



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

ARMY ELECTRIFICATION OVERVIEW

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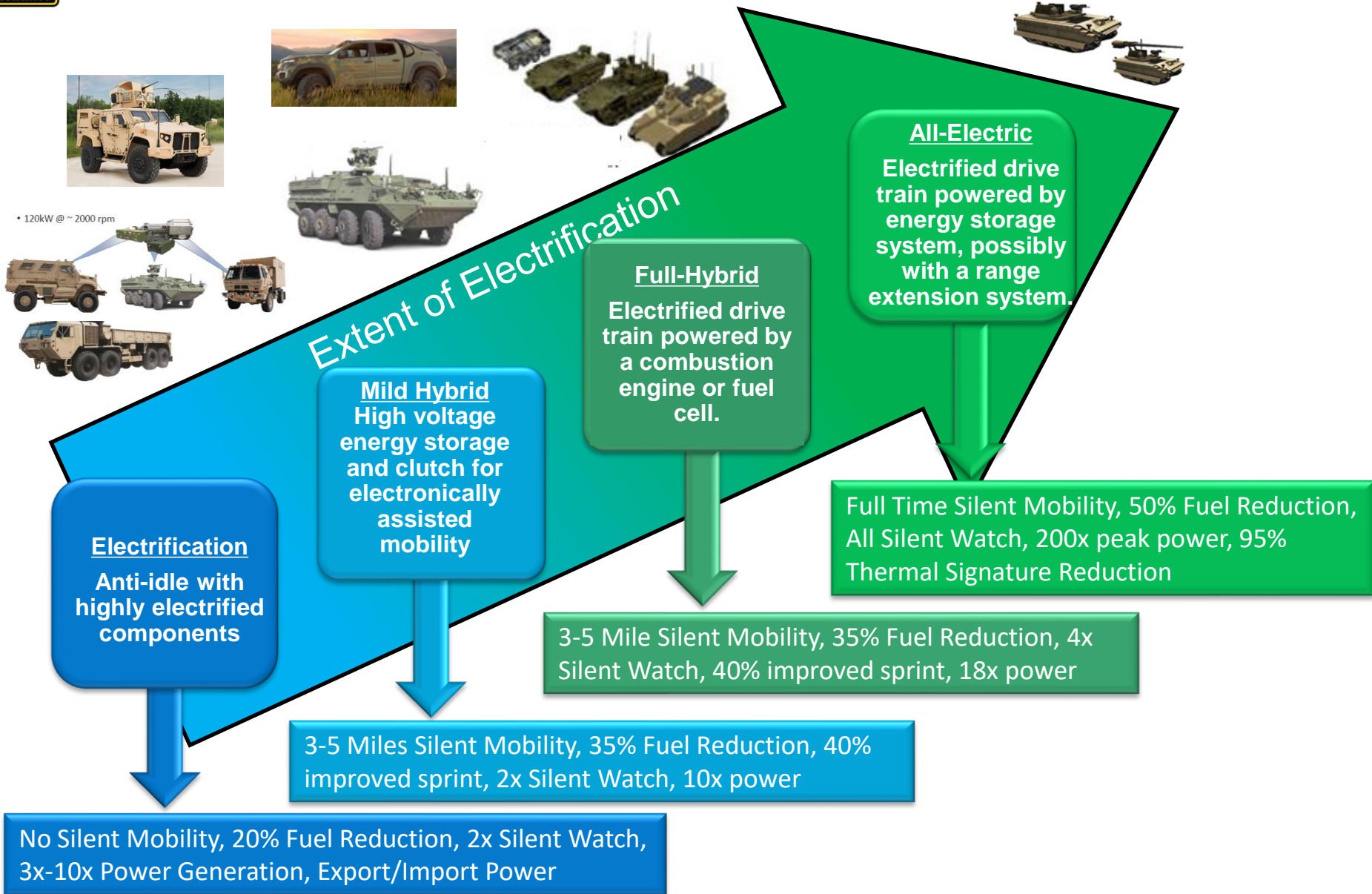
ELECTRIFICATION BENEFITS



1. Onboard power for energy based capabilities, such as directed energy weapons, jammers, electrified armor, etc.
2. Silent Mobility/Silent Watch
3. Extended Operations between resupply due to anti-idling.
4. Improved Mobility (and Survivability) due to improved acceleration and burst speed.
5. Ability to leverage vehicle to grid to support base camps for expeditionary operations
6. Ability to leverage host nation power grid to reduce logistics.
7. Reduced maintenance/sustainment costs



APPROACHES TO ELECTRIFIED PLATFORMS





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Next Generation Fuels, Fluids, and Lubricants

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AGENDA



- F&L Current State
- F&L Modernization Strategy
- F&L Future State
- Modernization Snapshots
- Important of Standardization
- Invitation to work together



F&L CURRENT STATE



Fuels

- JP-8 & F-24
- Diesel Fuel (in limited locations)
- DOD buys to commercial fuel specs
 - must still be additized
 - Commercial fuels are intended for near-term use
 - DOD does not align with commercial practices for fuel cleanliness

Lubricants & Fluids

- Military Standard Lubricants & Fluids
- Most are 30+ year old technology
- Interoperable with NATO Countries
- Conform to AR 70-12
- Some OEM specific products required
- Non-military standard products in the field that aren't supported



F&L MODERNIZATION STRATEGY



Adapt Commercial Specifications for Military Use

- ✓ Products for use in all environments
- ✓ Incorporate military specific requirements (legacy and future)
- ✓ Prevents product proliferation
- ✓ Endure long term storage without degradation/deterioration
- ✓ Increase competition & reduce reliance on one source
- ✓ Ensure product of requisite quality (qualified products)
- ✓ Minimize supply issues & misapplication during maintenance
- ✓ Maintain interoperability with Allied Partners
- ✓ Extend shelf life of products with specifications

Maintain compliance with AR 70-12



F&L FUTURE STATE



Fuels

- Monitor commercial fuels & evaluate risk to US Army Ground Equipment
- Alternative Aviation Fuels

Focus on:

- Fuel Properties: Cetane, Viscosity, Lubricity
- Cleanliness & Storage
- Material Compatibility

Lubricants & Fluids

- Synthetic, modern formulations
- Fuel Efficient
- Longer life
- Increase to drain intervals
- Compatibility with new hardware technology

Shift to Electrification:

- Thermal Mgt Fluids
- Specialized Lubricants



MODERNIZATION SNAP SHOT - FUELS



AVIATION FUELS JP-8 & F-24

- Army use since 1980s
- AR 70-12 directs use in all Army systems
- Tactical distribution force structure is based on single predominate fuel
- Monitor fuel properties

SUSTAINABLE AVIATION FUELS

- Drop-in replacements for petroleum fuel at specified vol %
- Common names:
 - Alternative
 - Synthetic Aviation Fuel (SAF)
 - Bio
 - Renewable
- 9 alternative fuel blends are approved in the commercial specs
- **In FY22, GVSC is funded to review and evaluate risk of new fuel pathways**

DIESEL FUELS

- Biodiesel allowed up to 5% (more if authorized by the local authorities) in US
- Concerns with global fuel quality and sulfur content
- Long term storage stability issues
- Seasonal & Regional – supply chain may lag

ARMY USES COMMERCIAL FUELS



MODERNIZATION SNAP SHOT - LUBRICANTS



- Synthetic Multipurpose Lubricant (SMPL)
- Fuel Efficient Gear Oil (FEGO)
- Brake Fluid for ABS systems (BFABS)
- Extended Life Coolants
- Sustainable Vapor Degreasing Solvent
- Thermal Management Fluids for Vehicle Electrification
- Specialized Fluids for Electric Components



THE VALLEY OF DEATH WITH F&L MODERNIZATION



Fluids & Fuels
fall right in
the middle



Acquisition

- There is no process to accept modernized fluids
- Acquisition programs hesitant to accept without ROI
- Transition of modernized fluids is difficult with no forcing function

Sustainment

- Army unable to capitalize on the benefits of the modernized fluids since they aren't approved
- Modernized fluids directly impact maintainability, reliability, interoperability, and mission readiness



Why is Standardization Important for Fuels & Lubricants?



- Ensures high quality, consistent, cost competitive lubricants
- Availability around the world
- High demand = quick delivery from DLA Aviation
- Low demand = long lead times (6months+)
- Commercial products may not be equivalent or meet military requirements
- Advantageous for AOAP programs
- Complies with Army Regulation AR 70-12 to reduce proliferation of products

Reduce risk to vehicle failure, downtime, & readiness



HOW CAN YOU HELP?



- Engage with the GVSC F&L Branch
 - We have SMEs that span all disciplines
 - Fuel Engagements to learn more about Alt Fuels

- Join the Military Vehicle Industry Consortium (MVIC) on fluid modernization
 - Background: Launched July, 2020, the MVIC is an effort as a result of a CRADA between GVSC and NDIA Michigan to help the Army, which wants to influence DOD processes and standards for modern fluid evaluation, standardization, introduction, acquisition, and meeting environmental regulations and sustainability goals, while supporting the Army Regulation 70-12 Fuels and Lubricants objective of minimizing the number of lubricants and associated products.



MILITARY VEHICLE INDUSTRY CONSORTIUM (MVIC) FLUID MODERNIZATION



Problem Statement:

Army needs to modernize and manage its fluid portfolio to achieve its goal to minimize the number of fluids to reduce footprint and overall cost, while maintaining the best overall performance as new vehicle technologies and fluids are developed and implemented by industry.

Challenges:

- New vehicle and equipment technologies require newer fluids
- OEM specific fluids required to maximize performance and durability
- New fluids introduced by fluid formulators
- Maximizing commonality within components and across components (i.e. one oil for all engines, and one oil for both engines and transmissions)
- Maintaining backward compatibility with legacy equipment.



THANK YOU!



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