



**SCIENCE & TECHNOLOGY ENABLING  
ARMAMENTS ACQUISITION  
MODERNIZATION**

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***ARDEC Director of Technology***  
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**UNPARALLELED  
COMMITMENT  
& SOLUTIONS**

*Act like someone's life depends on what we do.*



**U.S. ARMY ARMAMENT  
RESEARCH, DEVELOPMENT  
& ENGINEERING CENTER**



Long Range  
Precision  
Fires



Next Gen  
Combat  
Vehicle



Future  
Vertical Lift



Network



Air & Missile  
Defense



Soldier  
Lethality



- **DoD Priorities on Modernization**
  - Build a more lethal force
  - Lead innovation & leverage technology effectively
  - Organize & innovate to win
- **Army Modernization focus: make Soldiers and units more lethal to win our Nation's wars, then come home safely**
- **RDECOM-ARDEC, as the Army's RD&E lead for armaments directly supports the Modernization Focus**



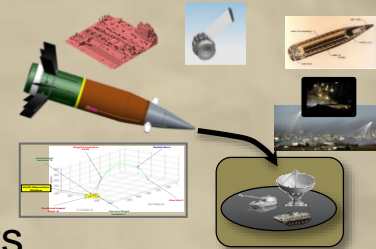


Long Range  
Precision  
Fires



## • OBJECTIVES

- Extend range of surface fires
- Engage imprecisely located, moving targets in a GPS denied, EW environments

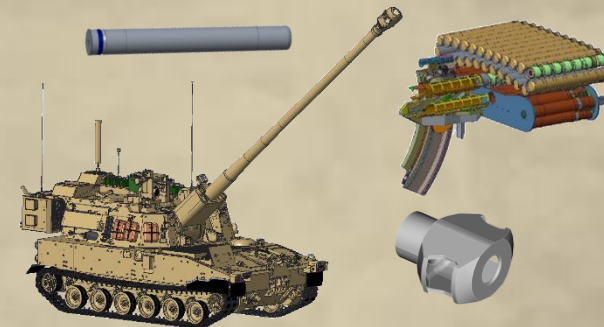


Next Gen  
Combat  
Vehicle



## • NEAR-TERM (2018-2023)

- Advanced lightweight cannon
- Supercharge propellant
- High rate of fire autoloader
- Unitary and Cargo projectiles
- Counter adversary IADS



Future  
Vertical Lift



Network



## • FAR-TERM (2024+)

- Range extension
- Novel AM propellants
- Collaborative engagement / re-targeting amongst multiple projectiles in-flight



Air & Missile  
Defense



Soldier  
Lethali



***Modernize a cannon for extended range, volume and increased missile capabilities to restore Army dominance in range.***



Long Range  
Precision  
Fires



## • OBJECTIVES

- Efficiently engage NGCV target sets at extended ranges for both manned and robotic platforms
- Engage targets in a dense urban environment
- Optimize armament systems for automation
- Reduce cognitive load on the operator



Next Gen  
Combat  
Vehicle



## • NEAR-TERM (2018-2023)

- Advanced medium caliber armament system capable of target defeat
- Precision “fire and forget” tank munition to engage threats at extended range
- Semi automated engagement of targets
- Lightweight 120mm Cannon with Autoloader



Future  
Vertical Lift



## • FAR-TERM (2024+)

- High elevation reduced recoil armament systems for increased effectiveness against multi-domain targets and in dense urban
- Tank-fired ammunition that can achieve hyper-velocity at extended range
- Velocity and Course correction technology for Ammunition that improves accuracy and lethality at extended range

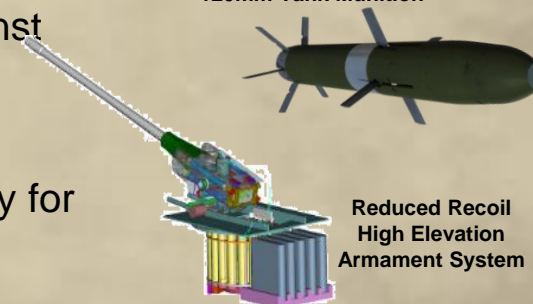


Network



Extended Line of Sight  
120mm Tank Munition

Air & Missile  
Defense



Reduced Recoil  
High Elevation  
Armament System

Soldier



*Develop prototypes that lead to the replacement of our current fleet of infantry fighting vehicles and later tanks in manned, unmanned & optionally-manned variants*

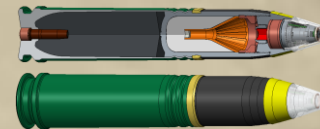


Long Range  
Precision  
Fires



## • OBJECTIVES

- Aviation lethality with air launched effects
- Holistic situational awareness & decision making
- Full spectrum targeting



*Advanced airburst multi-purpose ammunition*

Next Gen  
Combat  
Vehicle



## • NEAR-TERM (2018-2023)

- Legacy medium caliber armament system integration
- Advanced fire control leveraged from ground armament system
- Open system armament architecture
- Air burst for legacy & future weapons



Future  
Vertical Lift



*Medium Cal (20MM)  
Development*



*Advanced Fire  
Control*

Network



*Small Cal  
Remote  
Development*



*Counter-Measure  
Concepts*

Air & Missile  
Defense



## • FAR-TERM (2024+)

- Advanced countermeasure/decoy dispense module
- Small caliber remote weapons station firing multiple munitions



Soldier  
Lethality



*Incorporate manned, unmanned and optionally-manned variant vertical lift platforms that provide superior speed, range, endurance, altitude and payload capabilities.*





Long Range  
Precision  
Fires



## • OBJECTIVES

- Provide advisement that enables Armament & Lethality capabilities across other modernization priorities
- Serve as conduit between CFT and Other Transaction Authority (OTA) vehicles provided by ARDEC/ACC-NJ (i.e. C5, DOTC, DIUx)



*Network Enablers for In Flight Retargeting*

Next Gen  
Combat  
Vehicle



## • NEAR-TERM (2018-2023)

- Swarming Munitions – Round to Round Communications
- Munition In-Flight Communications – Command and Control (C2) to include Retargeting
- Manned-Unmanned Teaming (MUM-T) – Unmanned Weapon System C2 and Positive ID



*DARPA Hedgehog Wideband Radio – Smart Munition Employment*

Future  
Vertical Lift



**Network**



## • FAR-TERM (2024+)

- Leverage Artificial Intelligence, Machine Learning, and Big Data Lethality Enablers
- Leverage Low Earth Orbiting Satellite Network Enablers
- Leverage Non Traditional Waveforms for Machine-to-Machine Communications (LIFI, mmWave, etc.)



*Unmanned Weapon System Enablers*

Air & Missile  
Defense



Soldier  
Lethality



***Develop expeditionary infrastructure solutions to fight reliably on the move in any environment***



U.S. ARMY  
**RDECOM**

# OBJECTIVES & OPPORTUNITIES

## ASSURED POSITION, NAVIGATION AND TIMING



Long Range  
Precision  
Fires



Next Gen  
Combat  
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Future  
Vertical Lift



Network



Air & Missile  
Defense



Soldier  
Lethality



### • OBJECTIVES

- Mid-course guidance in GPS denied environments to enable range extension out beyond 70km
- Terminal Guidance to enable engagement of imprecisely located targets at extended ranges

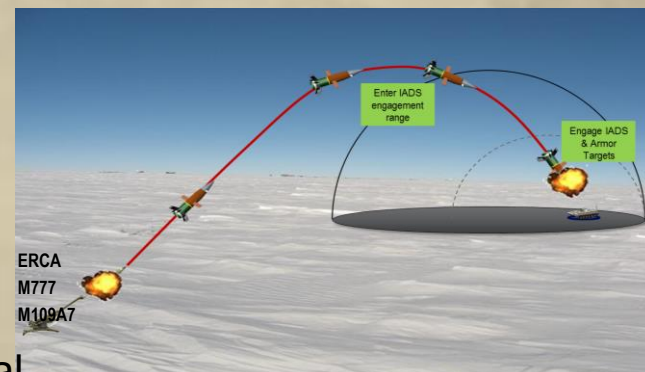
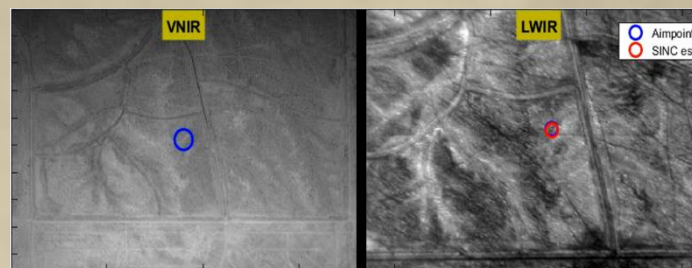
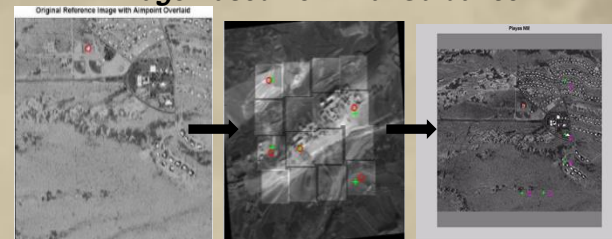
### • NEAR-TERM (2018-2023)

- Implementing Image Navigation w/ TRL-6 demo in FY18
- Tactical grade Inertial
- Multi-mode terminal seekers both Passive & Active
- Converged RF solutions

### • FAR-TERM (2024+)

- Gun hardened nav grade inertial through gun launch

Image Based Terminal Guidance



**Develop expeditionary infrastructure solutions to fight reliably on the move in any environment**





Long Range  
Precision  
Fires



## • OBJECTIVES

- Provide Maneuver Short Range Air Defense (M-SHORAD) maneuver elements & base camp security



Next Gen  
Combat  
Vehicle



## • NEAR-TERM (2018-2023)

- Systems of System approach for defeat of Group 1 & 2 Unmanned Aerial Systems (UASs)
  - Effective low collateral, low cost warheads/ effectors
  - Precision Targeting capability
  - Low SWAP-C remote weapon system
  - Programmable airburst munitions



Future  
Vertical Lift

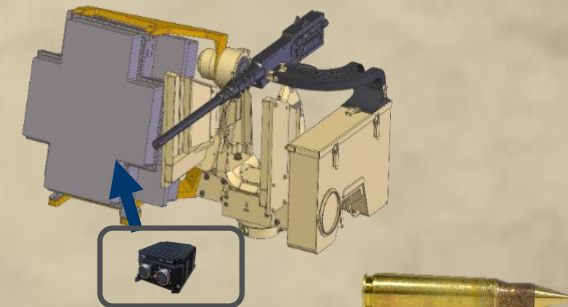


Network



## • FAR-TERM (2024+)

- Defeat of Group 2/3 UASs using directed energy & guided munitions
- Squad level defeat of Group 1 UASs
- Cannon delivered defeat of aerial targets



Air & Missile  
Defense



Soldier  
Lethality



***Ensure our future combat formations are protected from modern and advanced air and missile delivered fires, including drones***





Long Range  
Precision  
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Future  
Vertical Lift



Network



Air & Missile  
Defense



Soldier  
Lethality



## • OBJECTIVES

- Fight, win & survive in a multi-domain environment now & tomorrow
- Treat the Soldier/Squad same as a combat platform
- Initially focus on the Close Combat soldiers



## • NEAR-TERM (2018-2023)

- Next Generation Squad Weapons (AR and Carbine)
- Small Arms Fire Control
- Next Generation Family of Ammo



## • FAR-TERM (2024+)

- Advanced Ballistics Technology
- Propulsion & Terminal Mechanisms
- Counter Defilade Technology
- Signature Reduction

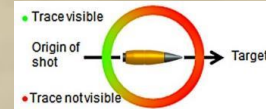
Next Gen. Common Cartridge (NGSWT)



General Purpose & Special Purpose



Reduced Range Training Ammo (RRTA)



One Way Luminescence (OWL)

*Develop the next generation of individual and squad weapons; improve body armor... and develop a synthetic training environment...*

**NEXT GENERATION  
COMBAT VEHICLE**



**FUTURE VERTICAL  
LIFT**



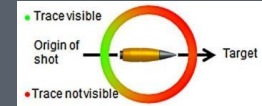
**NETWORK**



**AIR AND MISSILE  
DEFENSE**



**SOLDIER  
LETHALITY**



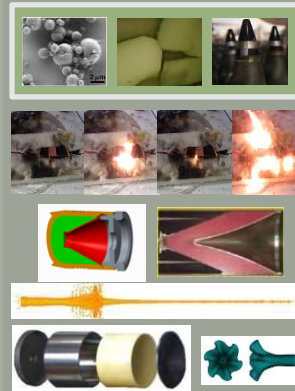
**TOP MUNITIONS NEEDS**

- Extended Range Projectile Technologies
- Advanced Small Caliber Ammunition
- Air Burst for Medium Caliber Weapon Systems
- Additive Manufacturing for Energetics
- Power Sources for Indirect Fire Precision Munitions
- CUAS Munitions Fired From Fielded Systems
- Novel Warhead Materials

**LONG RANGE  
PRECISION FIRES**



**“ENABLING”**







Long Range  
Precision  
Fires



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Vertical Lift



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Air & Missile  
Defense



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Lethality



- **Army Modernization**
  - Near-term capability
  - Developing prototype “systems” vs. component level
  - Incremental capability vs. disruptive
- **Armaments portfolio is well positioned to support Modernization & transition to PORs**
- **Innovation exists across the Government labs, industry partners, academia & international partners**
  - **Must be exploited to maintain/regain overmatch**