The Joint Light Tactical Vehicles (JLTV)

The Joint Light Tactical Vehicle (JLTV) is a major Army-Marine Corps defense acquisition program for a new-generation wheeled vehicle that would replace a portion of the Services' High Mobility Multipurpose Wheeled Vehicle (HMMWV) fleet. The program's aim is to develop a new multi-mission light vehicle family with superior crew protection and performance compared to the HMMWVs. The JLTV family will balance critical weight and transportability constraints within performance, protection, and payload requirements – all while ensuring an affordable solution for the Army and USMC.

The JLTV program is aligned with a joint program office under the management of the U.S. Army's Project Manager for Tactical Vehicles, which falls under the leadership of the Program Executive Office for Combat Support and Combat Service Support (PEO CS&CSS). In October 2008, the Army awarded three industry teams – BAE Systems, General Tactical Vehicles (General Dynamics-AM General), and Lockheed Martin – Technology Development (TD) contracts to design and fabricate competitive prototypes for testing and evaluation.

In June 2011, the Services successfully accomplished the 27-month TD Phase, completing rigorous test and evaluation efforts at Aberdeen Test Center, Md. and Yuma Test Center, Az. The prototypes underwent ballistic protection, system performance, and reliability and maintainability tests to gauge technical potential against JLTV requirements, with an emphasis on identifying potential trade-offs to reduce system weight. The Services completed all planned performance and RAM testing; however, because of the increased requirement in under-body survivability, more challenging ballistic testing was conducted to help inform the Engineering and Manufacturing Development (EMD) Phase requirements. Additionally, JLTV's first helicopter sling load transportability test with the Army's CH-47D and the USMC's CH-53E was completed with four-passenger General Purpose vehicles.

The development of the JLTV reinforces the Services' approach to interoperable platforms that provide expeditionary and protected maneuver to forces currently supported by HMMWVs. The JLTVs also improve payload efficiency through chassis engineering, enabling the vehicles to be deployed with the appropriate amount of force protection through scalable armor solutions. Further, expected JLTV fleet reliability and fuel efficiency will be significantly greater than the current HMMWV fleet, which will reap millions of dollars in savings over the JLTV life-cycle.

The TD Phase has satisfied its intended purposes: demonstrate the integration of mature technologies as a complete system and provide an assessment of the technical and performance risks relevant to entering the EMD Phase.

The EMD Phase will be a full and open competition, with the selection of multiple offerors. Milestone B is currently scheduled for 3Q FY-12.

Crew Protection Imperative

The advent in Iraq and Afghanistan of improvised explosive devices (IEDs) has taken its toll on the U.S. military's unarmored flat-bottom HMMWVs, which were never designed to withstand IED or mine blasts. Up-armoring of HMMWVs through the addition of armor plates provided increased protection, but the increased weight reduced the vehicle's payload capacity, maneuverability, off-road mobility, and air transportability.

With the JLTV, the Army and Marine Corps hope to regain the performance once offered by the HMMWV while adding inherent crew protection against IED-like threats. Some of the JLTV industry TD designs feature a V-shaped hull similar to the MRAP vehicles, as well as a semi-active independent suspension system with a variable ride height which allows the underside of the hull to be raised, to facilitate IED blast deflection. High ground clearance also is essential for off-road mobility, and the ability to adjust to a low ground clearance height is essential to vehicle transport in height-restricted shipboard spaces.

The JLTV will feature inherent and B-kit scalable armor. The vehicle's inherent armor protection levels, sufficient for non-combat humanitarian operations, will be supplemented by the addition of bolt-on B-kit armor for enhanced protection during combat missions. All three industry teams used modular B-kit armor panels to keep weight down while providing ballistic, mine, and IED protection.

Vehicle Configurations

The JLTV Family of Vehicles (FoV) consists of two variants, a two-seat and a four-seat variant, and a companion trailer (JLTV-T). The two-seat variant has one base vehicle platform, the Utility (JLTV-UTL). The four-seat variant has two base vehicle platforms, the General Purpose (JLTV-GP) and the Close Combat Weapons Carrier (JLTV-CCWC). The JLTV-GP will serve as the base vehicle platform for three mission package variations, the Special Purpose (JLTV-SP), the Heavy Guns Carrier (JLTV-HGC), and the C2 On the Move (JLTV-C2OTM), to perform a wide range of military operations. The JLTV FoV must be light enough to allow two vehicles with 2,000 lbs of payload to be transported as an external sling load underneath a Marine Corps CH-53K helicopter. High commonality among the JLTV FoV is a key objective. The Army and Marine Corps want to minimize the life-cycle ownership costs of the JLTV FoV by maximizing commonality of components, spare and repair parts, tools, maintenance procedures and training.

Another key factor in lowering the life-cycle costs will be the JLTV FoV's higher reliability and maintainability, as well as the use of more fuel-efficient engines. The Army and Marine Corps have also minimized any service unique vehicle requirements.

The JLTV will feature an open systems electronics architecture that will facilitate integration of current and future sensor, communications, and navigation systems as they become available. As a result, the JLTV's crew will have significantly improved battlefield situational awareness, compared with vehicles today.

The Army currently plans to procure approximately 46,000 JLTVs, making-up nearly one-third of the light tactical wheeled vehicle fleet, while the Marine Corps plans to procure 5,500 vehicles; those numbers are subject to change as each service refines its Tactical Wheeled Vehicle strategy.

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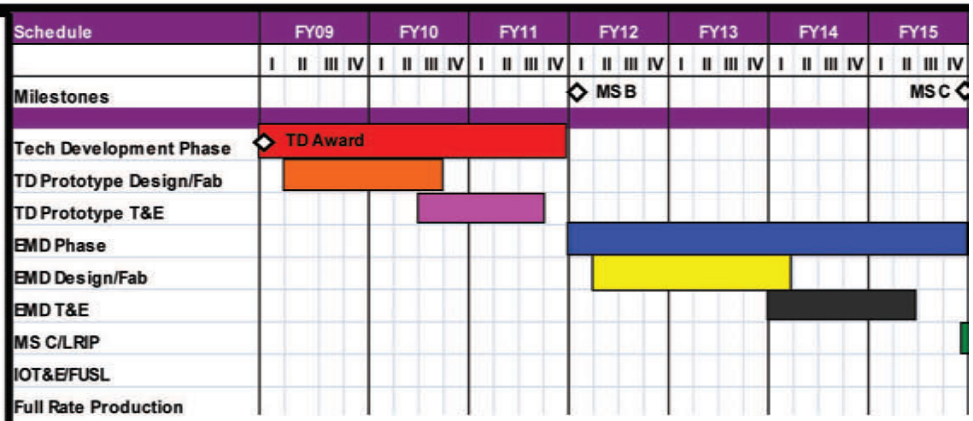
Joint Light Tactical Vehicle (JLTV)

BAE Systems Land and Armaments

General Tactical Vehicles

Lockheed Martin Systems Integration



Program Description

The JLTV is a Joint Army/Marine Corps program, which consists of a family of vehicles with companion trailers capable of performing multiple mission roles that will be designed to provide protected, sustained, networked mobility for personnel and payloads across the full Range Of Military Operations (traditional to irregular).

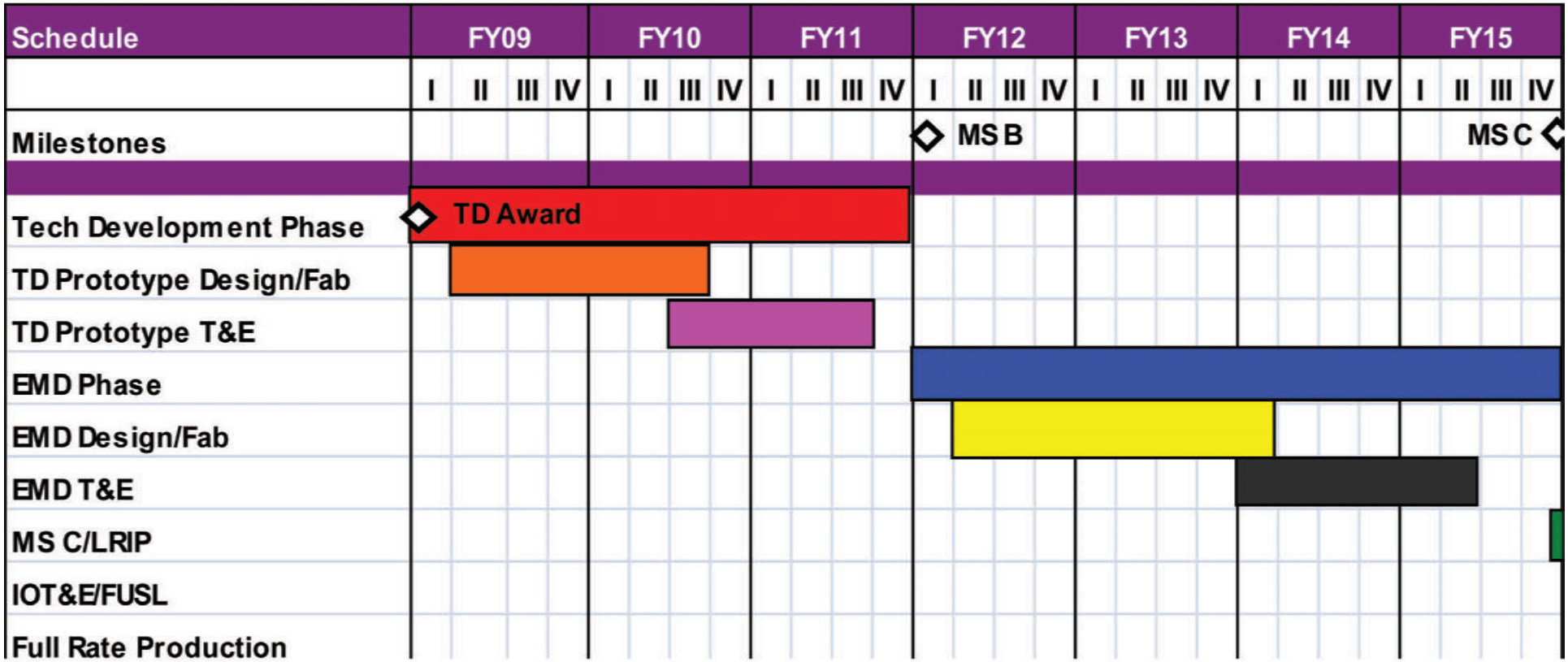
The initial production of JLTVs will provide the Operational Forces with tactical wheeled vehicles that provide a high level of scalable protection, improved sustainment, and net-ready maneuver platforms, that are strategically and operationally transportable, and tactically mobile across all terrain.

IOC: 2017 FOC: TBD AO: Increment I – 5,550

Program Status

- DAE Acquisition Review on 10 Sep 07 directed JLTV to enter at MS A
- JLTV MS A DAB convened 5 Dec 07
  - MS A Acquisition Decision Memorandum approved 21 Dec 07
  - Proceeding as Joint Pre-Major Defense Acquisition Program
  - MDA – USD (AT&L)
- TD contracts awarded Oct 08 to Lockheed, GTV and BAE
- All contractors delivered TD vehicles and testing commenced June 09

Joint Light Tactical Vehicle (JLTV)



The Joint Light Tactical Vehicles (JLTV)

JLTV'S Top Three Program Technology Issues:

1. Weight/Armor - The JLTV must be transportable by rotary and fixed wing aircraft, as well as aboard amphibious shipping and Maritime Prepositioning Ships (MPS). Any additional weight could hinder the vehicle's ability to be transported. Force protection needs will require higher levels of armor protection while still meeting the JLTV's transportability requirement.

2. Reliability, Availability, Maintainability (RAM) Modeling and Simulation (M&S) Modeling the reliability of the vehicle is critical to determine if there are maintainability issues. Fully integrated systems engineering M&S tool can dramatically reduce the TOC while maximizing the effectiveness of limited S&T resources to transition optimized, focused capabilities. Design tradeoffs are traceable, transparent and consistent.

3. Seat Shock/Vibration - Protect crew against current and emerging vehicle IED mine threats and rollovers. Emphasis on lower leg, spine and multiple directional protection. The crew and passengers of the vehicle must be able to perform their duties at the conclusion of the ride.

1. Weight/Armor:

1a. Active S&T Initiatives for JLTV

Discovery and Innovation (D&I)
- Energy Absorbing Structures for Blast Mitigation Light Tactical Vehicles
- Expeditionary Light Armor Seeding Development

Other
- JLTV Phase 'A' Light Weight Armor Study
- JLTV SE Toolkit

1b. Potential S&T Initiatives for JLTV

Discovery and Innovation (D&I)
- Lightweight Armor Materials

Small Business Innovation Research (SBIR)
- Modular Lightweight Armor System (ACV SBIR II)
- Aluminum Casting Alloy (ACV SBIR II)

Small Business Technology Transfer and Research (STTR)

- Low Cost, Low Weight, Self-Sealing Fuel Tank Technology Development (ACV STTR II)

TARDEC

- GSS- Blast Technology Development

Other

- Fuel Tank Protection System Swampworks

2. Reliability, Availability, Maintainability (RAM) Modeling and Simulation (M&S):

2a. Active S&T Initiatives for JLTV

Other

- JLTV SE Toolkit

2b. Potential S&T Initiatives for JLTV

Exploration & Development (E&D)

- Composite Armor Modeling and Optimization (CAM)
- Novel Ceramic Armor Configuration Modeling

TARDEC

- Survivability Optimization Modeling (TOSOM)
- Survivability Analysis and Optimization
- Armor Durability Simulation

Other

- HMMWV Trade Space M&S

3. Seat Shock/Vibration:

3a. Active S&T Initiatives for JLTV

Discovery and Innovation (D&I)

- Energy Absorbing Structures for Blast Mitigation
- CSTV Shock Mitigating Seats

Exploration & Development (E&D)

- CSTV Shock Mitigating Seats

3b. Potential S&T Initiatives for JLTV

Small Business Innovation Research (SBIR)

- Semi-Active Damped Seating (ACV SBIR III)

TARDEC

- GSS Blast Technology Development

Other

- MTVR Blast Seat Evals

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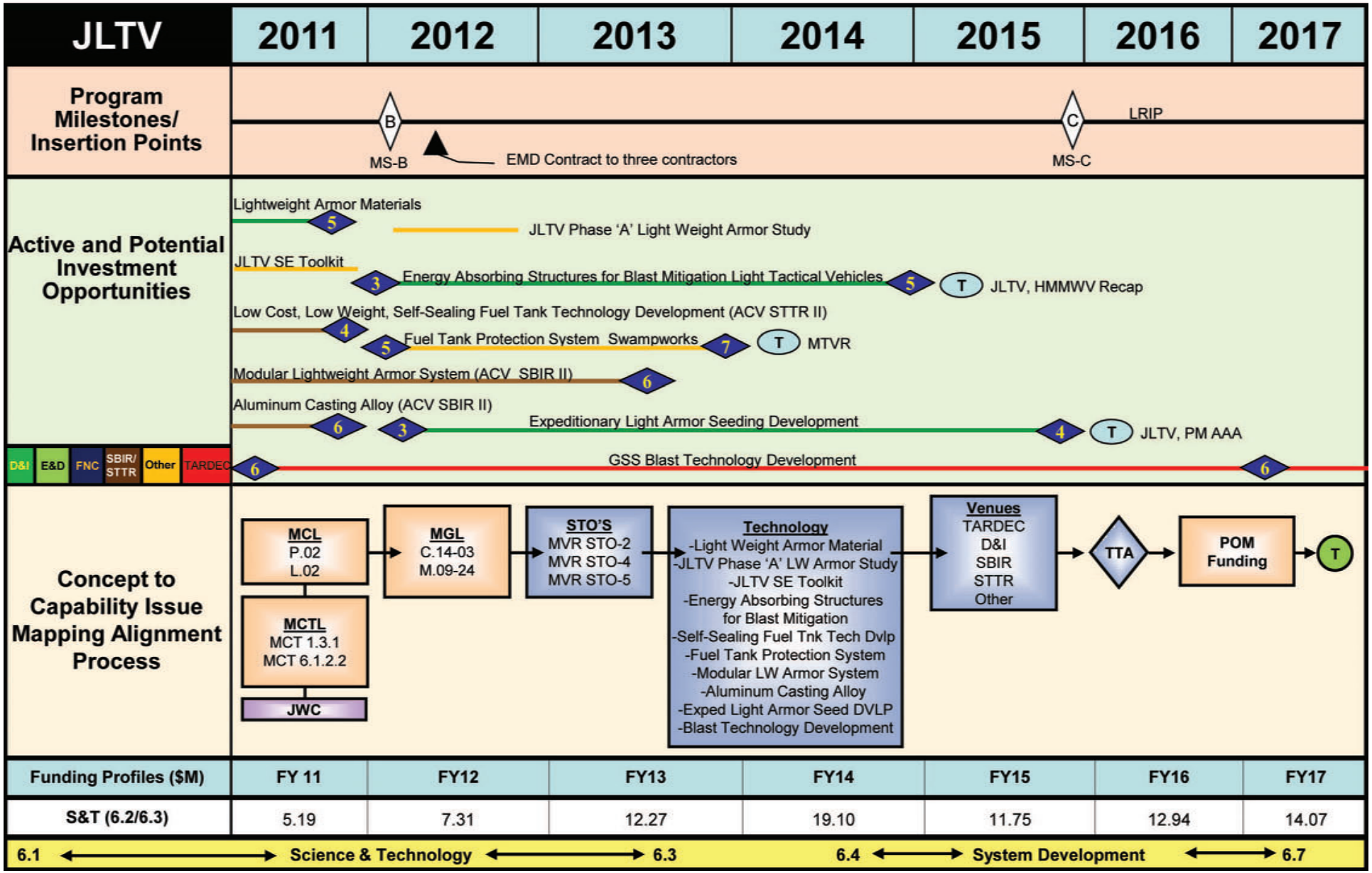
JLTV Technical Issue #1 Weight/Armor



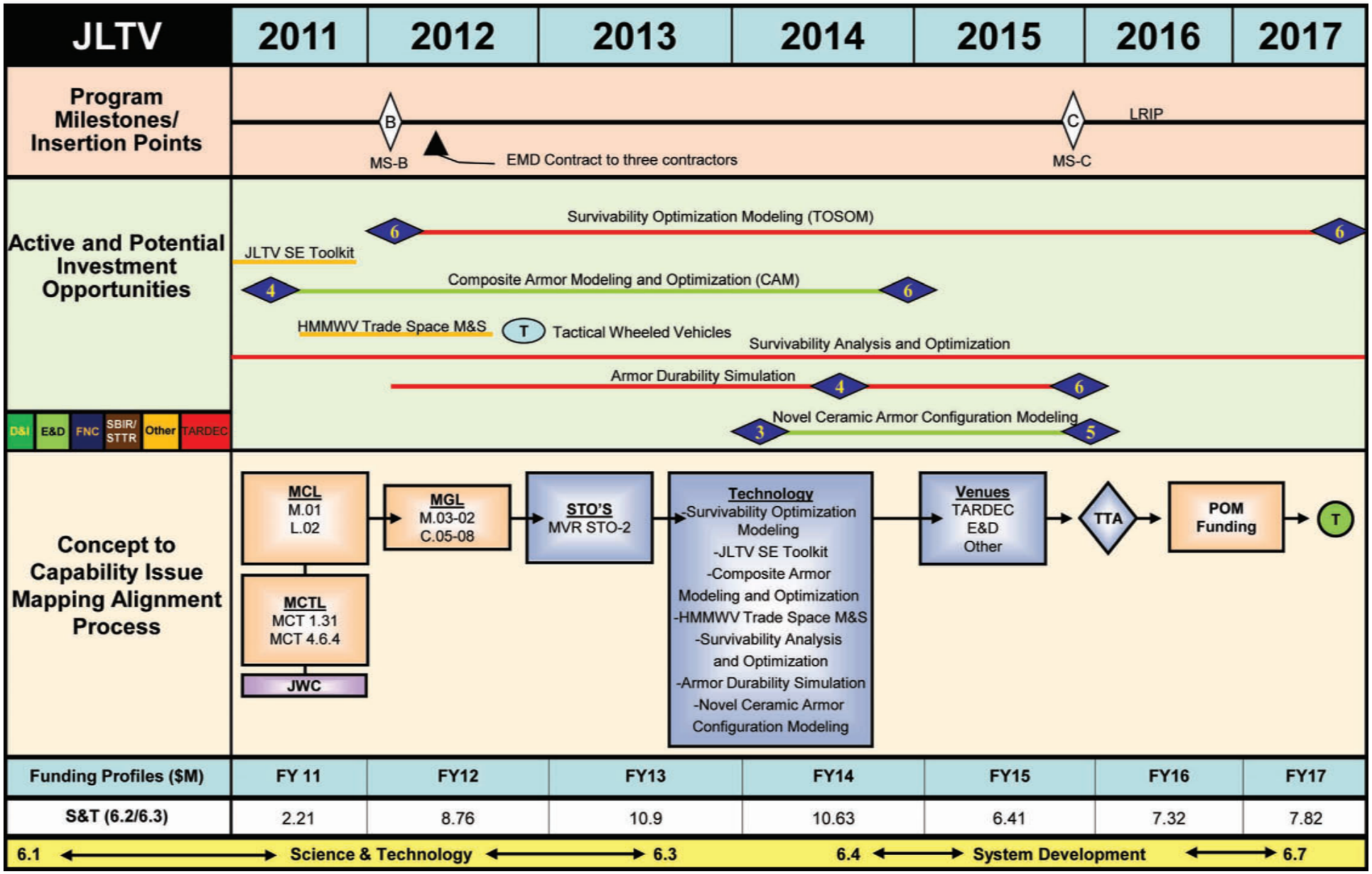
Funding Profiles ($M)	FY 11	FY12	FY13	FY14	FY15	FY16	FY17
S&T (6.2/6.3)	5.19	7.31	12.27	19.10	11.75	12.94	14.07

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

JLTV Technical Issue #1 Weight/Armor

MCL	P.02 Protect personnel, physical assets and LOCs L.02 Maintain equipment	
MCTL	MCT 1.3.1 Conduct Maneuver MCT 6.1.2.2 Harden Installations, Vehicles and Equipment	
MGL	C.14-03 Limited Transport Capability M.09-24 Force Protection	
STO'S	MVR STO-2 Ground vehicle mobility MVR STO-4 Advanced materials and survivability technology to enhance the performance and survivability of combat vehicles & surface crafts MVR STO-5 Vehicle & surface craft design for Marine usability, habitability and survivability	
Technology	Active: -JLTV Phase 'A' Light Weight Armor Study -JLTV SE Toolkit -Energy Absorbing Structures for Blast Mitigation Light Tactical Vehicles -Expeditionary Light Armor Seeding Development	Potential: -Light Weight Armor Materials (Univ. Delaware, Penn St.) -Low Cost, Low Weight, Self-Sealing Fuel Tank Technology Development (ACV STTR II) -Fuel Tank Protection System Swampworks -Modular Lightweight Armor System (ACV SBIR II) -Aluminum Casting Alloy (ACV SBIR II) -GSS Blast Technology Development
Venues	D&I, FNC, Plus-ups, E&D,SBIR	
TTA		T Transition target for: PM JLTV, MTVR, HMMWV, AAA
POM Funding	MCCDC integration division	
T	Transition to a program of record	Comments/Issues:

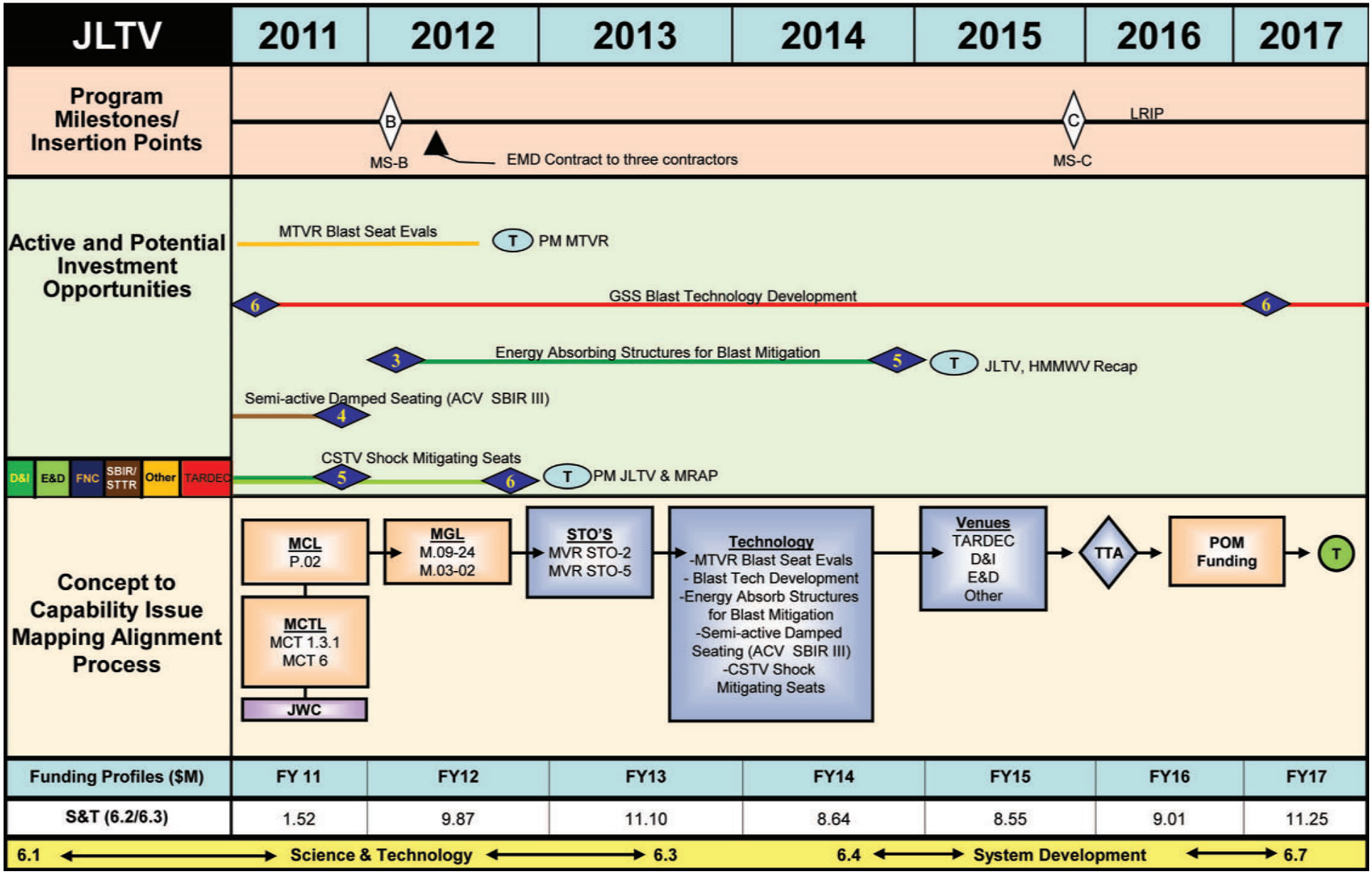
JLTV Technical Issue #2 Reliability/Affordability/ Maintainability (RAM) Modeling and Simulation (M&S)



JLTV Technical Issue #2 Reliability/Affordability/ Maintainability (RAM)

MCL	M.01 Maneuver to secure L.02 Maintain equipment		
MCTL	MCT 1.31 Conduct Maneuver MCT 4.6.4 Provide Simulators and Simulator Support Facilities		
MGL	M.03-02 Protected mobility C.05-08 Visualization Tools		
STO'S	MVR STO-2 Ground vehicle mobility		
Technology	Active: -JLTV SE Toolkit		Potential: -Survivability Optimization Modeling (TOSOM) -Composite Armor Modeling and Optimization (CAM) -HMMWV Trade Space M&S -Survivability Analysis and Optimization -Armor Durability Simulation -Novel Ceramic Armor Configuration Modeling
Venues	TARDEC, E&D, Other		
TTA		T	Transition target for: PM JLTV & other Tactical Wheeled Vehicles
POM Funding	MCCDC integration division		
T	Transition to a program of record	Comments/Issues:	

JLTV Technical Issue #3 Seat Shock/Vibration



JLTV Technical Issue #3 Seat Shock/Vibration

MCL	P.02 Protect personnel, physical assets and LOCs	
MCTL	MCT 1.3.1 Conduct Maneuver MCT 6 Protect the Force	
MGL	M.09-24 Force Protection M.03-02 Protected mobility	
STO'S	MVR STO-4 Advanced materials and survivability technology to enhance the performance and survivability of combat vehicles & surface craft MVR STO-5 Vehicle & surface craft design for Marine usability, habitability, & survivability	
Technology	Active: -CSTV Shock Mitigating Seats -Energy Absorbing Structures for Blast Mitigation	Potential: -MTVR Blast Seat Evals -GSS Blast Technology Development -Semi-active Damped Seating (ACV SBIR III)
Venues	Active: D&I, E&D	Potential: TARDEC, Other, SBIR
TTA	Not required, only required on FNC	T Transition target for: PM JLTV, MRAP, MTVR, HMMWV
POM Funding	MCCDC integration division	
T	Transition to a program of record	Comments/Issues: