



Army Robotics at the Tactical Edge



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Exploit

is-Integrate

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Army Robotics Outlook



Maneuver Capabilities Development & Integration Directorate

- > FY2020 will remain an exciting time to be in the business of Army Robotics
 - Approved Robotic and Autonomous System Initial Capabilities Document
 - Funding of Robotics is Increasing
 - Significant Senior Leader Support of Robotics and Artificial Intelligence
- Mission Manage Army Futures Command level activities to include requirements generation, force modernization, industry engagement, and concept development for both air and ground robotics, autonomy, and AI
- Vision Enable Army Formations to increase their lethality, endurance, persistence, protection and depth

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Maneuver Capabilities Development & Integration Directorate



MDO Identifies Four Interrelated Trends

- Contested in all domains
- Increasingly lethal and expanded battlefield
- Increasingly complex environment
- Challenged deterrence

Cross Domain Maneuver

- Application of combat power in all domains
- Push capabilities down to the smallest echelons
- Independent operations
- Continuous R/S at all echelons
- Realize Mission Command

Robotics Overview

Major Robotic Capability Development Efforts:

- Information Systems CDD
- Universal Robotic Controller
- AI Small Unit Maneuver CDD
- C-UAS (Mounted & Dismounted) Annex to CDD
- Robotic Combat Vehicle
- Short Range Recon UAS (POR down select to a specific system, 2nd QTR FY2020)
- Long Range Recon (POR)
- JTAARS Joint Tactical Autonomous Aerial Resupply System – Developing effort
- Medium Range Recon (POR)
- SMET Multipurpose Equipment Transport (Approved under NDAA 804 Authorities)

PENETRATE

- Common Robotic System Individual
- Soldier Borne Sensor (POR)

REALE

Robotics Portfolio Plan:

Near-term (2020-2024): The primary focus is fielding modular, interoperable air and ground RAS to improve situational awareness, sustainment, and protection and reduce Soldier loads.

RAS development is focused on rapid prototyping and Soldier experiments to inform requirements for the NGCV RCV and increasing autonomous capabilities.

<u>Mid-term (2024-2028)</u>: The Army Modernization priority is the Robotic Combat Vehicle program.

The Robotics Portfolio invests in increasing autonomous and interoperable modular mission payloads to expand the capabilities of the fielded RAS systems.

Far-term: The primary focus will enable revolutionary warfighting concepts and achieve overmatch through modernized autonomous systems.

RE-COMPETE-

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EXPLOIT

Maneuver Robotics overlap with the AMS

Fielded Force (2024) 2019-2023

- Insert Soldier Operated Robotics: SBS; SMET; CRS(I); SRR
- Mature capabilities for LRR; URC; Exoskeleton; C-SUAS; FITS
- Execute 10x Robotic and AI Infantry Platoon Tech Demo
- Support NGCV CFT Experimentation in support of the RCV Decision in FY23
- RDTE for Network; Autonomy; AI; Power and Energy

PENETRATE

MDO Capable Force (2028) 2025-2028

- More effective maneuver formations(>1x)
- Field integrated interim robotic capabilities supported by AI on the path toward the MDO Ready Force.
- Develop and field small, light, inexpensive, expendable yet highly lethal and non-lethal Robotic systems to enhance maneuver formations

MDO Ready Force (2035) 2029-2035

- Significantly more effective maneuver formations (>10x)
- Field integrated persistent air and ground robotic capabilities operated by an open architecture AI cloud commanded by Soldiers

• Field RCV

Increase Situational Awareness





Facilitate Maneuver / Protect the Force

Ground Robot Systems



Tactical Mobility / Lighten Soldier Load / Increase Sustainment

Unclassified

Small Multi-Purpose Equipment Transport Candidates



"Capabilities Carrier" – SMET MMP

Unclassified



SMET Modular Mission Payloads – "What capabilities do we need?"

Lighten Soldier Load



Dephy Bionic

Lockheed Martin Onyx Exoskeleton

Mawashi Uprise Exoskeleton



RAS ISO Maneuver Forces – Expanding the Area of Influence

Multi-Domain Maneuver / Dismounted Operations



WE HAVE THIS, WHERE WE ARE AT (2019)

WHERE WE WANT TO BE (2028-2035)



Robots as Teammates in a Constellation of Systems



1. Increase Situational Awareness

- 2. Lighten Soldier Load
- 3. Increase Sustainment
- 4. Facilitate Movement and Maneuver
- **5. Protect the Force**

Through Manned-Unmanned Teaming (MUM-T), Robotics enables Army formations to increase their endurance, persistence, lethality, protection and depth.

Problem Sets - Conduct Cross-Domain Maneuver

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Future maneuver forces require the capability to integrate and team air and ground manned and unmanned systems capabilities during cross-domain maneuver to seize and control terrain, destroy enemy forces, and protect populations, infrastructure and activities.

Problem Set 1: Maneuver unmanned systems with minimum Soldier input

Problem Set 2: Increase surveillance, reconnaissance and security capabilities

Problem Set 3: Improve threat detection, recognition, identification, and acquisition of enemy capabilities

Problem Set 4: Prevent enemy acquisition of friendly forces by reducing signatures and deploying deception

Problem Set 5: Employ unmanned systems in an EMS contested environment

- **Problem Set 6:** Transfer data reliably and securely at extended ranges by neutralizing, degrading or destroying an adversaries cyber threat (jam, sense and detecting assured communications)
- Problem Set 7: Enhance sensor and information fusion

Problem Set 8: Develop and disseminate the COP down to the appropriate level

* Critical Robotic Enabling Technologies - - Assured Communications, Autonomy, Soldier/Robotic System Interface, Power and Energy.







Initiatives at the Maneuver Center of Excellence

• <u>Hypothesis</u>: Enabling Platoon leaders and Soldiers with Artificial Intelligence will enable them to observe, orient, decide, and act (OODA Loop) up to 10 times faster and with better decisions than their current capability.

• Artificial Intelligence tools will take disparate streams of information from platoon organic Soldier and robotic sensors as well as higher echelon mission command, intelligence, and sensors; weave them into a coherent picture; and then provide that picture to the Soldier in an intuitive way through the Integrated Visual Augmentation System (IVAS).



10x Robotic and AI Dismounted Infantry Platoon Tech Demo Timeline

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Robotics Requirements, Maneuver CDID, received and is assessing, with Army and Joint partners, White Papers from Industry and Government Labs for proposed technologies that will enable:

- Demonstration of a robotically equipped dismounted Infantry Platoon that is measurably more effective with a goal of 10 times more effective. Infantry Platoons will integrate through Manned-Unmanned Teaming (MUMT) prototype robotic ground, air, water, and virtual systems that increase the Infantry Platoon's lethality, mobility, protection, situational awareness, endurance, persistence, and depth.
- Demonstration of prototype Artificial Intelligence (AI) tools that show a path to enabling Platoon leaders and Soldiers to observe, orient, decide, and act (OODA loop) faster than their current capability with a goal of 10 times faster. AI tools will take disparate streams of information from organic robotic and Soldier worn sensors with higher echelon mission command, intelligence, and sensors. AI tools will then weave those streams of information into a coherent picture and provide that picture to Soldiers. Soldiers will then use AI tools to command effectors on robotic systems.

Georgia Tech Research Institute (GTRI) is contracted as the Technology Integrator

Timeline

Request for White Papers (RWP) – 79 White Papers – received on 4 Sep – being assessed

EXPLOIT

- ➢ Table Top Exercise (TTX) at Maneuver Battle Lab (MBL) − 24-26 Sep
- Request for Prototype Proposal (RPP) to selected industry Oct/Nov
- Simulation Exercise (SIMEX) Nov 20-22
- Go/No Go decision Nov/Dec

PENETRATE

- If Go, fund Prototypes Dec 19/Jan/Feb 20
- > 10x Robotic and AI Dismounted Infantry Platoon Tech Demo Sep 20

DIS-INTERGRATE