EXPEDITIONARY FIGHTING VEHICLE (EFV)

National Defense Industrial Association (NDIA)

Combat Vehicle Division Conference

21 Oct 08

EFV MISSION

Provide High Speed Transport of Embarked Marine Infantry From Ships Located Beyond the Horizon to Inland Objectives

Provide Armor Protected Land Mobility and Direct Fire Support During Combat Operations

EFV

Revolutionizing Expeditionary Maneuver Warfare

Present: AAV

- WWII Doctrine
- No Standoff Distance for ATF
- Slow Speed Amphibious Assault
- 1960's Technology
- Limited Survivability

Future: EFV

- EFV directly supports the Marine Corps' Capstone Concept: Expeditionary Maneuver Warfare
- The EFV will provide the tactical mobility asset required to spearhead the EMW concept and permit the Marine Corps to fully exploit littoral areas as maneuver space
- The EFV will allow immediate, high speed maneuver of Marine infantry units as they emerge from ships located beyond the horizon (25 nm and beyond)
- The EFV's unique combination of offensive firepower, armor, NBC protection, and high speed mobility on land and sea represent major breakthroughs in the ability of Naval and Marine expeditionary forces to avoid an enemy's strength and exploit its weakness

Leap Ahead to 21st Century Technology

EFV

Mission Essential Functions

Move (Land)

Move (Water)

Shoot

Communicate

Carry

Protect

EFV - KEY PERFORMANCE PARAMETERS

CRITERIA	THRESHOLD	OBJECTIVE
• **High Water Speed** - 2'significant wave height, for not less than one continuous hour	20 knots	25 knots
• **Land Speed** - Forward speed on hard surface road	69 kph	72 kph
• **Firepower** - Maximum effective range Interoperability/standard ammunition with other service(s)	1500m	2000m
• **Armor Protection** - Any azimuth	14.5mm/300m	30mm/1000m
• **Reliability** - Mean Time Between Operational Mission Failure	43.5 hrs	56 hrs
• **Carrying Capacity**	17 Marines	18 Marines
• **Net Ready**	100% of Critical *IERs	100% of Top Level *IERs

***** Information Exchange Requirements (IERs)

Currently Demonstrated Plan to Demonstrate

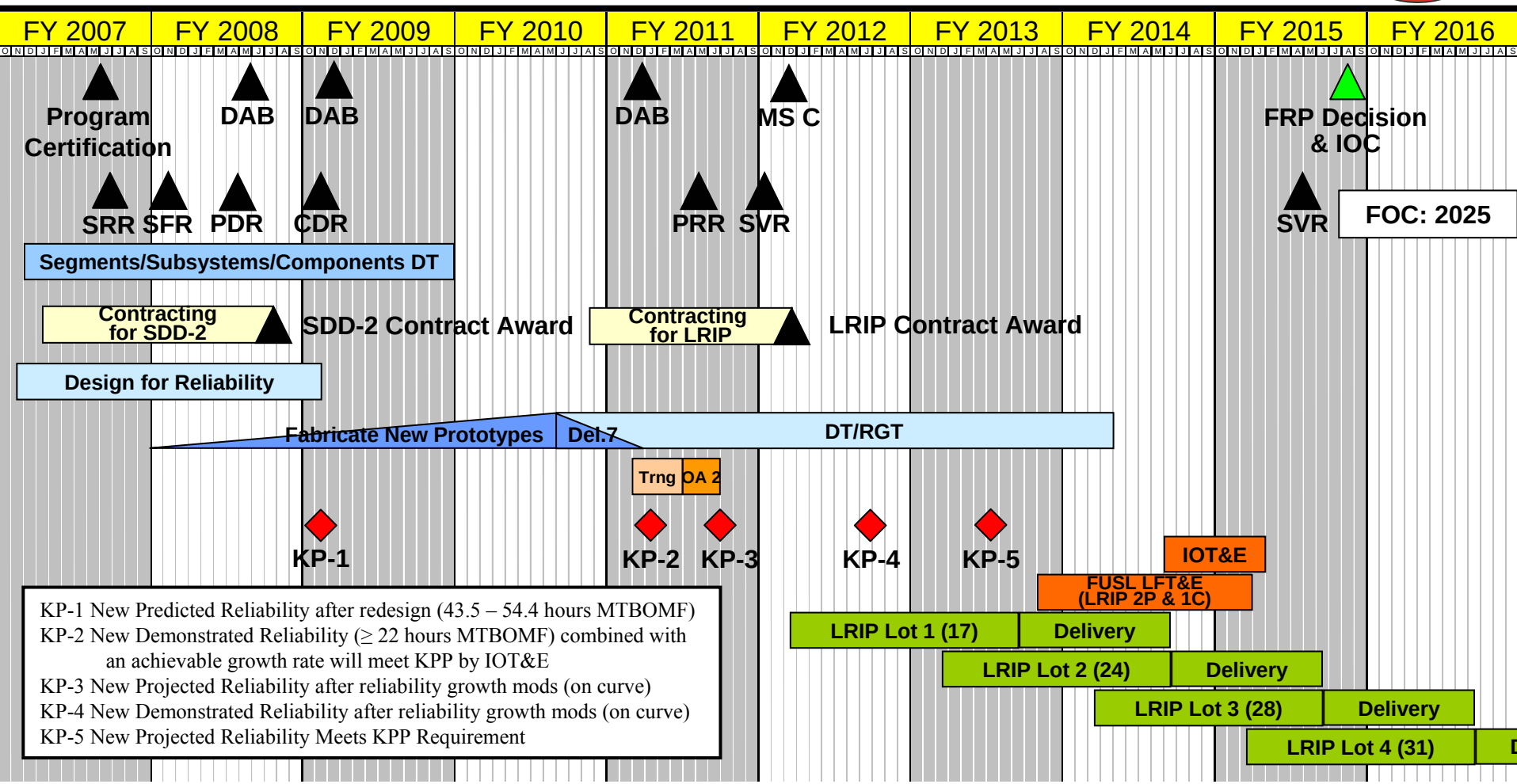
PROGRAM UPDATE

SIGNIFICANT EVENTS

- System Requirements Review (SRR) completed 28 Jun 07
- System Functional Review (SFR) completed 11 Dec 07
- DFR Contract Mod Definitized 17 Jan 08
  - 51 Mission Essential Components included
  - Fault Tree Model continues to predict a design of 60.7 hrs Mean Time Between Operational Mission Failure (MTBOMF)
- System Software Review (SSR) conducted 28 Feb 08
- Capstone Preliminary Design Review (PDR) conducted 2 May 08
- Systems Development & Demonstration - 2 (SDD-2) Defense Acquisition Board Review conducted 30 May 08
- SDD-2 Contract awarded 31 Jul 08
- Component Design Review (CDR) Nov 08
- Integrated Baseline Review (IBR) Jan 08

PROGRAM UPDATE

13 AUGUST 2007 EFV PROGRAM STRUCTURE



KP-1 New Predicted Reliability after redesign (43.5 – 54.4 hours MTBOMF)
KP-2 New Demonstrated Reliability (≥ 22 hours MTBOMF) combined with an achievable growth rate will meet KPP by IOT&E
KP-3 New Projected Reliability after reliability growth mods (on curve)
KP-4 New Demonstrated Reliability after reliability growth mods (on curve)
KP-5 New Projected Reliability Meets KPP Requirement

Prior Yrs	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	(Millions)
2,078	244	316	212	189	174	88	77	51	RDT&E
186	0	0	0	70	484	598	614	680	PMC
1	0	0	0	0	17	24	28	31	Quantity

Program Efforts Leading To MS C

- **Redesign for reliability**
  - Instituting robust systems engineering processes
  - Extensive segments/subsystems/components developmental testing
- **Build new prototypes**
  - Prototypes will be fabricated as parts "earn their way in" through the design release/verification process
- **Conduct extensive testing on new vehicles**
  - Developmental Testing and Reliability Growth Testing
  - Confirmation program is on reliability growth curve
  - Operational Assessment to support Milestone C

SDD-2 PROGRAM GOALS

- **Reduce Vehicle Weight**
- **Reduce Vehicle Cost**
- **Improve Vehicle Performance**
- **Improve Vehicle Reliability, Availability, Maintainability, Durability (RAM-D)**
- **Introduce New Warfighting Capabilities**

PROGRAM OBJECTIVES

- **Emphasize near term technology, but anticipate for future upgrades through production and fielding.**
- **Reduce Vehicle Weight**
  - Lighter Weight Track
  - Lighter Weight Armor
  - Material Substitution
- **Reduce Vehicle Cost / Life Cycle Cost**
  - Identify Substitute Line Replaceable Units
  - Improve Manufacturing Processes
  - Improve Logistic Support Programs

PROGRAM OBJECTIVES

- **Improve Vehicle Performance**
  - Improve Power Transmission
  - Increase Armor Protection
- **Improve Vehicle RAM-D**
  - Corrosion Prevention
  - Robustness
- **Introduce New Warfighting Capabilities**
  - Wireless Technology
  - Advanced Displays
- **Introduce Design Enhancements**
  - Dissimilar Metal Avoidance
  - Modeling & Simulation of Battle Damage

Small Business Innovation Research Program Initiatives

- **Reduction of Ground Vehicle Observables**
  - Reduce the vulnerability of ground vehicles to detection and weapon-targeting systems
- **Blast and Impact Resistance of Polyurea Coatings on Metallic and Non-Metallic Materials**
  - Research, develop and characterize polyurea materials ability to increase blast and fragment protection
- **Directional High Flow Ballistic Exhaust Grille**
  - Research, design and build a high flow rate ballistic exhaust grille that allows directional output control

Small Business Innovation Research Program Initiatives

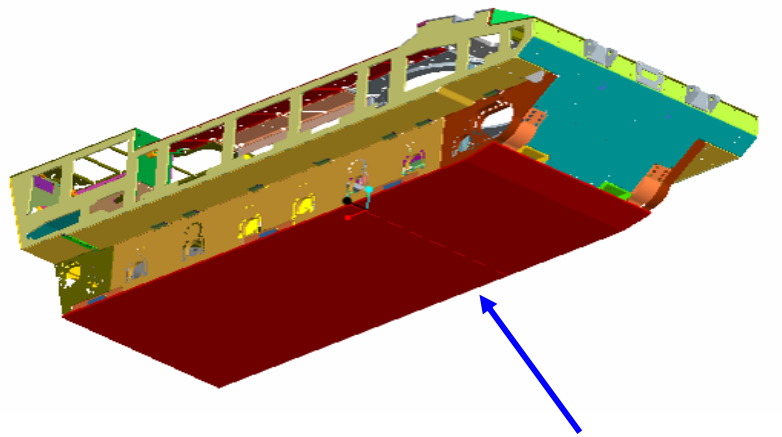
- **Low Cost, Low Weight, Self-Sealing Fuel Tank Technology Development**
  - Conduct research in self-sealing fuel tank technology and the development of an integrated material solution that is low cost, rugged, lightweight, and non-flammable; solution will enable vehicle operation in hostile environments and minimize loss of fuel due to a direct / indirect hit
- **Air Flow Noise Reduction Techniques**
  - Develop techniques to reduce engine cooling system noise levels to mitigate the potentially adverse health affects on crew members

Small Business Innovation Research Program Initiatives

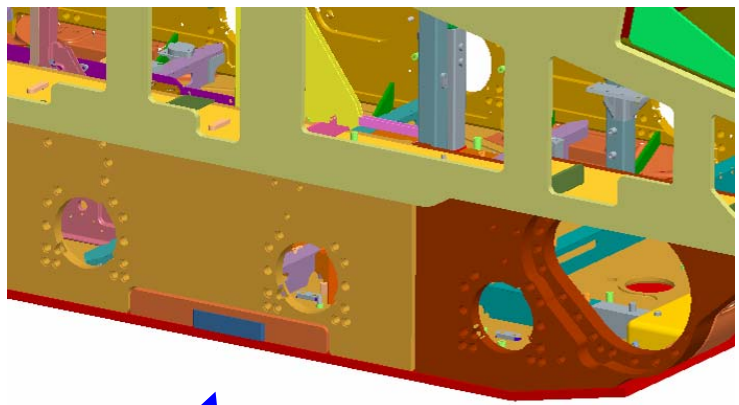
- SBIR Point of Contact is
  - Craig Harvey Program Manager, Advanced Technology
  - (703) 780-2458

OTHER INITIATIVES

- Appliqué Armor Kit
  - Provides Mine Blast Protection for Extended Land Operations
  - Belly/appliqué integration has minimal impact on reliability, production, Land Operation Modes
  - Reduced Water Mode Capabilities



Appliqué kit



Appliqué kit attaches to existing features on the vehicle

PROGRAMMABLE AIRBURST MUNITIONS (PABM)

B004
MK310

ATK HEAB

FY08	FY09	FY10	FY11	FY12	FY13
• PABM qual effort (1200 rds)		• RDT&E PABM buy (4000 rds) /$3.6 mil purchased		Unfunded	
• PABM system integration (2520 rds)					
				• SDDII vehicle integration	

- PM AAA is the lead in a joint (US Army, Navy & USMC) effort to qualify PABM round
- Testing and lethality modeling prove 30mm AB Munitions have 4-6 greater lethal effects against Infantry and light to medium material targets
- Approximately eight 30mm AB rounds as lethal as a 155mm round
- The significant increase in lethality provided by the 30mm PF/AB round will provide ~$10M cost savings over the Life Cycle
- PABM efforts currently on hold due to lack of funding

Note: Our CPD requirement is – 1 EFV will take out a MRPlatoon (T), take out a MRCompany (O). MPLD/HEI meets the threshold requirement, PABM gets us closer to the objective requirement


www.efv.usmc.mil