



U.S. ARMY



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**RDECOM**



U.S. ARMY TANK AUTOMOTIVE RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

# Shaping the future of the TWV Fleet

**Dr. Paul Rogers**  
**Director, TARDEC**



Unclassified, Distribution A

# Who is TARDEC?



## MISSION:

**Develop, integrate and sustain the right technology solutions** for all manned and unmanned Department of Defense (DOD) ground systems and combat support systems to **improve Current Force effectiveness** and **provide superior capabilities for the Future Force.**

## VISION:

The first choice of technology and engineering expertise for ground vehicle systems and support equipment – today and tomorrow.

**We help our Warfighters succeed and come home alive**

# TARDEC's 30-Year Strategy

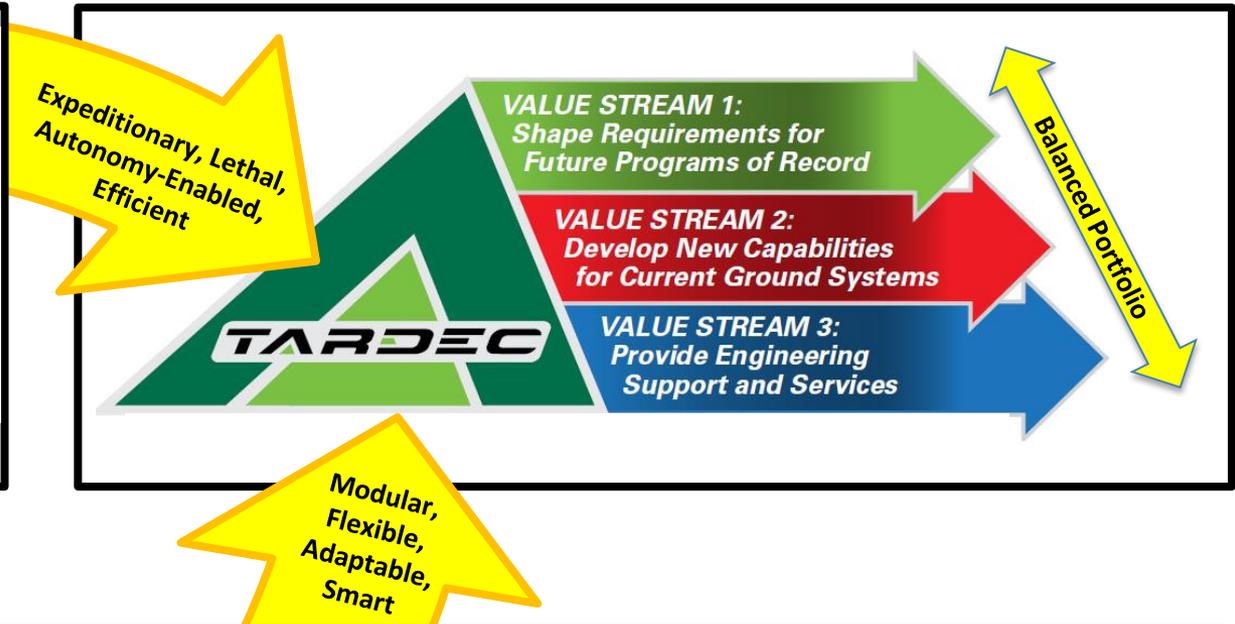


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## Strategic References

## 30-Year Strategy



## Art of the Possible

Survivability	Power and Energy	Electronic Architecture	Autonomy	Software	Human Interface	Force Projection
<b>Modeling and Simulation</b>			<b>Advanced Concepts</b>			

# Tactical Truck of the Future

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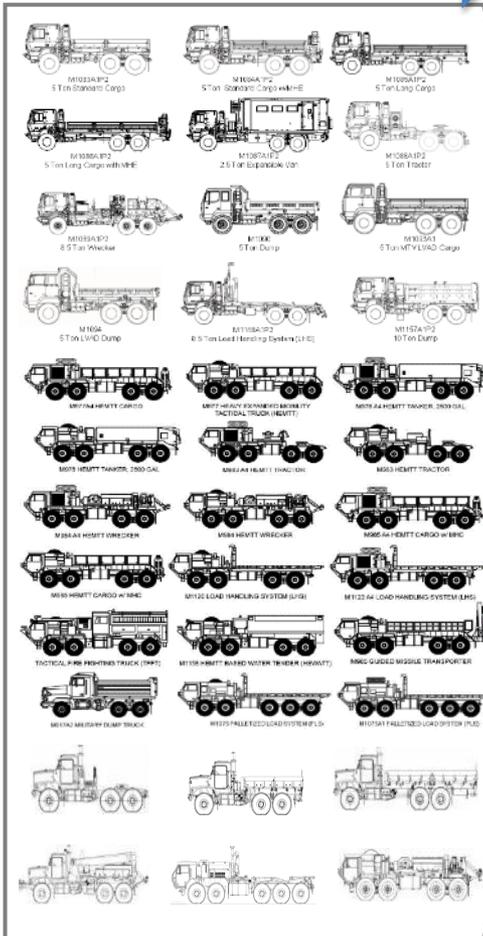


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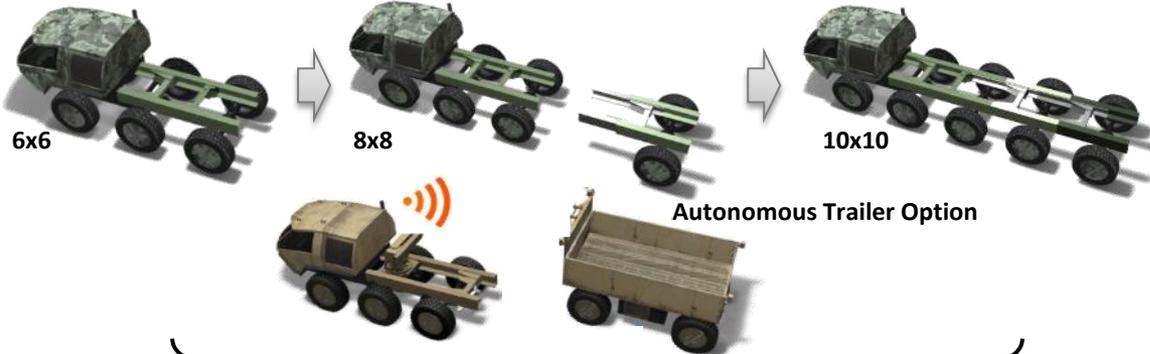


Today

Beyond 2025



## JTTS Modular Prime Mover



### Dry Cargo Modules

- M1 Flatrack
- M1077 Flatrack
- M3 CROP
- M3A1 CROP



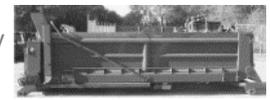
### Bulk Fuel Modules

- Modular Fuel System (MFS)
- SIXCON



### Dump Modules

- M6 Dump Body Module



### Bulk Water Modules

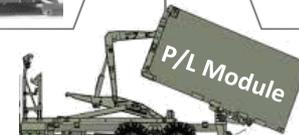
- XM9/10 Water Distributor
- HIPPO
- SIXCON



### 5<sup>th</sup> Wheel Modules



### Wrecker Modules



**Load Handling System (LHS)  
P/L Module Infrastructure**

## Mobility

Powertrain Efficiency 30 - 35%

>50%

On-board Vehicle Power 5.6 – 11.2 kW

120 – 160 kW

## Protection

Hit Avoidance None

Active Protection System

## Autonomy

Level of Autonomy None

Active Safety / Driver Assist

Leader Follower

Autonomous Convoy Operations

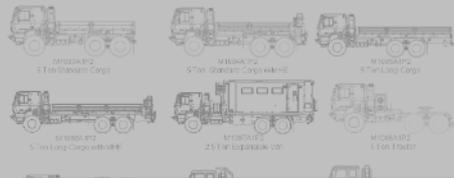
# Tactical Truck of the Future



Today

Beyond 2025

JTTS Modular Prime Mover



6x6



8x8



10x10

## AFFORDABLE

- Modular platform replaces 5 families of systems across the Army and USMC (over 40 systems) currently in the tactical vehicle fleet

## SMART

- Autonomous Convoy capability enables soldiers to be reassigned to mission critical tasks while increasing logistic throughput and enabling 24 / 7 operation.
- Networked collaboration between UGV, UAV and unmanned sensors.

## FAST

- Highly efficient powertrains significantly reduce the operational energy requirements for the tactical fleet
- Significantly more available on-board vehicle power enables advanced capability on the platform and exportable power to support contingency basing.

## PRECISE

- Integration to Sustainment Network to enable the right supplies reaching the soldier when they need it

## PROTECTED

- Ability to optionally man platform significantly reduces the risk to soldiers.
- Modular, low cost active protection systems enable tailorable protection from a range of threats when vehicles are manned.
- Active safety and driver assist technology significantly reduce crash and rollover injuries

Mobility  
Power  
On-board  
Protect  
Hit Av  
Auton

Level of Autonomy

None

Active Safety / Driver

Unclassified, Distribution A

Autonomous Convoy Operations

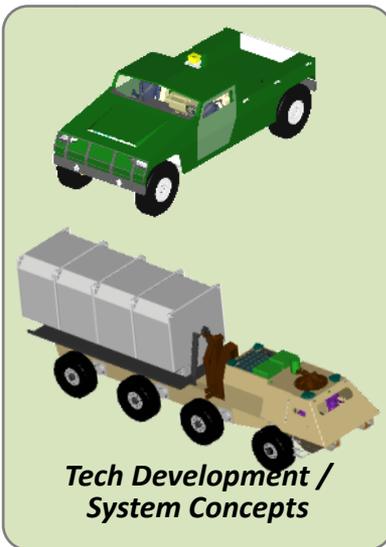
# Army S&T Prototyping Value Proposition



RDECOM prototype vehicles drive state of the art, achievable requirements and set acquisition programs of record up for success.

## 1999-2002

Future Tactical Truck System (FTTS) STO



## 2003-2007

FTTS Advanced Concept Technology Demonstrator (ACTD)



## 2009 - Present

Joint Light Tactical Vehicle Program of Record



- FTTS enabled the Army to get hardware in the hands of the User prior to JLTV program initiation to define achievable, affordable requirements and work future tactics and doctrine.
- Accelerate POR execution, reduce acquisition costs and drive down POR technical risk.
- Created a cohort of technical experts within S&T on prototype vehicle's trade space and integration challenges that populated the new JLTV Program Office.
- Brought non-traditional ground vehicle industry into the competitive process for JLTV acquisition.

# Joint Tactical Transport System (JTTS)



## Detailed system engineering analysis ongoing between TARDEC, CASCOM and PEO CS&CSS



### Risk (ISEF, Project Recon)

- Risk & opportunity identification, evaluation, mitigation planning



### Needs → Requirements (DOORS)

- Requirement decomposition, tracing, verification planning



**\$101M Joint Funding**

## Advanced Vehicle Power and Technology Alliance (AVPTA)

**\$25M Joint Funding**



## Operational Energy Capability Improvement Fund (OE CIF) Program

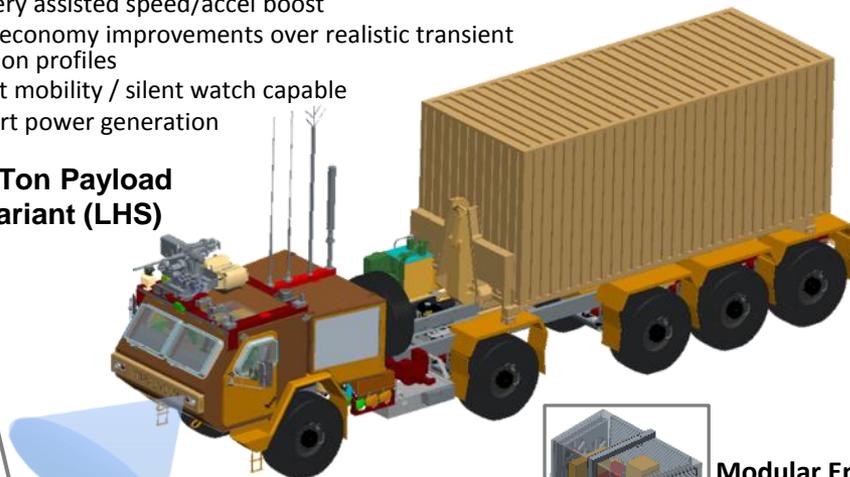
## Leveraging Joint Department / Service Technology Development

## Modular Chassis Concept Approach

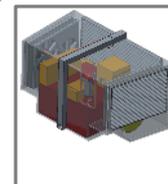
### Series Hybrid-Electric Powertrain

- Battery assisted speed/accel boost
- Fuel economy improvements over realistic transient mission profiles
- Silent mobility / silent watch capable
- Export power generation

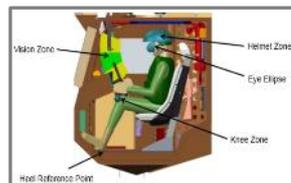
### 18 Ton Payload Variant (LHS)



Ground up Integration of Autonomy



Modular Engine Compartment



Increase Survivability

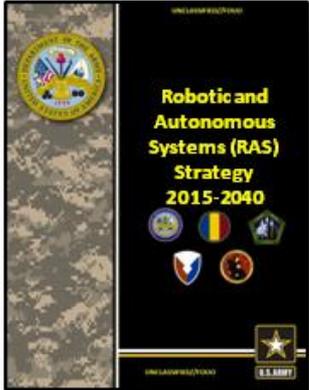


### Modular Axle

- Field reconfigurable, tailor to mission needs
- Potential for autonomous insert/trailer docking

**Setting the stage for prototype development in FY19**

# Autonomy-Enabled Logistics Operations



Synergistic Unmanned-Manned Intelligent Teaming (SUMIT) (2020-2025)



Dynamic Force & Mission Autonomy (2030-2040+)

Combined Arms Maneuver (2030-2035)

2040



2030

Autonomous Convoy Operations (2020-2025)

2020

Extend the Reach of the Warfighter (2020)



Active Safety Drive Assist Applique Kits (2015)

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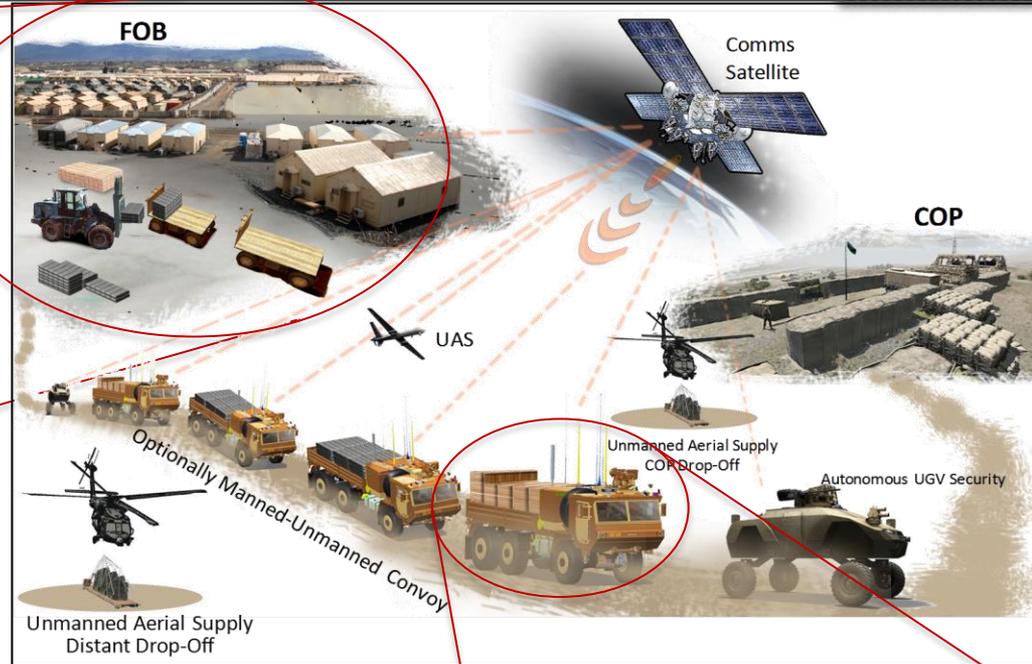


2015



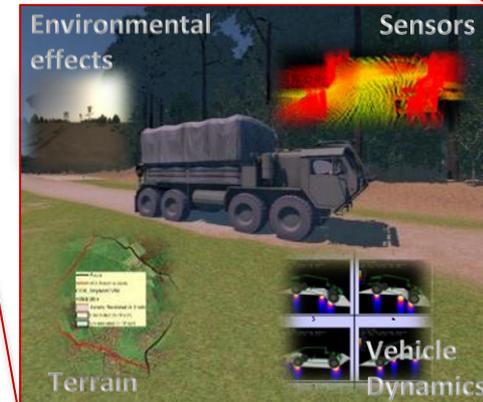
RDECOM plays a critical role in defining the future autonomy strategy for the Army to "Operationalize" Autonomy-Enabled systems

# Autonomous Ground Resupply



## Near-Term Challenges:

- Development of Open Robotics Architecture
- Advanced Autonomous Behaviors and Software Development Tools
- Incorporating modeling and simulation into the design, development, and testing of unmanned ground systems
- User Acceptance



Bringing the state of the art in autonomy-enabled sustainment into Army operations today

## The EBO is Your Connection for New Opportunities

- Visit TARDEC's Web Site [www.army.mil/TARDEC](http://www.army.mil/TARDEC) for details:
- TARDEC Capabilities
- 30-Year Strategy
- New Opportunities



- Engage TARDEC through our Ground Vehicle Gateway (online) to submit:
  - New Proposals
  - Technology Plans
- Industry Days - April 2016

**We Need Your Help to Shape the Future of the Army and Deliver Advanced Capabilities to the Warfighter**