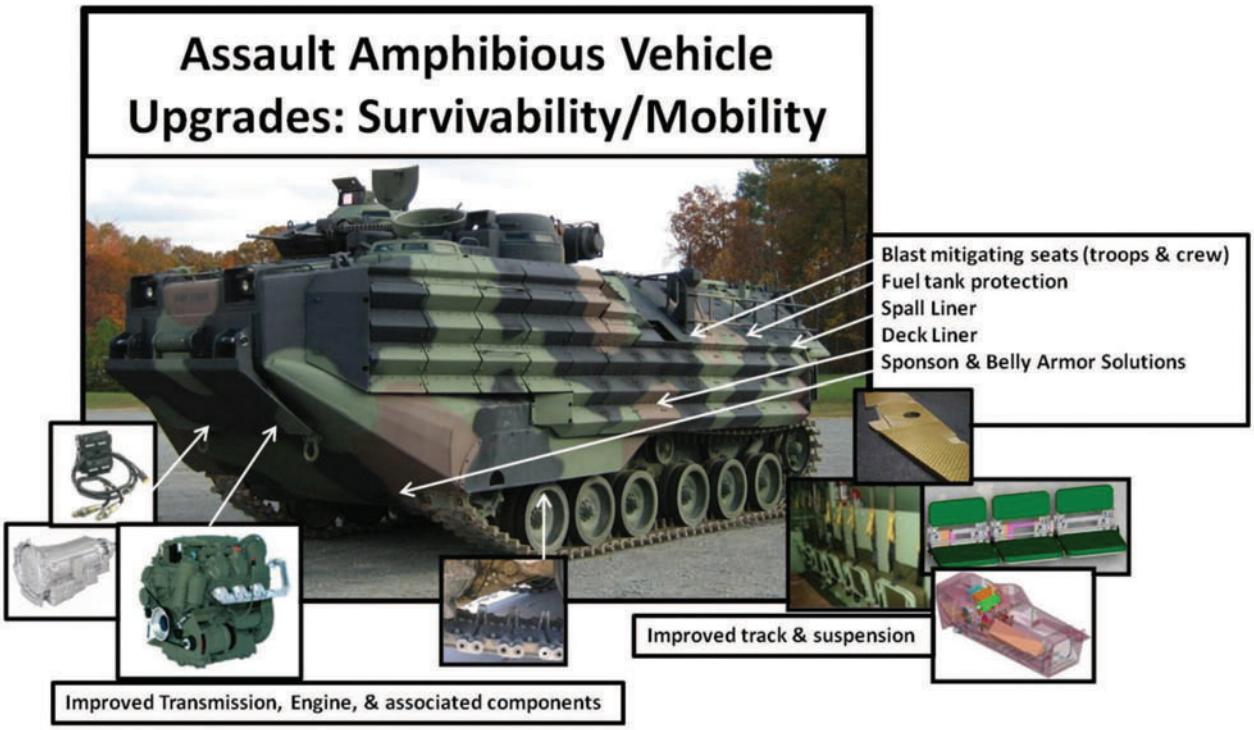
Assault Amphibious Vehicle (AAV7A1 RAM/RS)



Assault Amphibious Vehicle (AAV7A1 RAM/RS) Family of Vehicles (FoV) Upgrade Description

The Assault Amphibious Vehicle, initially fielded in 1972, remains the primary general-support Armored Personnel Carrier (APC) for Marine infantry. The AAV FoV consists of the AAVP7A1 RAM/RS APC and two supporting mission-role variants: AAVC7A1 RAM/RS command and AAVR7A1 RAM/RS recovery. The AAV7A1 RAM/RS FoV provides ship to shore to objective mobility as well as direct fire-support with organic weapons. Programmed to be replaced by a new amphibious combat vehicle, the AAV7A1 RAM/RS FoV will continue to serve the Marine Corps until at least 2025. The AAV7A1 RAM/RS FoV previously underwent a series of capability enhancements to improve mobility, improve reliability, and extend the platforms' service life.

The AAV Upgrade Program will further improve survivability and land and water mobility of the AAV, serving as a capability bridge to fielding and replacement by a new amphibious combat vehicle. This initiative will improve force protection and platform survivability by integrating technically mature upgrades into the existing hull. These upgrades will include: underbelly and sponson armor, blast-mitigating seats for embarked Marines and crew, spall lining, fuel tank protection, deck liners, and automotive and suspension upgrades to maintain current land and water mobility characteristics with the anticipated increased weight growth. These upgrades are

slated for approximately 392 AAVP7A1 RAM/RS with potential select upgrades applied to the Communications and Recovery variants.

Operational Impact
The upgraded Assault Amphibious Vehicle will provide significant survivability improvements through increased protection against current and future threats. Through improvements in both physical armor systems and supporting subsystems within the hull of the AAV, the upgraded vehicles will increase protection to embarked Marines and crew.

Program Status
The AAV Upgrades program will enter the acquisition life cycle at Milestone B during FY13 and begin the engineering, manufacturing and development phase. Currently, Developmental Testing is planned for late FY14 followed by Operational Testing in late FY16. Low Rate Initial Production is planned for late FY15, and Full Rate Pro-duction is planned to begin in 3rd quarter FY17. Initial fielding is planned for late FY17.

Assault Amphibious Vehicle (AAV)

AAV Schedule	FY 10				FY 11				FY 12				FY 13				FY 14				FY 15				FY 16				FY 17			
Quarter	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Trade Study Awarded										▲																						
Trade Study Results												▲																				
MDD												▲																				
Pre-EMD Review														▲																		
Milestone B																♦																
EMD Contract Award																▲																
Milestone C																								♦								
Initial Operational Capability (IOC)																																▲
Full Operational Capability (FOC)																																

Program Description

- AAV Upgrade AAO provides 4 Infantry Battalions lift capacity to the MAGTF

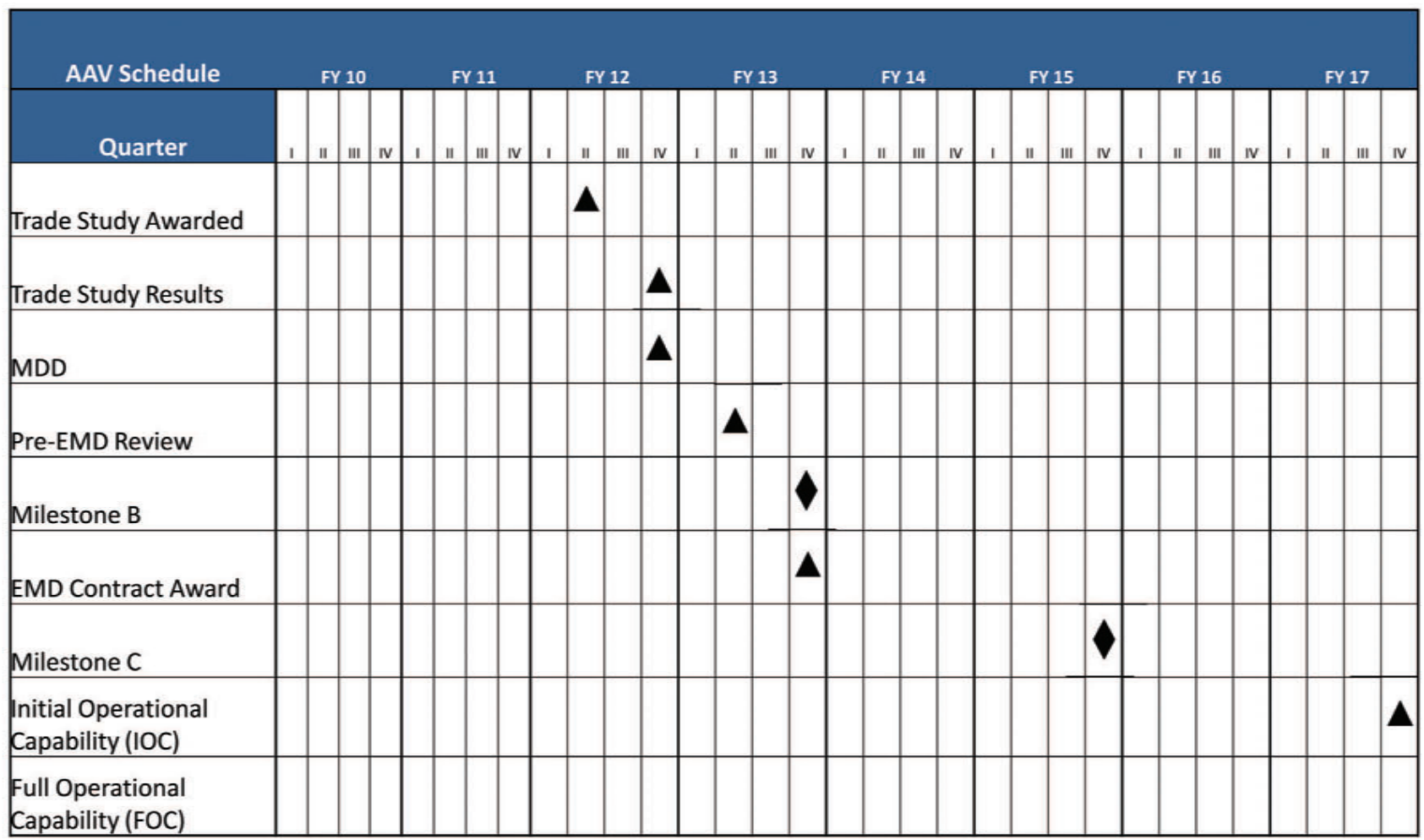
- The AAV Upgrade is to be a **bridge capability** to ACV. *Focus* - restore operational relevance to the AAV by updating outdated protection attributes

Mission: General Support Lift / Amphibious Mobility
Dimensions: H: 130 in
W: 130 in
L: 321 in
Wt: 46,330 lbs (curb wt)
Weapons: HMG
Payload: 21 Infantry Marines + 3 Marine crewmen
Range: 200 miles
Speed: Effective with M1A1 off-road / 6 knots in water

Program Status

Acquisition Status: Pre MS-B
Acquisition Objective: 392
IOC/FOC: FY17/FY23

Assault Amphibious Vehicle (AAV)



Assault Amphibious Vehicle (AAV7A1 RAM/RS)

AAV'S Top Three Program Technology Issues:

1. Survivability - Advances in ceramic and layered armor that can improve survivability and reduce weight. AAV Upgrade will likely be looking for a combined internal and external belly armor solution. AAV Upgrade will likely also look at seat survivability and spall liner in addition to armor solutions.

2. Weight/buoyancy management - Enhancing survivability will likely add weight to the AAV platform. A critical need for advances in technology is the development of alternative light weight, economical materials along with design improvements to increase and protect buoyancy.

3. Sustainment/In-service engineering - The AAV is a 40-year old platform that will remain in service for years to come. The AAV Upgrade program will not be fielded until FY17 and will not be an across-the-board upgrade, or SLEP, or reliability upgrade, but instead will be focused on survivability while "doing no harm" to current attributes such as mobility. The day-to-day logistics and technical challenges of managing such a dated platform become more pronounced every day due to component obsolescence (radios, intercoms, mechanical parts), age of the vehicle, and daily operations.

1. Survivability:

1.a No Active S&T Initiatives for AAV

1.b Potential S&T Initiatives for AAV

Discovery and Invention (D&I)
- Energy Absorbing Structures for Blast Mitigation
- CSTV Shock Mitigating Seats
- Lightweight Armor Materials

TARDEC
- GSS- Blast Technology Development

Other
- MTVR Blast Seat Evals

Small Business Innovation Research (SBIR)
- Aluminum Casting Alloy (ACV SBIR II)
- Modular Lightweight Armor System (ACV SBIR II)
- Semi-active Damped Seating (ACV SBIR III)

2. Weight/Buoyancy Management:

2.a No Active S&T Initiatives for AAV

2.b Potential S&T Initiatives for AAV

Exploitation and Development (E&D)
- Vehicle Stability

Small Business Innovation Research (SBIR)
- Aluminum Casting Alloy (ACV SBIR Phase I)
- Lightweight High Temp Armor (ACV SBIR Phase II)
- Modular Lightweight External Fuel Tank System (ACV SBIR Phase II)
- Modular Lightweight Armor System (ACV SBIR II)

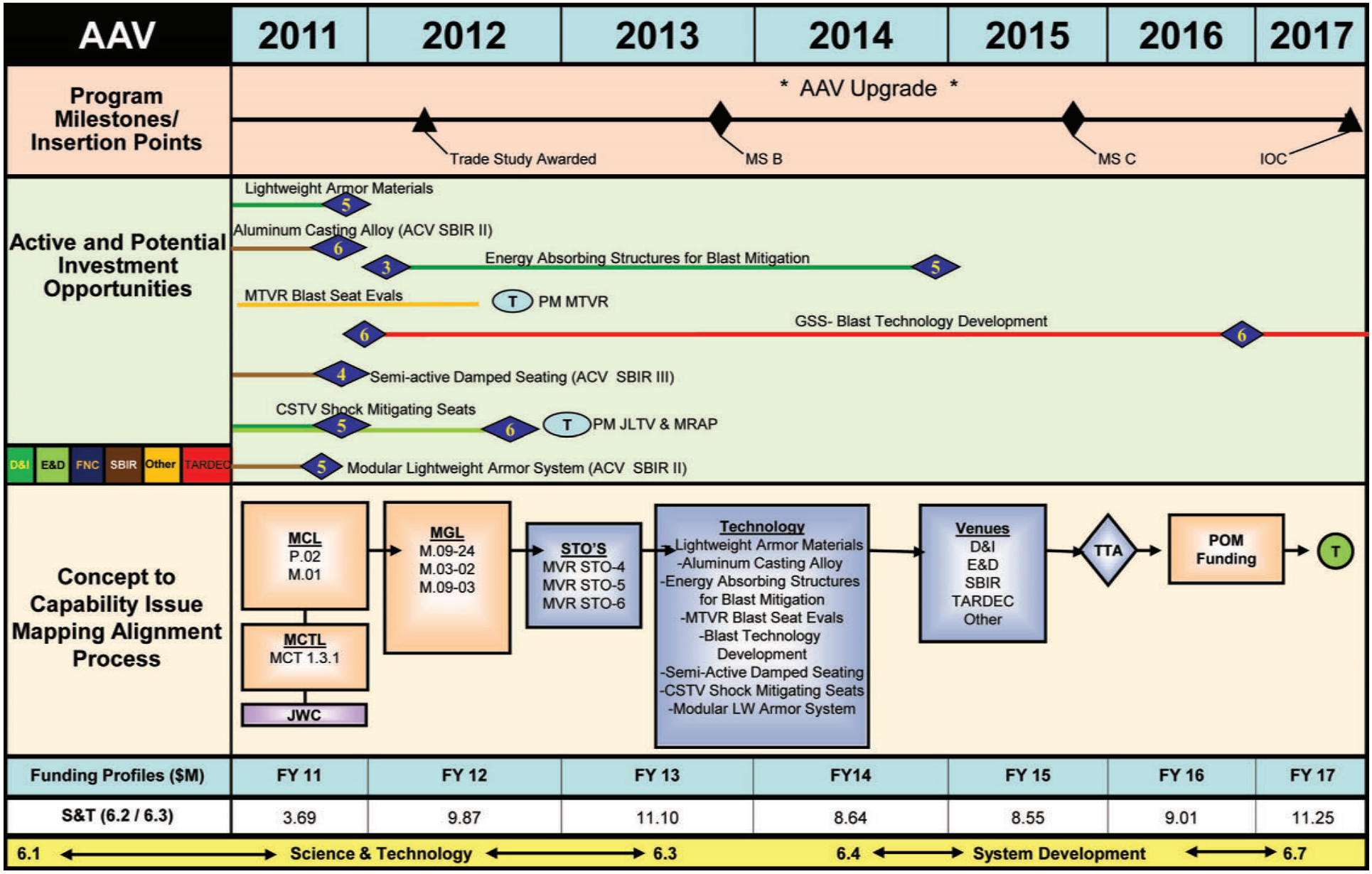
3. Sustainment/In-Service Engineering:

3.a No Active S&T Initiatives for AAV

3.b Potential S&T Initiatives for AAV

TARDEC
- Elastomer Maturation for Increased Track Durability
- Component Integration

AAV Technical Issue #1 Survivability



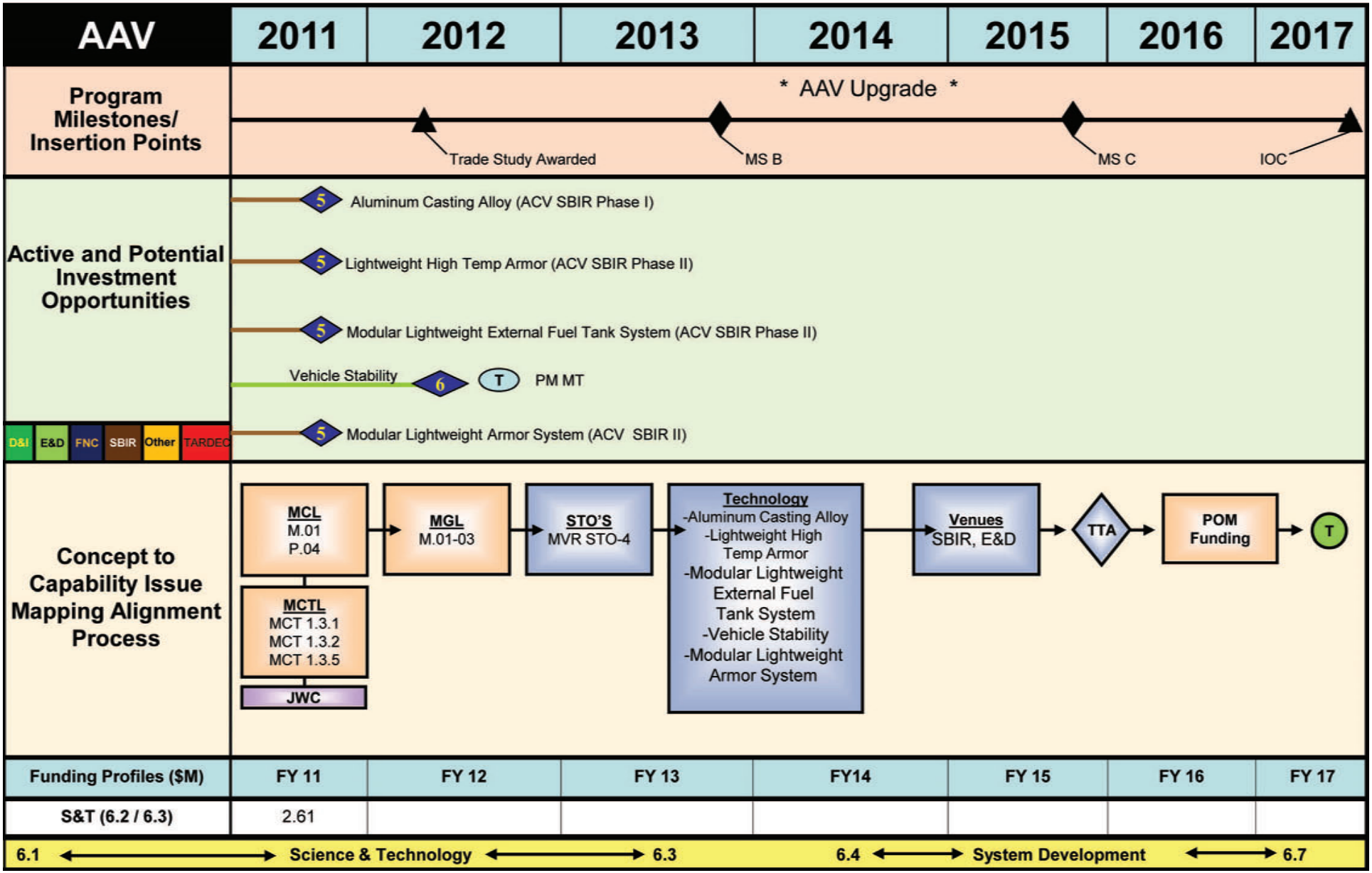
Funding Profiles ($M)	FY 11	FY 12	FY 13	FY14	FY 15	FY 16	FY 17
S&T (6.2 / 6.3)	3.69	9.87	11.10	8.64	8.55	9.01	11.25

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

AAV Technical Issue #1 Survivability

MCL	P.02 Protect Personnel/physical assets and LOCs M.01 Maneuver to secure		
MCTL	MCT 1.3.1 Conduct Maneuver		
MGL	M.09-24 Force Protection M.03-02 Protected mobility M.09-03 Protect armor platforms against RPG and ATGMs		
STO'S	MVR STO-4 Advanced materials and survivability technology to enhance the performance and survivability of combat vehicles and surface craft MVR STO-5 Vehicle and surface craft design for Marine usability, habitability, and survivability MVR STO-6 Mine and IED neutralization		
Technology	Active: None	Pending: N/A	-Potential: --Lightweight Armor Materials -Aluminum Casting Alloy -Energy Absorbing Structures for Blast Mitigation -MTVR Blast Seat Evals -Blast Technology Development -Semi-Active Damped Seating -CSTV Shock Mitigating Seats -Modular LW Armor System
Venues	D&I, E&D, SBIR, TARDEC, Other		
TTA	N/A	(T) Transition target for: PM LAV, JLTV, MRAP & Multiple PMs	
POM Funding	MCCDC integration division		
(T)	Transition to a program of record	Comments/Issues:	

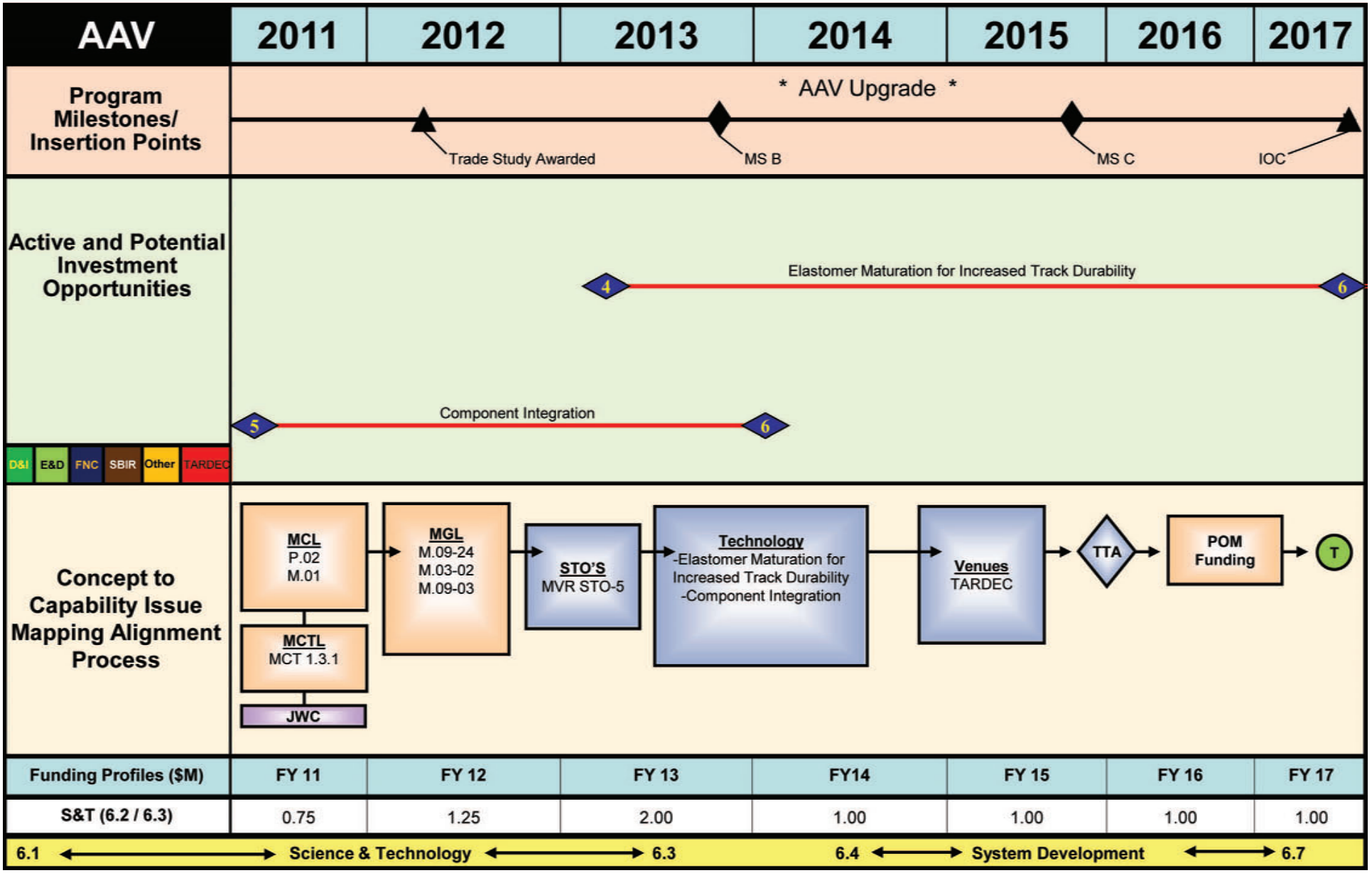
AAV Technical Issue #2 Weight/Buoyancy Management



AAV Technical Issue #2 Weight/Buoyancy Management

MCL	M.01 Maneuver to secure P.04 Detect threats to protect/secure forces	
MCTL	MCT 1.3.1 Conduct Maneuver MCT 1.3.2 Conduct Amphibious Operations MCT 1.3.5 Navigate	
MGL	M.01-03 AAV in support of STOM	
STO'S	MVR STO-4 Advanced materials and survivability technology to enhance the performance and survivability of combat vehicles and surface craft	
Technology	Active: None	Potential: Aluminum Casting Alloy Lightweight High Temp Armor Modular Lightweight External Fuel Tank System Vehicle Stability Modular Lightweight Armor System
Venues	SBIR, E&D	
TTA		
POM Funding	MCCDC integration Division	
T	Transition to a program of record	Comments/Issues:

AAV Technical Issue # 3 Sustainment/In-service Engineering



Funding Profiles ($M)	FY 11	FY 12	FY 13	FY14	FY 15	FY 16	FY 17
S&T (6.2 / 6.3)	0.75	1.25	2.00	1.00	1.00	1.00	1.00

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

AAV Technical Issue # 3 Sustainment/In-service Engineering

MCL	P.02 Protect Personnel/physical assets and LOCs M.01 Maneuver to secure		
MCTL	MCT 1.3.1 Conduct Maneuver		
MGL	M.09-24 Force Protection M.03-02 Protected mobility M.09-03 Protect armor platforms against RPG and ATGMs		
STO'S	MVR STO-5 Vehicle and surface craft design for Marine usability, habitability, and survivability		
Technology	Active: None	Pending: None	Potential: -Elastomer Maturation for Increased Track Durability -Component Integration
Venues	TARDEC		
TTA	N/A	T	
POM Funding	MCCDC Integration Division		
T	Transition to a program of record	Comments/Issues:	