational Requirements Document (JORD) threshold weight of 10,000 lbs. In addition, a developmental M777 Extended Range (M777ER) project may add an additional 800 lbs to the howitzer. PM-TAS has begun to investigate alternative weight reduction measures and feels there is potential for insertion of lightweight materials into the M777ER adapter kit, which could also be applied to the baseline M777A2 howitzer.

LW155

ACAT II Sustainment

Description: M777A2 (LW155) Provides direct, reinforcing, and general support fires to maneuver forces. Replaces the M198 howitzer as the general support artillery for light forces in the Army. Replaces all howitzers in all missions in the USMC.

Key Events

- Jan 2017: India FMS Contract Awarded to BAE
- Feb 2017: Software Material Release for v4.1.3R anticipated
- Mar 2017: PBLCS Option Year 4 Award
- Mar-Apr 2017: 2-146FA WA ARNG fielding
- Apr 2017: Army Prepositioned Stock 3 (APS-3) IBCT fielding
- May 2017: 1-107FA PA ARNG IBCT fielding
- Jun 2017: 1-194FA IA ARNG IBCT fielding

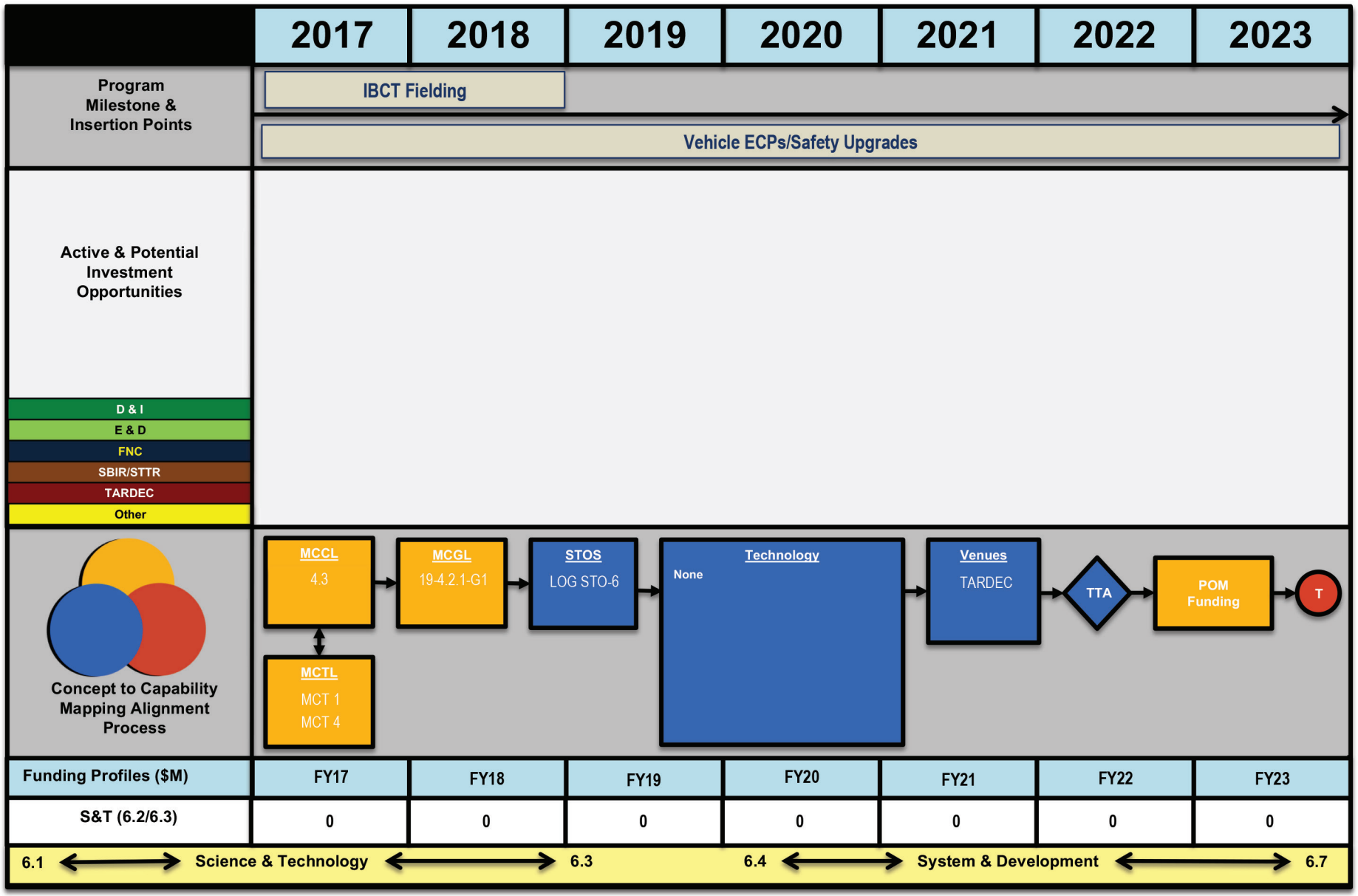
Program Status/Issues/Concerns

Status:

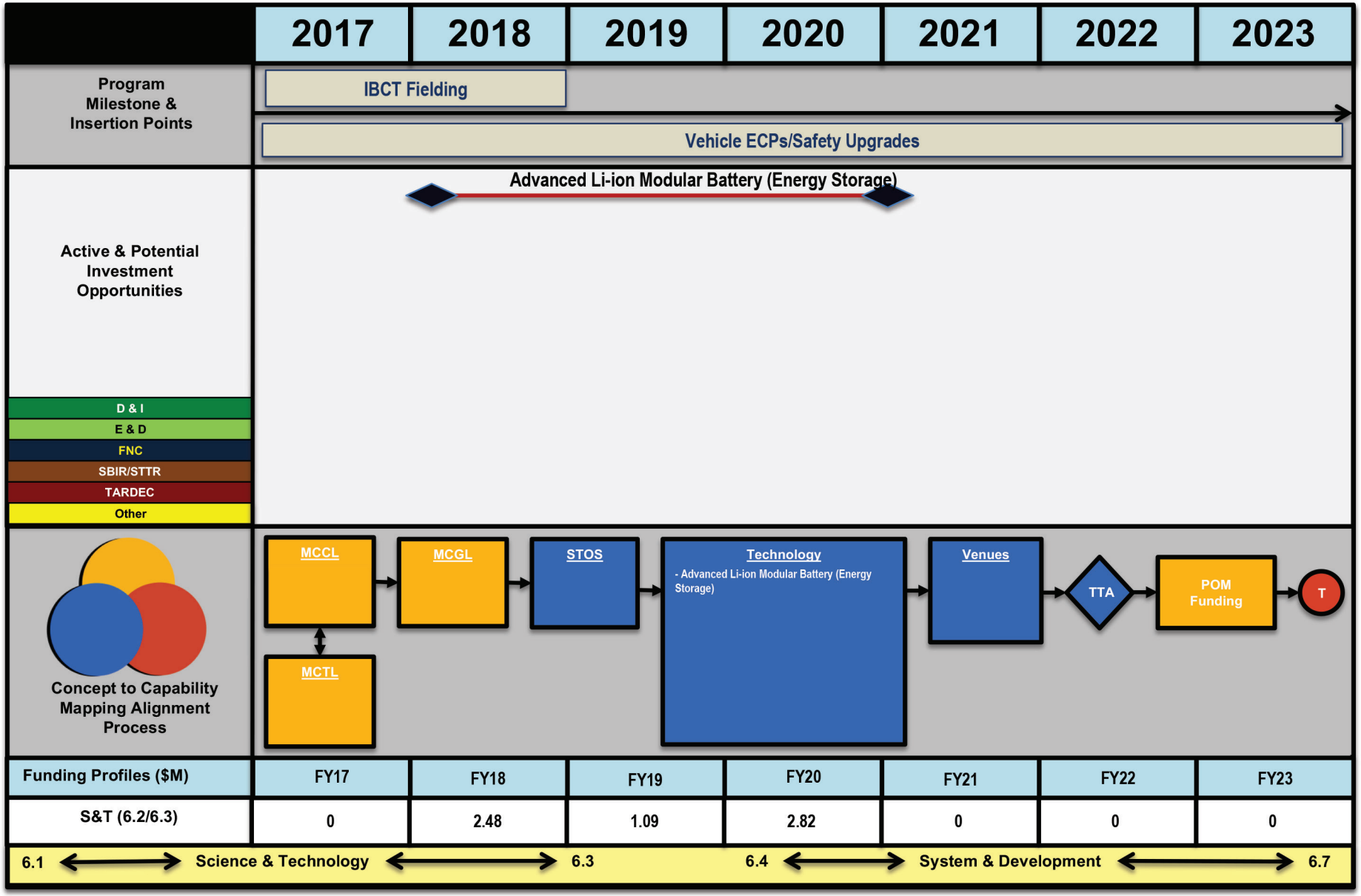
- Program in Sustainment, supported by Performance Based Lifecycle Support – FFP Contract with BAE Systems until May 2023 (based on meeting on time delivery metrics)
- FMS to Canada (37), Australia (54), India (145 on order)
- Upgrades to Digital Fire Control System components to begin this year.

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	In Sustainment																												
Test Events																													
Contract Events																													

LW155 Technical Issue #1 Navigation in GPS Denied Environments



LW155 Technical Issue #2 Safe and Transportable Battery High Capacity Technology



LW155 Technical Issue #3 On System Power Generation and Conservation