



Maneuver Requirements Division Electrification Industry Day Information Briefing 20 OCT 2020

Presenters:

MAJ Ryan Ressler, Maneuver Requirements Division (MRD)
Dr. James Mancillas, Futures and Concepts Center (FCC)
Mr. Steven Herrick, Product Lead Ground Mobility Vehicles
(PL GMV)

Agenda

- Opening Comments
- FCC White Paper Presentation
- TaCV-E Presentation
- eLRV Presentation
- Questions and Answers

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Purpose



- **Connect**

- Connect with Industry partners to share knowledge and to assist in informing requirements and developing solutions.

- **Communicate**

- Communicate the importance of Army vehicle electrification to Industry.
- Communicate MCDID's commitment to electrify the tactical and combat vehicle fleet.

- **Inform**

- Inform Industry partners of Army & Maneuver Capabilities Development and Integrations Directorate (MCDID) Electrification efforts Tactical and Combat Vehicle Electrification (TaCV-E) and Electric Light Reconnaissance Vehicle (eLRV)

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Agenda



Topic	Presenter
MCDID Opening Comments	SES Mr. Donald Sando, MCDID
FCC White Paper Presentation	Dr. James Mancillas, FCC
TaCV-E ICD Presentation	MAJ Ryan Ressler, MRD
eLRV A-CDD Presentation	Mr. Steven Herrick, PL GMV MAJ Ryan Ressler, MRD
Questions and Answers	All
Closing Comments	

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White Paper - Electrification of U.S. Army Ground Force (An Evolutionary Revolution)

Dr. James Mancillas
FCC, Futures Integration Directorate

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Compete

Penetrate

Dis-Integrate

Exploit

Re-Compete



Requirements Document Status



- ❖ Army Futures Command (AFC) approved the MCDID to proceed with development of Tactical and Combat Vehicle Electrification (TaCV-E) Initial capabilities and the Electric Light Reconnaissance Vehicle (eLRV) requirements.
- ❖ The MCDID has drafted the requirements and is soliciting comments resulting in a final document to be submitted for Army approval by senior leaders.

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Tactical & Combat Vehicle Electrification (TaCV-E)

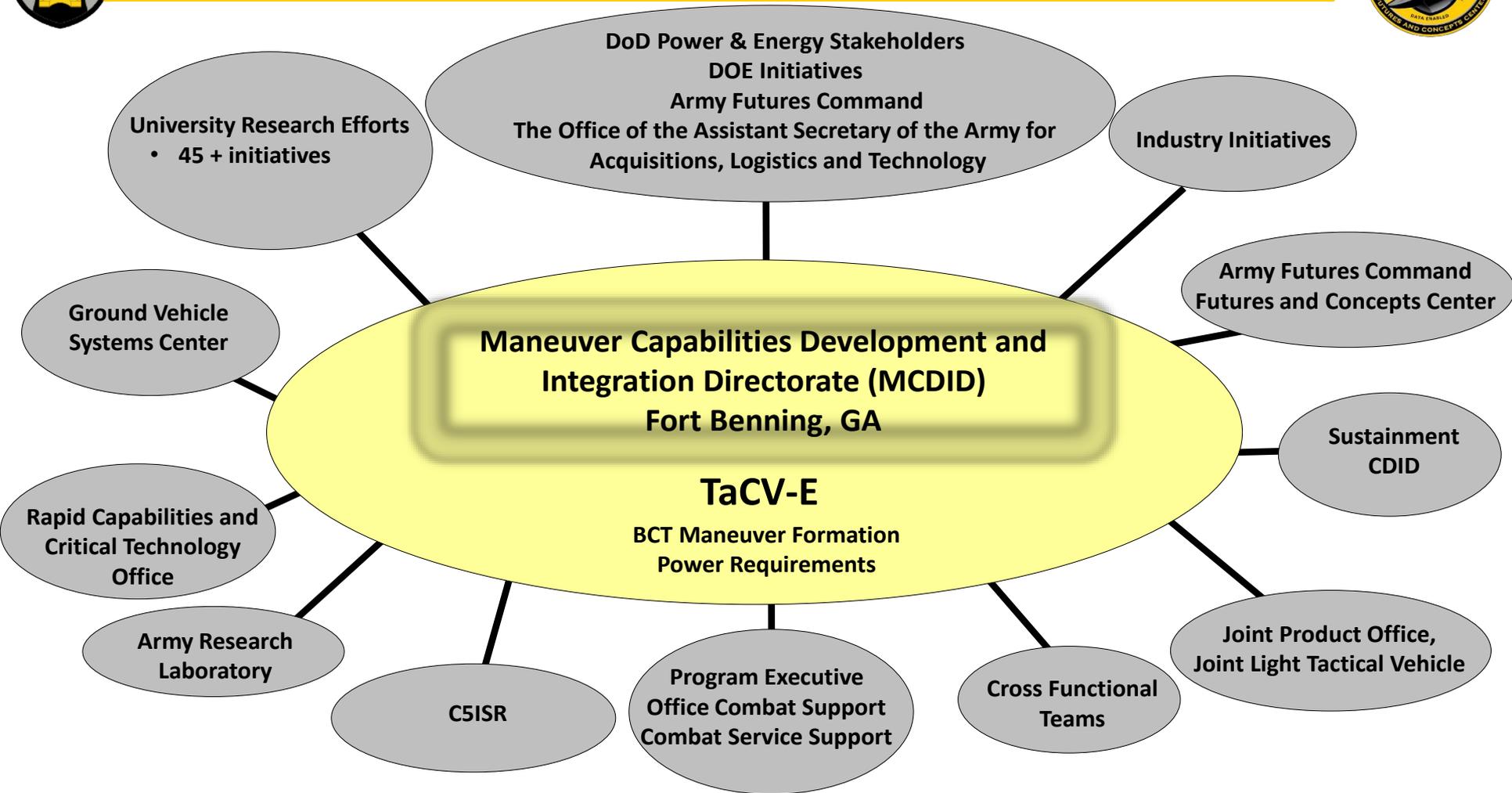
MAJ Ryan Ressler, MRD

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TaCV-E Community of Interest



TaCV-E serves as the foundational requirement for Army Electrification

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Benefits of Electrification



CROSS-DOMAIN MANEUVER ENABLED BY PLATFORM ELECTRIFICATION



- High Voltage DC Power Architecture
 - Hybrid Electric Drive
 - All Electric Drive

Tactical	Operational
✓ Silent Mobility	✓ Liquid Fuel Reduction
✓ Extended Silent Watch	✓ Increased Reliability through powertrain simplicity
✓ Increased mobility, torque and speed in austere environments	✓ Increased maintainability through simplicity
✓ Formation Power	✓ Better control of tempo through smaller logistical tail
✓ Micro-Grid Capable	✓ Reduced exposure for sustainers
✓ Smart Power through Artificial Intelligence and Machine Learning	✓ Cost savings over time
✓ Ability to support organic and habitually attached high demand energy systems	✓ Environmental efficiencies through clean technology

All contributing to freedom of movement and action; capability to move formations rapidly to control tempo and momentum; and conduct joint combined arms operations of sufficient scale and ample/extended duration...

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TaCV-E Description



We intend to move forward with industry in development of vehicle based electrification initiatives and technologies. This starts with maintaining situational awareness of ongoing and future efforts.

- ❖ TaCV-E is an overarching requirement that sets the foundation for electrification Army electrification.
- ❖ TaCV-E is an incremental approach that will assist and guide capability developers in electrification of Army vehicles through modification of existing systems and developing new starts.
- ❖ Electrification under TaCV-E will follow a natural progression of technological advancements that will drive liquid fuel reduction while increasing capabilities within the ground domain.
- ❖ TaCV-E will guide capability development across the force enhancing our Commander's ability to fight in all phases of Multi Domain Operations (MDO). **TaCV-E interest include but are not limited to: enhanced power train, increased onboard and mobile power generation, advancements in battery technology, sustainment capabilities, audible & thermal management and formation power.**
- ❖ Key to achieving platform electrification is answering the question, how do we sustain/re-charge electric vehicles in an austere environment?

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TaCV-E Path to Electrification



Light Vehicle Fleet

Tactical Wheeled Vehicles
Combat Wheeled Vehicles
Up to 2.5 tons

Medium Vehicle Fleet

Support/Service Support Vehicles
Combat Vehicles
Tactical/Combat Vehicles
2.5 – 10 tons

Heavy Vehicle Fleet

Combat Platforms
Support/Service Support Vehicles
10 tons and above

NOW

NEXT

EVENTUALLY

- All-Electric Vehicles
- All-Electric Combat Platforms (AACP)
- All-Electric Sustainment Capabilities

Natural Pathway to Electrification Increasing Capability and Difficulty Build, Test, Learn & Adjust

Now

Capabilities

Hybrid Modification of Legacy Systems/Hybrid New Starts

- Liquid Fuel Reduction
- Silent Mobility
- Silent Watch
- Export Power
- Reduced Thermal
- Increased Reliance Maintainability

Next

Capabilities

Hybrid Mod of Medium Vehicle Fleet, New Starts/Early Transition to All-Electric

- Liquid Fuel Reduction
- Silent Mobility
- Silent Watch
- Export Power
- Reduced Thermal
- Micro-Grid
- Electric Sustainment Solutions
- Increased on-board power
- Supports high energy demand systems

Eventually

Capabilities

All-Electric Platforms (Likely Purpose – Built)

- Liquid Fuel Reduction
- Silent Mobility
- Silent Watch
- Export Power
- Reduced Thermal
- Micro-Grid
- Increased on-board power
- Supports high energy demand systems
- All-Electric Sustainment Capabilities
- Supports Directed Energy Systems

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TaCV-E Pillars



- ❖ **Platform Power Generation**. Through Electric Propulsion, capabilities will generate sufficient power at a rate equal to or exceeding that of existing performance levels maximizing the use of hybrid/all-electric technologies to achieve the optimal propulsion solution in the specified timeframe.
- ❖ **Power Storage**. Capacity to store energy to the maximum extent possible based on the power demand of the specified platform.
 - Platforms should incorporate adequate power storage without degrading capabilities for the assigned mission role with sufficient margin for growth.
 - Power storage will ensure platforms can achieve military relevant operational ranges and doctrinal objectives.
- ❖ **Power Distribution**. Sustainment infrastructure has the ability to support hybrid electric and all-electric capabilities within the relevant timeframe.
 - Sustainment infrastructure must support power distribution in the field/deployed and garrison environments.
 - TaCV-E capabilities support exportable power and power sharing to support the formations power needs.
- ❖ **Power Management**. Capabilities should display vehicle power management systems to allow operators to control, manage, distribute and export power through hardware and software. User components/software should support upgrades to incorporate future smart power technologies.
 - Power management must balance: mobility, applications of onboard systems, exportability power and duration

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Electric Light Reconnaissance Vehicle (eLRV)

Mr. Steven Herrick, PL GMV
MAJ Ryan Ressler, MRD

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eLRV Description



- ❖ eLRV is a six-Soldier reconnaissance platform intended to be fielded to Motorized Cavalry Troops in Infantry Brigade Combat Teams (IBCT) Cavalry Squadrons.
- ❖ eLRV provides enhanced mobility, lethality, protection, mission load capacity, and onboard power for a Scout Squad with their associated equipment to conduct combinations of mounted and dismounted Reconnaissance and Surveillance (R&S) missions.
- ❖ eLRV electrification will provide commanders a substantial competitive advantage in Multi-Domain Operational (MDO) environment against threat capabilities through reduction in acoustic and thermal signature, silent mobility, increased dash speed, increased reliability, increased duration and reduction in liquid fuel requirements.
- ❖ eLRV will be a fully electric or hybrid-electric combat vehicle. Vehicle must have the ability to be sustained in an austere environment.
- ❖ eLRV demonstrates the Army's intent to pursue electrification of vehicles and will help nest industry and Army electrification efforts.
- ❖ The eLRV Abbreviated Capabilities Development Document (Requirement) is currently in Army staffing.

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eLRV Desired Capabilities (1 of 2)



- ❖ **Capacity**. Provide seating for six Scouts with the ability to transport all associated equipment and supplies
- ❖ **Electric Propulsion**. Will be equipped with hybrid or all-electric powertrain with the ability to re-charge in austere and garrison environments
- ❖ **Mobility**. Able to operate majority of time off-road over soft soil in restricted terrain and complete its mission profiles with fuel/energy reserve
 - Provide increased dash speed using electric motors, instantly deliver high torque and rapid acceleration
- ❖ **Silent Mobility**. Enables on-demand silent mobility to the greatest extent practical
- ❖ **Silent Watch**. Increases the ability to conduct silent watch longer than current standards
- ❖ **Sustainability**. If hybrid will minimize reliance on liquid fuel to the maximum extent possible. If all electric will maximize use of energy/battery power.
 - Provides greater reliability and maintainability through simplicity and design
 - Provide extended duration to the greatest extent practical
- ❖ **Recharging**. Ability to quick charge in both field and garrison environments
 - Ability to conduct quick charge off of shore power, generators and electrical networks
 - Ability to adapt to host nation power

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eLRV Desired Capabilities (2 of 2)



- ❖ **Power Storage**. Capacity to store energy to the maximum extent practical.
 - Should incorporate adequate power storage for the assigned mission role with sufficient margin for growth
 - In addition to mission role, power storage should cover expected growth and incorporation of high demand power systems/adequate size, weight, power and cooling to support future capabilities
- ❖ **Formation Power**. Ability to re-charge all organic or habitually attached equipment required for the mission roles
- ❖ **Power management**. Tools to allow mission planning and real-time status of on-board power
- ❖ **Transportability**. Should support sling load and forcible entry operations through low velocity air drop
- ❖ **Survivability**. Design must reduce the possibility of being seen or heard when moving or when stationary in overwatch or observation post (Silent mobility, reduced thermal signature and extended silent watch)
- ❖ **Lethality**. Supports up to MK-19 and M2 weapon systems. Should have the capability and necessary power to accept a Common Remotely Operated Weapon System-Javelin (CROWS-J)
- ❖ **Vehicle Curb Weight**. This weight *should* not exceed 8,000 lbs.
- ❖ **Full Combat Mission Payload**. We seek the ability to transport 4,000 lbs +.

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eLRV Market Survey

JOINT PROGRAM OFFICE JOINT LIGHT TACTICAL VEHICLES

- eLRV will take a phased industry informed approach to requirement refinement and development
 - Must not rush to requirement as technology integration to military application is unknown
 - Industry input to the initial Market Survey will shape the acquisition and requirements moving forward
 - Industry involvement will be early and often
- eLRV requirements document is currently in World Wide Staffing and funding discussions have begun
 - There is no solicitation at this time
 - Pre MS B/C dependent on path forward (hybrid electric or fossil fuel) and may be a Middle Tier Acquisition Program
- PL GMV requests industries perspective on the total eLRV concept as well as shortfalls already experienced in developing off-road alternative propulsion systems requiring larger payloads
- USG recognizes the competitive future of electrification and the commercial truck market. All proprietary data will be handled in accordance with 18 U.S.C. § 1905: The Trade Secrets Act to protect confidential information provided to the USG
- USG is targeting end of month release of three section eLRV Market Survey
 - Commercial off the Shelf (COTS) all electric or electric-hybrid Platform
 - Military Integration
 - Supportability/Sustainment

Honest and candid feedback is critical to the success of this program

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How Industry Can Help



- ❖ Candid feedback of our ability to achieve desired capabilities (via One-on-One Meetings, Market Survey)
 - ❖ If interested, please schedule one-on-one follow-up's (October through November)
- ❖ Define what is in the realm of possible by desired timeframe
- ❖ Inform MCDID of technology readiness levels of current relevant programs, projects and initiatives and where those programs may influence our initiatives (via One-on-One Meetings).
- ❖ Create understanding of affordability of capabilities
- ❖ Provide proposals and compete on contracts when asked!

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Questions and Answers

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Electrification Points of Contact



❖ For one on one interviews please contact:

- CALSTART: Mr. Steve Sokolsky
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❖ For all other inquiries contact:

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