U.S. ARMY

DEVCOM GROUND VEHICLE SYSTEMS CENTER

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

Integration - Capabilities Overview

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Ground Vehicle Power & Mobility Test & Integration

Always Moving

Building 212A & 212B
Detroit Arsenal

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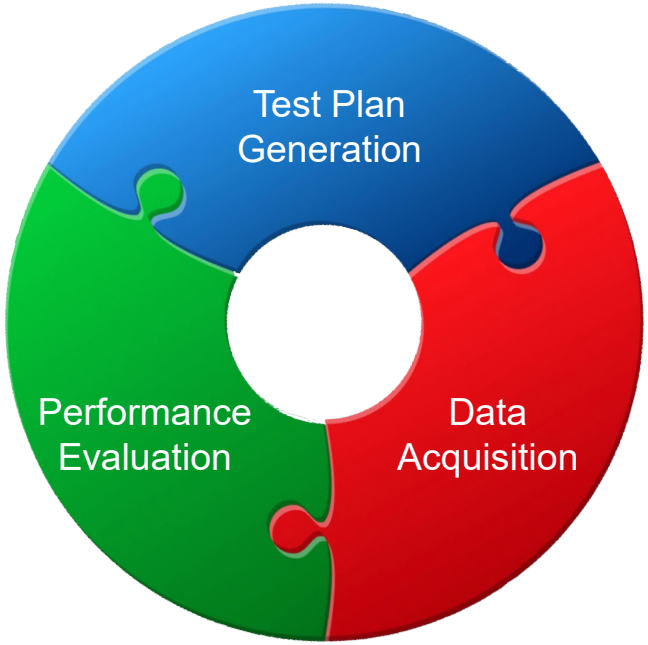
Test & Integration Support

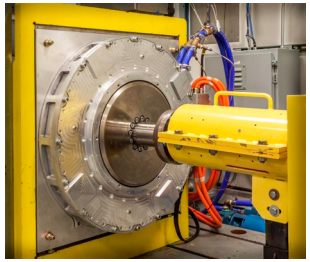
Purpose: Manage, develop, and support integrated life cycle Test and Integration (T&I) services. Provide strategy to innovatively test for performance and reliability of ground systems, and mitigate risks associated with the deployment of ground systems while ensuring timely focus on reliability and maintainability requirements.

- **TRL Maturation**
- **Requirements Testability**
- **Subsystem Integration**
- **Developmental/Operational Test Management**
- **Engineering Change Validation**
- **T&I Efficiencies**



Technology Maturation → ***Subsystem Integration*** (A) → ***System Level DT*** (B) → ***System Level OT*** (C) → ***Engineering Changes***

Best Practices
Similar System Analysis
Efficient / Effective Testing



Increased Utilization of available data (HWIL, M&S, Physical Simulation, Proving Ground)

Integration

Connecting Systems, People, and Ideas

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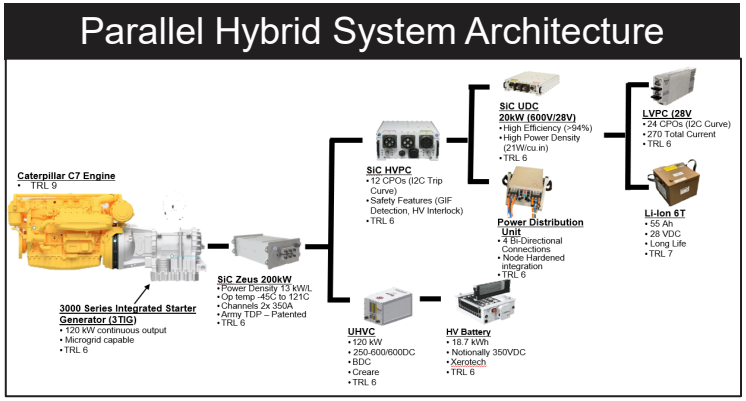
Integration

GVSC's Ground Vehicle Power and Mobility (GVPM) Integration Team is integrating advanced powertrain capabilities to extend operational duration and lethality, improve mobility, and enable advanced warfighting capabilities on combat and tactical platforms. The team has demonstrated capability on Bradley FOV, Stryker, JLTV, FMTV, and HTV. Results include 10-20x power generation capability, 2x operational duration, 120kW power tap (for integration of Directed Energy Weapons/ radar/ missile systems/ C2/ other high-power systems), 60kW of 208VAC 3-phase 5-wire export power, extended engine off operational capability, increased acceleration, increased speed on grade, and fast forming vehicle microgrids.

Integration - Systems Architecture Capabilities

- Parallel Hybrid Systems (in-line or PTO)
- Series Hybrid Systems
- High Power Variants – 10x power
- Model Based Digital Systems Engineering
- Vehicle Controls Software - Auto-coded
- Vehicle Centric Fast Forming Microgrids
- Base Integration of High-power Platforms



Stryker and FMTV Parallel Hybrid System

Integration

Results:

Advance Power Networking

High Power Variant – FMTV A1

- Power Generation:
  - 120 kW Continuous (static)/ vehicle
  - 20 kW Continuous on-the-move
- 2x Operational Duration Increase - static
- Tactical Microgrid Standard (MIL STD 3072) compliant
- Fast Forming Networking - 2 ½ minutes to form & 1 minute to disaggregate and move
- Frees pintles

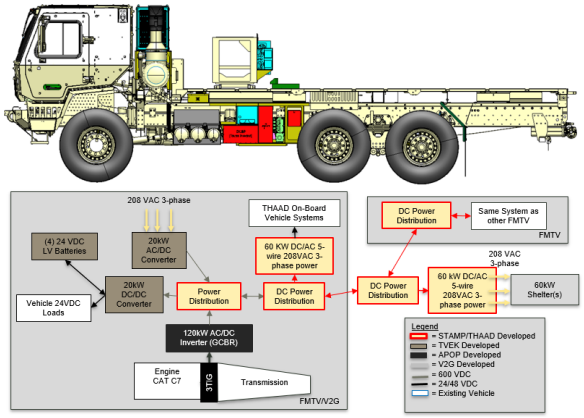
Bradley FOV Parallel Hybrid

- 160kW Power Generation – 10x increase
- ~1.5x sprocket power increase
- Smart Electrified Auxiliaries
- Significantly improved acceleration
- Drive by wire – ready for tele-operations or autonomous package
- 1.5X Increased Operational Duration

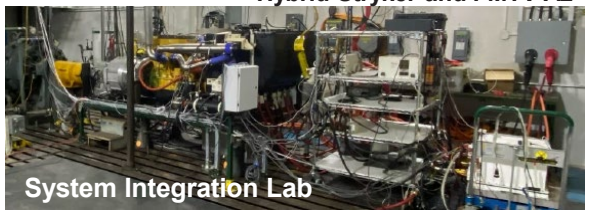
Wheeled Hybrid System

Expected results 2026:

- 2x Operational duration increase
- 40% improved acceleration
- 20% increased peak speed on grade
- 120kW Continuous/ 240kW Peak - single vehicle
- 240kW continuous/360 kW Peak – two vehicles
- ~SWAP-C Neutral
- TMS (MIL STD 3072) Compliant




Hybrid Stryker and FMTV A2



Integration

How the Integration Branch supports Tactical and Combat Platforms?

- Develop and Integrate high-power generation systems for increased power
- Hybridize a platform to:
  - Double the operational duration capability
  - Provide silent operations (silent mobility and extended silent watch)
  - Significantly improve mobility (acceleration, speed on grade, peak speed)
  - Enable powering and integration of advanced warfighting capabilities (EW, CUAS/DEW, APS, Mobile Radar, and Highly Mobile Missile Systems)
  - Enable expeditionary power - export power, import power, power networking
- Eliminate thermal challenges with power electronics and rotating equipment
- Increase the maximum power capability of platforms
- Enable networking of platforms into fast forming vehicle centric microgrids
- Enable connectivity with base grids to touchless perform vehicle maintenance, provide grid services, and provide power for continuity of operations
- Significantly improve the Return on Investment for advanced powertrains
- Support PM power systems engineering efforts

Integration

FOR FURTHER INFORMATION:

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GVPM Testing and Integration Website:
https://gvsc.devcom.army.mil/gvpm/

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