4.4 OPEN PLUG & PLAY COMMUNICATIONS ARCHITECTURE

"I want a knowledge based force that leverages seamless enterprise capabilities across the spectrum of conflict in order to enhance decision making, achieve knowledge superiority and gain tactical, operational, and strategic advantage over our Nation's adversaries."
-BGen Kevin J. Nally, USMC, Marine Corps Information Enterprise Strategy, 2010

MRAP WITH C4ISR EQUIPMENT

As the Marine Corps continues to develop a comprehensive C4ISR Standard, PEO Land Systems will work with partners to integrate new systems and architectures into tactical Marine vehicles. Upgrading legacy vehicles and developing new platforms provide opportunities to enhance combat effectiveness and ensure Marines maintain their combat edge.

The Challenge: The rapid development and employment of complex C4ISR tools has stressed the power systems, data networks, and overall effectiveness of the Marine Corps fleet of tactical vehicles. Current systems were not designed to support the multiple new technologies that have been added to enhance combat operations. The development of a modular, scalable, affordable and universal architecture to enable a plug-and-play mission capability across all tactical vehicles will enable rapid vehicle modernizations, more intelligent resource allocation, and tactical agility for both current and future vehicle programs.

Potential Solutions:

ONR Efforts

Modular Vehicle Platform: This ONR 30 effort is focused on developing a scalable, reusable, and subdivided vehicle system that will employ a series of self-contained functional modules (medical, Combat Operations Center (COC), remote weapons station, etc.). While the program is exploring potential solutions to a variety of technical challenges, it will require an open plug-and-play architecture to support the various modules and platform elements. This C4ISR backbone will permit system wide power and thermal management and provide common interfaces for the different modules, enabling vehicle mission optimization. This S&T effort, attempting to integrate new systems into a legacy platform, will inform PEO LS of possible architectures and interfaces to feed current and future tactical vehicle programs.

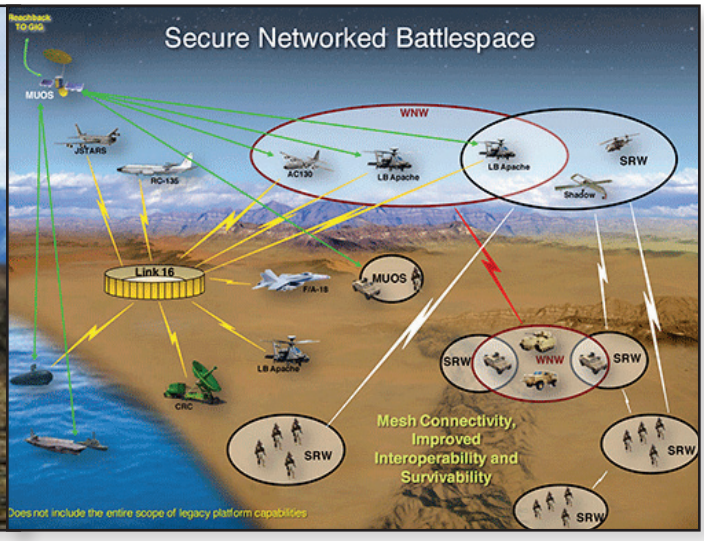
Dynamic Tactical Communications Networks: This Enabling Capability under the FORCENET FNC aims to develop algorithms and protocols to create and maintain networks at the tactical edge. The program's goal is to configure a 200 node network in 2 minutes and reconfigure it in 30 seconds to support C4ISR information over IP in a resource-constrained environment.

C4I Interoperability Architecture: This program is a future Code 30 effort to develop a standardized C4I architecture throughout the Marine Corps. As PEO LS modernizes current vehicles and builds new systems that will support the future MAGTF, the S&T effort will develop future specifications for tactical vehicles for enhanced interoperability.

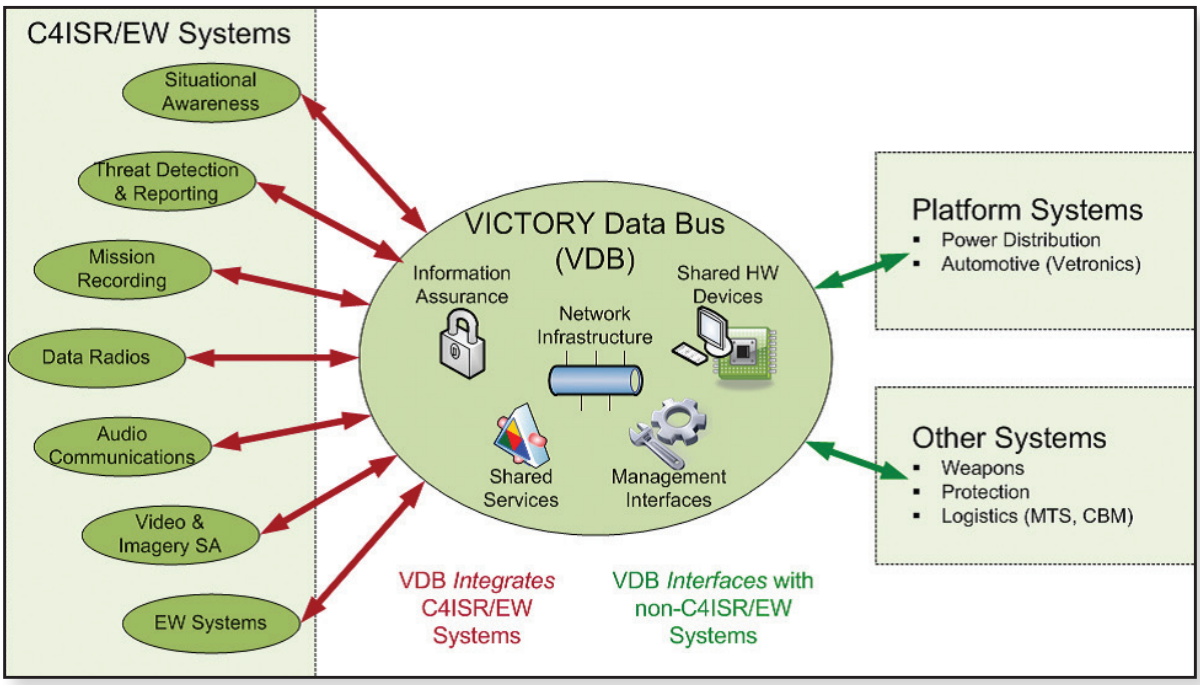
PEO LS and MCSC Efforts

Networked User Control of Locally Embedded and Unique Systems (NUCLEUS): MCSC SIAT sponsored an effort by NSWC Dahlgren and Space and Naval Warfare Systems Command (SPAWAR) to rapidly develop a common display for the MTVR. The NUCLEUS display is a Government-owned hardware and software architecture for vehicle data displays on selected Marine Corps vehicles. MTVR will be the first USMC vehicle to install the NUCLEUS display, but the hardware and software will be able to be reused on other USMC vehicle platforms. The design shall be an open architecture design using common standards-based hardware supported by multiple vendors, and Government-owned software based on open software architecture standards. PM M&HTV intends to integrate the first five systems into the MTVR for a Field User Evaluation in 2013.

Potential MVP Construct



Dynamic Tactical Communications Networks



VICTORY Architecture Concept

TARDEC Efforts

Vehicular Integration for C4ISR/ Electronic Warfare Interoperability (VICTORY) SIL: The VICTORY SIL is established and developed at the U.S. Army TARDEC. The lab will be utilized for the development and integration of an extensive set of C4ISR/Electronic Warfare (EW) technologies that are to be systematically down selected to provide the comprehensive VICTORY services and infrastructure required in the development of mission capabilities of the Army's tactical and combat vehicles. A fully functioning VICTORY SIL will be utilized for validation and independent verification of the Army's and the vendor-provided C4ISR/EW subsystems. The lab will emphasize the importance of testing the data, power and physical interface strategy of the subsystems in a low-cost laboratory environment before integration onto a vehicle. This section describes how the VICTORY SIL will advance the RDECOM's vision for a standardized electronic architecture for ground vehicles as well as the strategy and process for the design, development and testing of the infrastructure and the VICTORY core services.

The VICTORY SIL is a Tool for Advancing Standardized Ground Vehicle Electronic Architecture and Provides These Advantages:

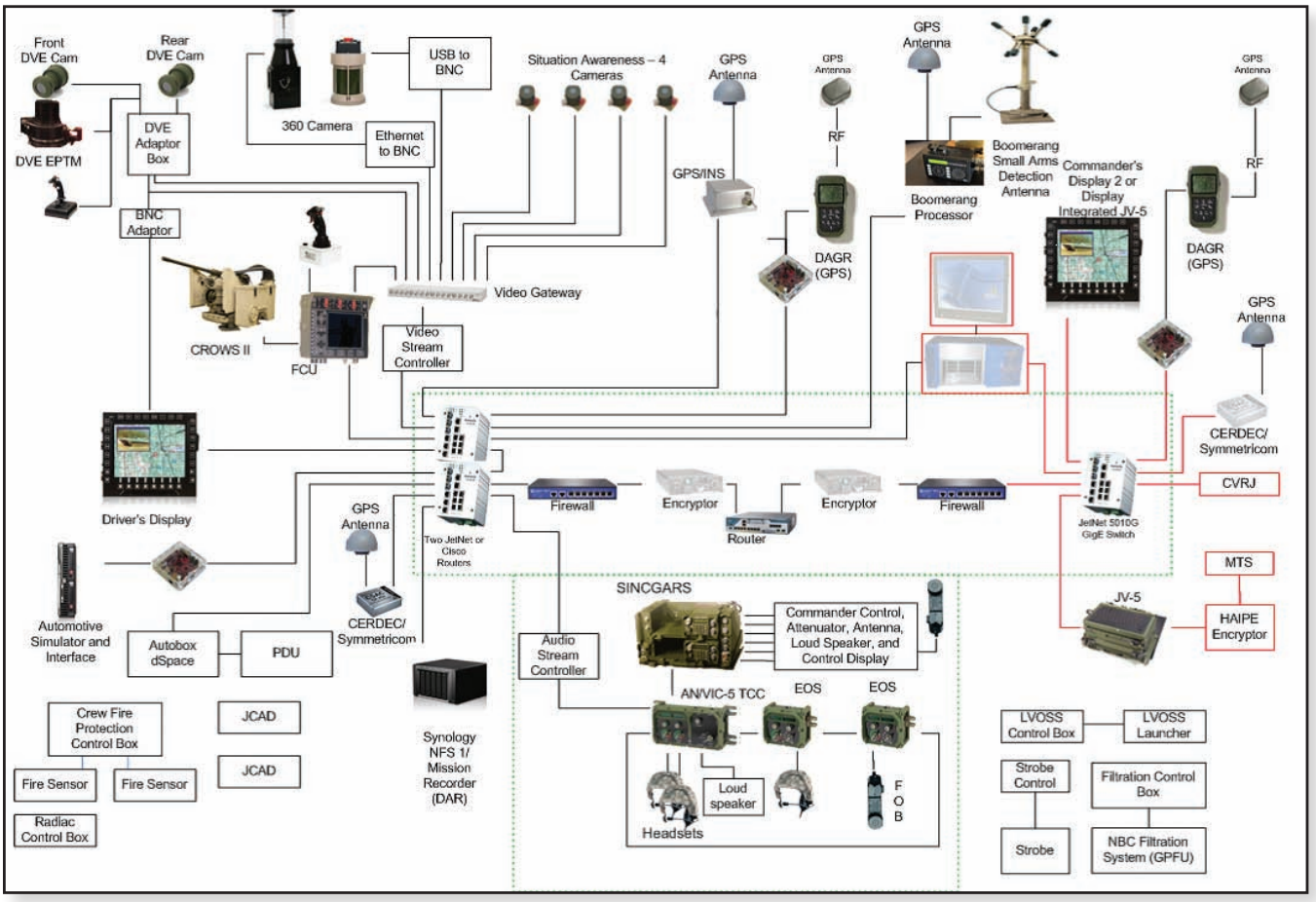
- Build In-house Environment and Knowledge Base to Support Future R&D Capability Regarding Vehicle Electronics and Architecture
- Capability to Test and Verify Vendor Components and Subsystems
- Advance SWaP-C with Porting and Testing VICTORY Implementations to Small, Open and Powerful Process Modules
- Provides an Independent Implementation of the VICTORY 1.0 Standards
- Provides Validation and Verification of the VICTORY 1.0 Standards
- Advances VICTORY Standards from "Proposed" to "Draft"
- Identifies and Clarifies Issues with the VICTORY 1.0 Standards

- The SIL will continue to evolve and change over time as new VICTORY Standards are released.
- Utilize a representative vehicle cabin to demonstrate the VICTORY 1.0 [Fully Mission Capable in September 2012]
- Standards developed in a system level vehicle environment

SBIR Efforts

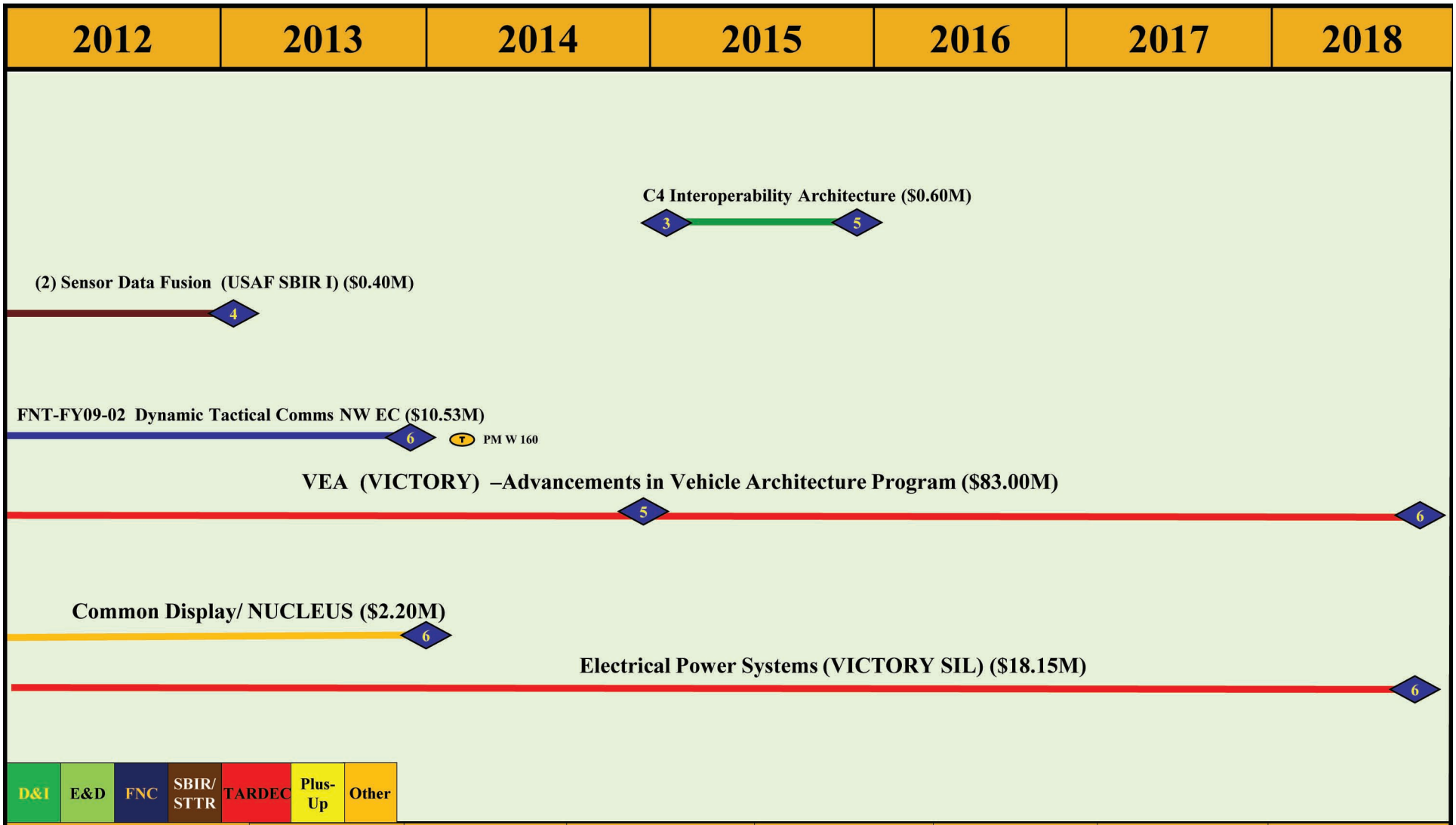
Sensor Data Fusion for Intelligent Systems Monitoring and Decision Making: This Air Force funded SBIR aims to develop a framework to integrate data from various air and ground sensor systems employed in an urban environment to collect data on moving/stationary vehicles and dismounts.

The Open Plug & Play Communications Architecture Focus Area Charts on the following pages highlight critical efforts monitored and supported by the PEO LS S&T Director.



VICTORY 1.0 SIL: End State Architecture

Open Plug & Play Comms Architecture



Funding Profiles ($M)	FY 12	FY13	FY 14	FY15	FY 16	FY 17	FY 18
S&T (6.2 / 6.3)	16.23	16.62	15.32	16.58	13.72	13.80	11.34