



U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND – GROUND VEHICLE SYSTEMS CENTER

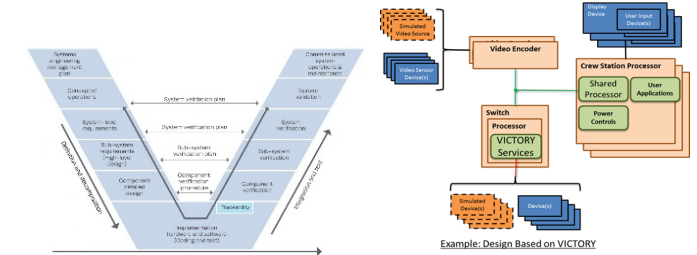
Vehicle Electronics & Architecture Overview

George Hamilton
Associate Director
VEA

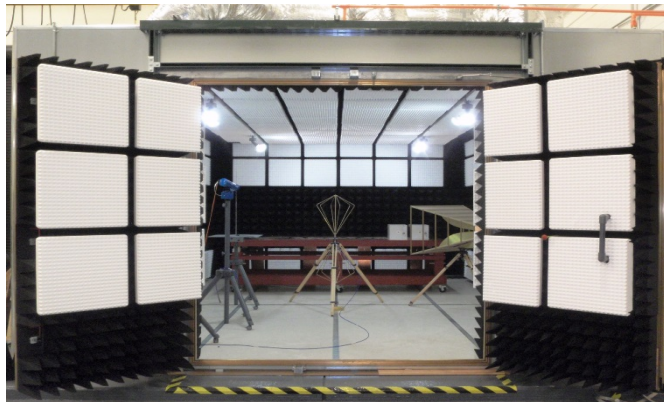
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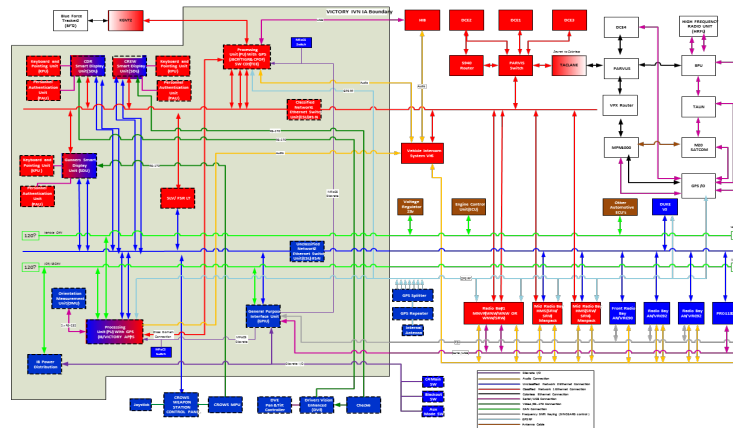
Engineering Services



EMI Analysis & Test

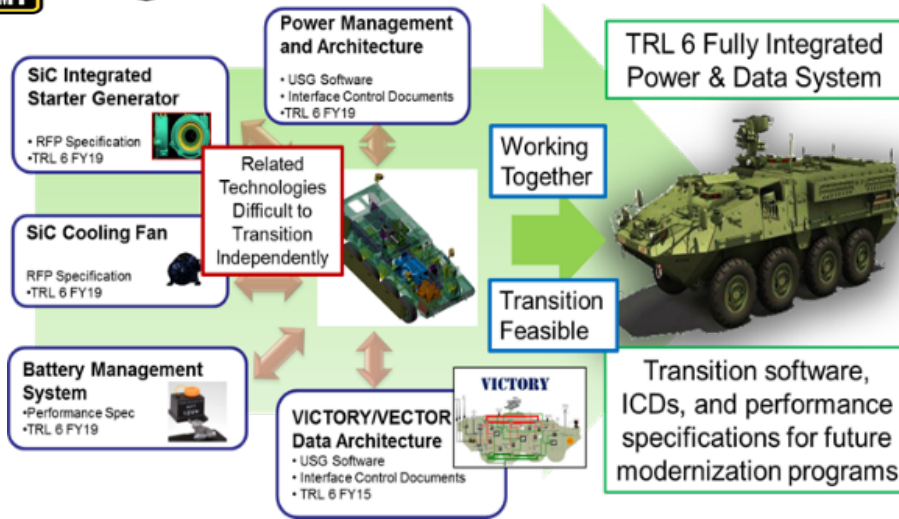


C4ISR Integration





VEA MOBILE DEMONSTRATOR (VMD)



Schedule & Cost

Milestones	FY16	FY17	FY18	FY19
SNR – Stakeholder Needs Development	SNR			
SRR – System Requirements Development		SRR		
SFR – Define System		SFR		
CCR – Capabilities and Concepts			CCR	
IPR – In-Process Review			IPR	
VMD – Integration			vehicle	
RTTR – Ready To Test				RTTR
VMD – Testing				6
PTR – Product Transition				PTR
Total Funding: \$41.79M	\$9.374M	\$12.455M	\$11.895M	\$8.067M

Problem Statement:

Combat vehicle power systems have proprietary interfaces and are limited to incorporate data & software advancements. This results in high integration costs for new technology which has to be repeated for each combat vehicle platform.

Mission:

Demonstrate on a combat vehicle a power and data architecture common across combat vehicle requirements enabling a reduction in volume and weight of current components and increased available power and bandwidth for integration of new technologies such as advanced protection, lethality and network systems.

Payoff:

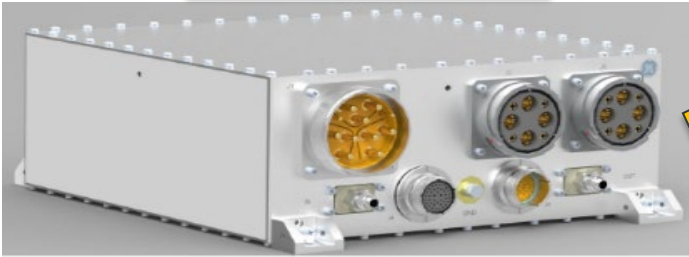
- Validates architecture implementation via a system design on a relevant platform (Stryker)
- Fuel savings of > 10% w/power management
- Combat vehicles will be able to distribute significantly more electrical power enabling integration of advanced weapons, networks and protection systems.
- Reduction in volume and weight of power conversion and distribution components by 50-75% over current technology.
- Provides mature standards and specifications to support future combat & infantry vehicle modernization programs



NEXT GENERATION COMBAT VEHICLE ELECTRICAL POWER ARCHITECTURE IMPLEMENTATION



ISG Controller



Electric Propulsion Cooling Fan



Bi-Directional Converters



Low Voltage Power Controllers



High Voltage Power Controller

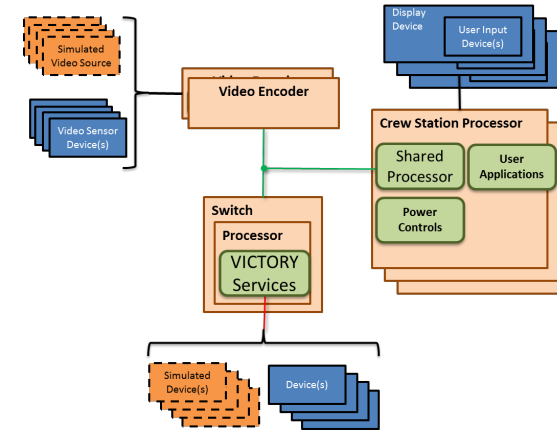
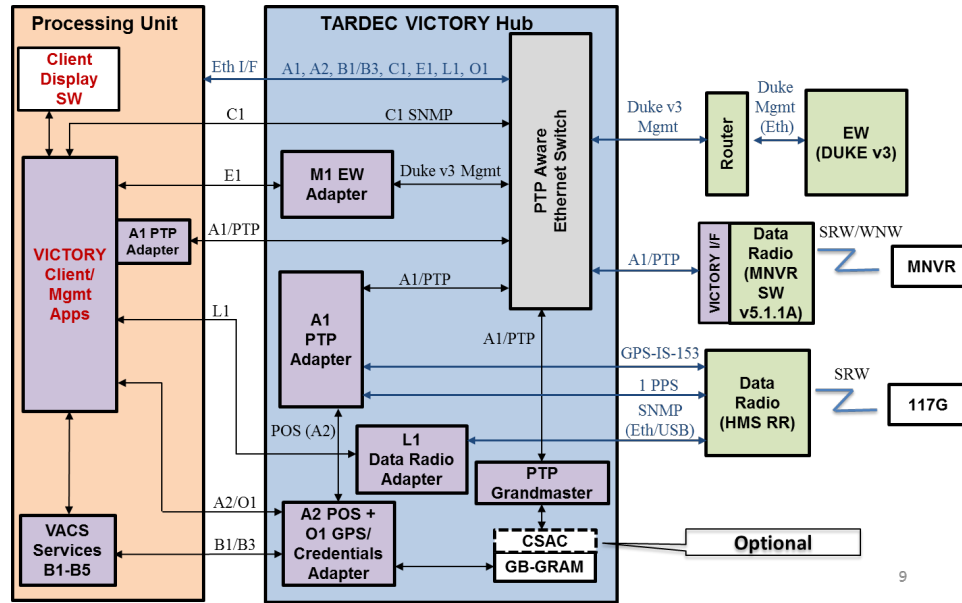


High Temp Coolant Pump





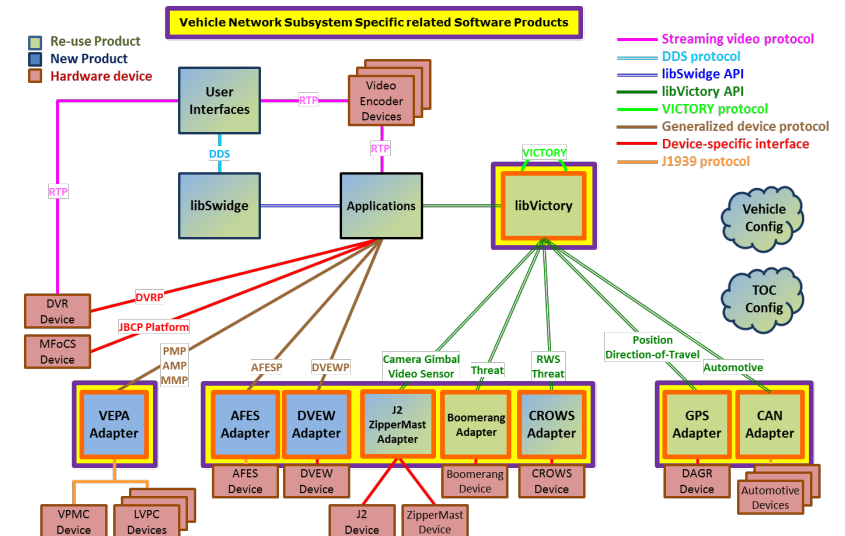
VETRONICS ARCHITECTURE



Example: Design Based on VICTORY

Objectives

- Mitigate implementation risk of networking onboard vehicle systems via VICTORY
- Distribute PNT information to devices and subsystems
- Demonstrate distributed timing to client devices via VICTORY
- Demonstrate remote control of C4ISR systems via VICTORY
- Demonstrate access control using VICTORY
- Demonstrate the art of the possible in reducing SWAP

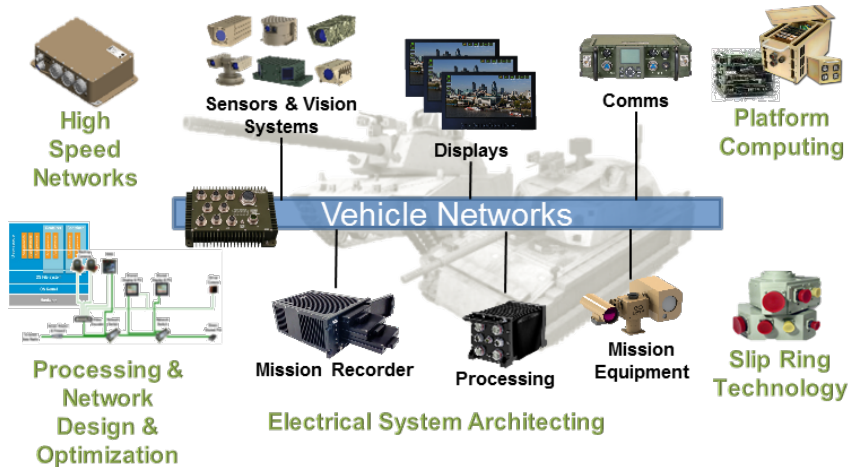




ENHANCED - VEHICLE ELECTRONICS (E-VETRONICS) OVERVIEW



Program Overview



Progress

- **Begin developing the overall E-Vetronics architecture concept**
- **Begin concept development, market research, and requirements for the Advanced Slip Ring**
- **Develop Flexible I/O Architecture concept, market research, and requirements**

Overall Project Design

- Develop and demonstrate a military standard open architecture for combat vehicles to manage data, video, and power systems to enable future combat vehicle capabilities such as advanced protection, lethality and network systems.
- Challenges include developing a common solution across vehicle platforms, developing a standard open architecture that industry will adopt, and integrating high power technologies. These challenges are difficult to solve because the solutions require a holistic view and cannot be focused on a specific platform.

Timeline

Tasks	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Develop Architectural Concept							
Digital Containerization Architecture							
Advanced Slip Ring Development							
Flexible I/O							
Tactical Situational Awareness							
Mission Package Integration							
Bench Level Demonstration							
E-Vetronics Vehicle Integration							6
Funding (BA 6.2) \$M	2.3						
Funding (BA 6.3) \$M							



TECHNOLOGY FOCUS AREA: ARMY VEHICLE ELECTRONICS



• Tech Challenge 1: MIL-Rugged Technology Affordability

- Gap: Cost goals
- Barrier: Low Volume for Mil Rugged Electronics
- Resolution Timing: ASAP - Program Dependent

• Tech Challenge 2: SiC Power Electronics

- Gap: Small Mil-Rugged Power Electronics
- Barrier: Availability and cost of power switching devices and LRUs
- Resolution Timing: ASAP - Program Dependent

• Tech Challenge 3: Next Generation Slip Ring

- Gap: 600VDC, coolant, CAN, 10gbps Ethernet, 3rdGen FLIR slip ring
- Barrier: No one has been funded to develop for emerging requirements
- Resolution Timing: FY21 MET-D

Opportunities for Partnership FY19/20

- SiC 120kW DC/DC converter
- SiC 1MW Power Distribution
- Next Generation Slip Ring

