

U.S. Army Cyber Center of Excellence and Fort Gordon



BUILDING A WORLD CLASS CYBER WORKFORCE

Cyber Quest 2018 TechNet Briefing
MAJ Scott MacPherson
Cyber Quest EXCON Chief
US Army Cyber Center of Excellence, Fort Gordon, GA



U.S. ARMY

Panel Introductions



Panel Members:

Moderator – MAJ Scott MacPherson – Cyber Battle Lab, Cyber Center of Excellence, Fort Gordon, GA

ARCIC STRACD - Mr. Chris Warshawsky

MCOE - Mr. Harry Lubin or Edwin Davis

CERDEC, STCD - Jeff Huisigh

TCM Cyber - CPT Owens

TCM Electronic Warfare (EW) – Mr. Daniel Bush

TCM Network and Services (N&S) – MAJ McCullough

TCM Tactical Radio (TR) – MAJ Kang

*Note: TCM (Training and Doctrine Command (TRADOC) Capability Manager)



Agenda



- **Placing Cyber Quest within context of other TRADOC Prototyping Assessments (ALPA), the TRADOC Campaign of Learning and external events– (30 min)**
 - STRACD overview of MFIX, MSSPIX – Mr. Warshawsky
 - AEWE Brief – Mr. Lubin
- **Cyber Quest 2018 - (60 min, incl 10 min for questions) - MAJ MacPherson**
 - Cyber Quest Mission and CONOPS
 - Cyber Quest 2018 Initial Insights
 - Key features
 - » EW experiment features
 - » Cyber experiment outcomes
 - » Red Team capabilities
- **Cyber Blitz brief (20 min)**
- **Cyber Quest 2019 BAA overview – (30 minutes)**
 - TCM Cyber
 - TCM EW
 - TCM N&S
 - TCM TR
- **Question and Answer Session (10 min)**



Panel Introductions



Panel Members:

Moderator – MAJ Scott MacPherson – Cyber Battle Lab, Cyber Center of Excellence, Fort Gordon, GA

ARCIC STRACD - Mr. Chris Warshawsky

MCOE - Mr. Harry Lubin or Edwin Davis

CERDEC, STCD - Jeff Huisigh

Cyber Battle Lab

TCM Cyber

TCM Electronic Warfare (EW)

TCM Network and Services (N&S)

TCM Tactical Radio (TR)

*Note: TCM (Training and Doctrine Command (TRADOC) Capability Manager)



Unclassified



ARCIC Live Prototype Assessment (ALPA) Information Briefing

Christopher Warshawsky

Accelerated Capabilities Branch Chief

ARCIC, STRACD

21 Aug 2018

Information Brief

Unclassified



Unclassified



ARCIC Live Prototype Assessment (ALPA)

- **ALPA Defined:** ALPA provides a centralized management process for live prototype assessments under a single governance structure providing guidance and initial selection. It aligns live prototype assessments with the AWFC running estimates and the Learning Demands from the Campaign of Learning.
- **ARCIC Prototype Assessment End State:** Use verified data generated from live prototype assessment conclusions and recommendations to identify specific capabilities and the best transition strategy to inform interim solutions to Capability Gaps, AWFC Running Estimates, O&O Development and progression of F2025M efforts.

**Each event has an end state with a conclusion,
recommendation and a transition point**

Unclassified



Unclassified



ALPA Terms of Reference

- **ARCIC Live Prototype Assessment (ALPA):** Conduct experimentation to assess and refine initial O&O concepts and capabilities. Promising concepts inform future JWA exercise design through the Future Force planning process.
 - **Army Live Experimentation (ALE):** Provides capability developers, the science and technology community, and industry, with repeatable, credible, rigorous, and validated operational experiment venue(s) to assess possible solutions/technology in support of all Army Warfighting Challenges (AWFC). ARCIC sponsored ALE specific events include:
 - **Focused Assessment (FA):** More narrowly focused than an ALE, one-time only assessment, conducted anywhere, anytime, or any place. Assesses identified enabling concept shortfalls and modifies concepts. Uses prototype and surrogate systems to represent concept capabilities.

Unclassified



Unclassified



ARCIC Live Prototype Assessment (ALPA)

Planning Working Group

Operational Effectiveness Requirements Lens

Sponsor

ASA(ALT)

DARPA

Industry

RCO

SCO

RDECOM

Etc.

Campaign of Learning (CoL)

System-of-System Enhances Small Units (SESU)

Rapid Prototyping (RP)

ARCIC Live Experiment: Annual live, broad-based, multiple system recurring event with Soldier hands-on, force on force echeloned based (AEWE, MFIX, Cyber Quest, MSSPIX)

Focused Assessment (FA): Small scale, narrow focused, one-time only, conducted anywhere, anytime, or any place. Assesses identified enabling concept shortfalls and modifies concepts. Uses prototype and surrogate systems to represent concept capabilities.

...experiments that have potential of improving Soldier operational effectiveness leading to improved Organizational and Operational (O&O) concepts development and mitigate Army high risk capability gaps.

ALE

Army Expeditionary Warrior Experiments (AEWE)

Maneuver and Fires Integration Experiments (MFIIX)

Cyber Network & Electromagnetic Integration Experiments (Cyber Quest)

Maneuver Support, Sustainment, Protection Integration Experiments (MSSPIX)

Focused Assessments

Effective Energy for Expeditionary Operations (E2X)

Pacific Manned-Unmanned Teaming (Ground) - Initiative (PACMAN-I)

FA Examples

Analytically Supportable Recommendations for Capability Development

- Inform Learning Demands in the Campaign of Learning
- Operational Validation of Technology
- Force design change recommendations
- Accelerated development / equipping
- Risk Reduction JWA / NIE
- Further technology
- Transition to a program of record status
- Inform JCIDS
- Inform the Army that an idea does not have merit

ARCIC Live Prototype Assessment (ALPA) Experimentation

- ✓ ARCIC Centralized Management Process for Prototype Experimentation
- ✓ Provide The Campaign of Learning Verified Data From Live Prototype Assessments
- ✓ Validate Technology Base, SESU and RP Capabilities Operational Effectiveness
- ✓ Assess Specific Capabilities to Mitigate Gaps
- ✓ Identifies Best Transition Strategy to Inform Capability Gap Solutions

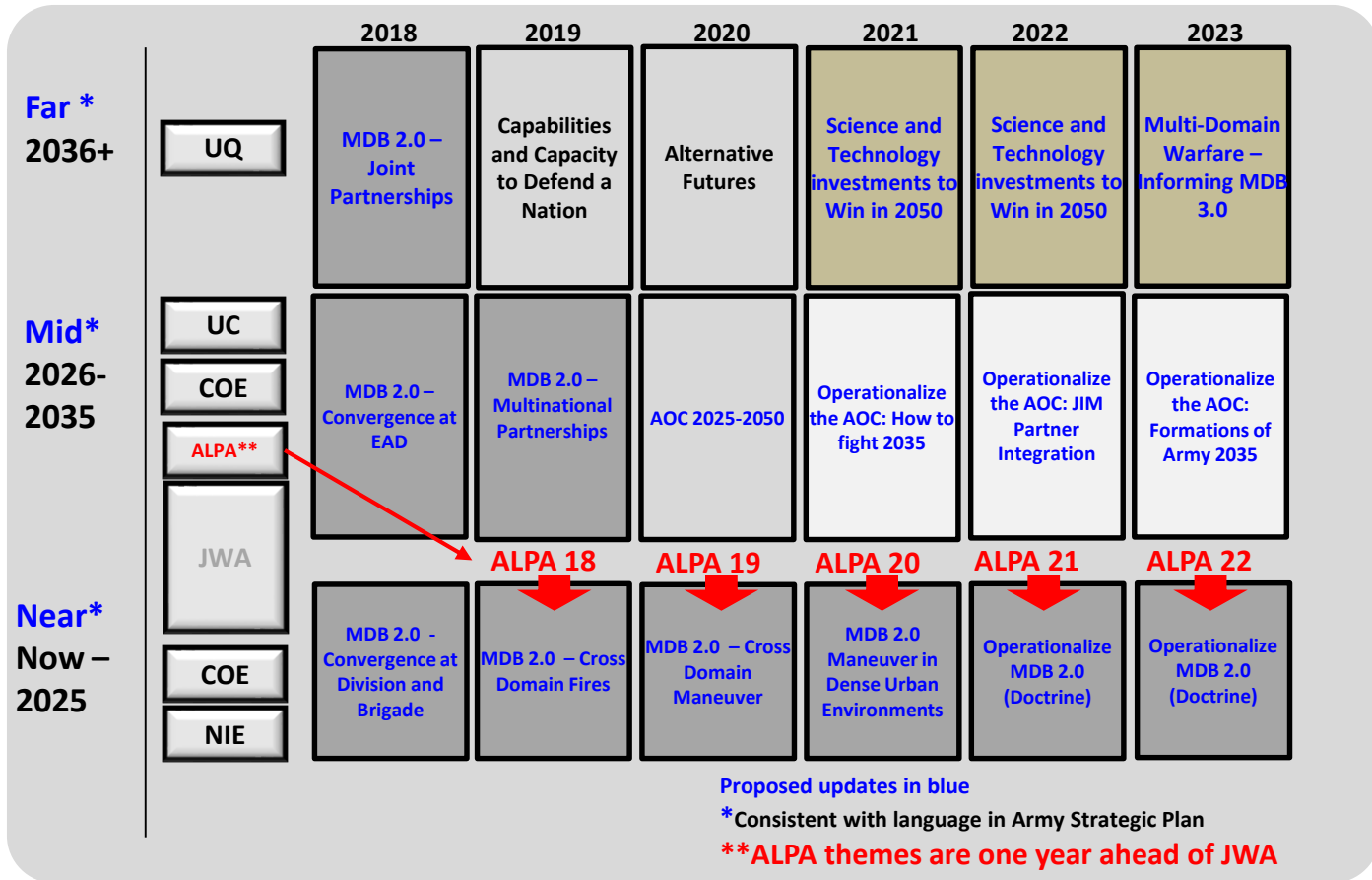
Unclassified



Unclassified



CDLD – Implementing FY19-23 Themes



ARCIC Director Approved 28 Nov 2017

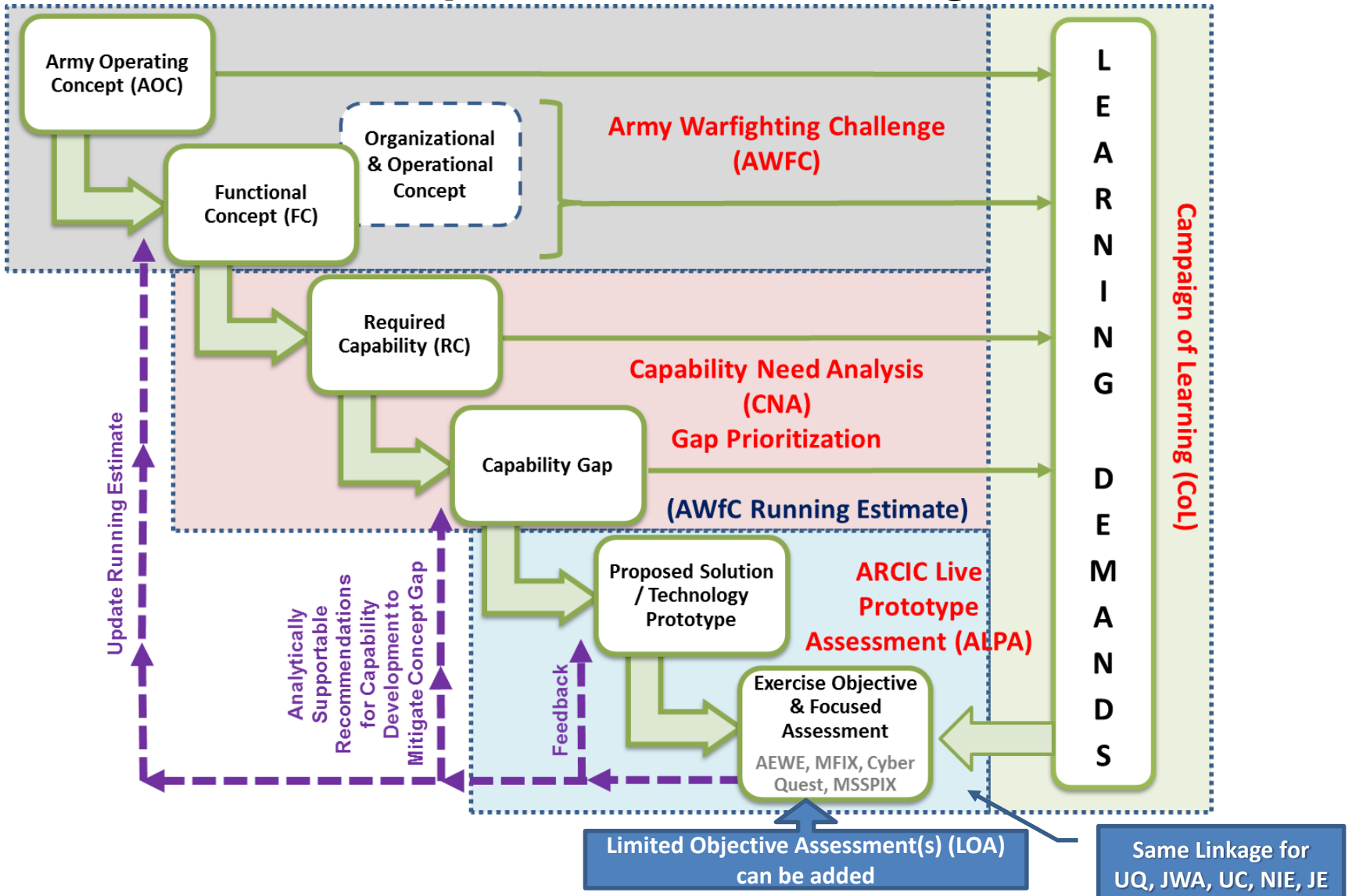
Unclassified



Unclassified



Campaign of Learning (CoL) Experimentation Linkage



Unclassified



Unclassified

ARCIC Live Experimentation (ALE) Annual Recurring Venues



Maneuver and Fires Integration Experiments (MFI), Ft. Sill, OK [NOVEMBER]

Lead	Fires Center of Excellence (FCoE)
Purpose	Develop, evaluate and expand integrated concepts, emerging doctrine, organization, training and material capabilities focused on how Fires enhances tactical operations below the Brigade Combat Team.
Primary AWFCs	#11, #17/18



Army Expeditionary Warrior Experiments (AEWE), Ft. Benning, GA [FEBRUARY]

Lead	Maneuver Center of Excellence (MCoE)
Purpose	Examines DOTMLPF capabilities and concepts designed to improve overmatch for the Soldier and small unit.
Primary AWFCs	#9, #10, #11, #12, #13, #15, #16



Maneuver Support, Sustainment, Protection Integration Experiments (MSSPIX), Ft. Leonard Wood, MO [APRIL]

Co-Leads	Maneuver Support and Sustainment Center of Excellence (MSCoE & SCoE)
Purpose	Conduct physical integration, demonstrations, assessments, and evaluations of contingency basing, base defense, and sustainment capabilities and technologies in an operationally relevant environment.
Primary AWFCs	#5, #6, #16



Cyber Network & Electromagnetic Integration Experiments (Cyber Quest), Ft. Gordon, GA [JUNE]

Co-Leads	Cyber and Intelligence Center of Excellence (CCoE & ICoE)
Purpose	Experimentation to inform solutions and DOTMLPF changes for critical capability gaps facing Cyberspace Operations, Signal, Electronic Warfare, and Situational Understanding operational forces.
Primary AWFCs	#1, #7, #19



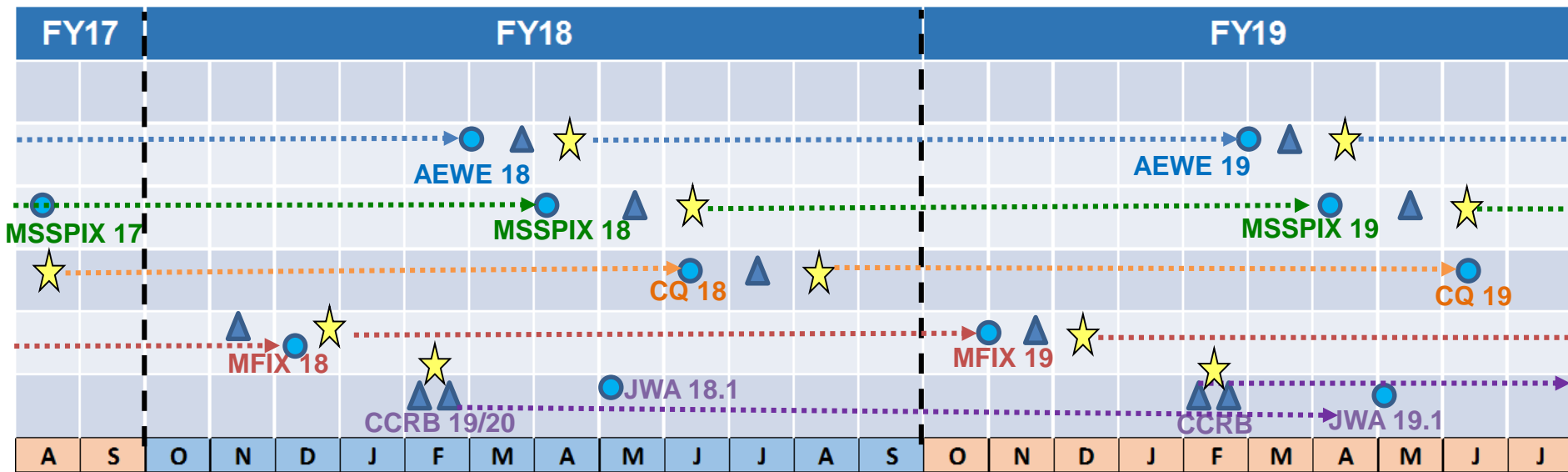
Unclassified



Unclassified



Battle Rhythm 4 ALE Events Annually



- AEWE – Army Expeditionary Warrior Experiments [MCoE]
- MSSPIX – Maneuver Support, Sustainment, Protection Integration Experiments [MSCoE & SCoE]
- CQ – (Cyber Quest) Cyber Network & Electromagnetic Integration Experiments [CCoE & ICoE]
- MFIX – Maneuver Fires Integration Experiments [FCoE]
- JWA – Joint Warfighting Assessment
- UC – Unified Challenge
- JWA – Joint Warfighting Assessment
- NIE – Network Integration Evaluation

- Planning Working Group (PWG)
- Concept and Capability Review Board (CCRB)
- ARCIC Approval/Guidance
- ARCIC Live Experimentation Event

Unclassified



Focused Assessment Robotic Complex Breach Concept



Experiment Partner: STRACD, MCoE, JMC, ARDEC, MSCoE, USMC.

What: The MBL assesses a robotic complex breach, including employment of Robotic and Autonomous Systems (RAS) in intelligence, suppression, obscuration, and reduction tasks at Grafenwoehr, Germany as part of JWA 19 at Fort Lewis, WA.

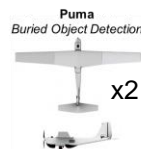
Problem: Current Combined Arms Breach doctrine, techniques, and equipment require Soldiers to be at the Point of Breach, which is an extremely high risk, vulnerable, and well targeted area by threat integrated effects. Joint and US Army forces need to develop a breach concept enabled by autonomous systems that provides assured mobility without compromising operational tempo.

Purpose: Inform assured mobility concepts and future capability requirements. Inform RAS capabilities in support of the Movement and Maneuver functional concepts/doctrine.

Background: CG TRADOC directed inclusion of a complex obstacle breach using just robotic systems for the "first wave" in JWA 18.1. ARCIC leverages existing venues to evolve concepts and prototype capabilities, culminating at JWA 19.1, including AEWE 18 and 19 as risk reductions. RCBC is an ARCIC resourced Focused Assessment in JWA 18.1 conducted in Germany (Grafenwoehr) 27 March 2018 to 06 April 2018. STRACD was the overall lead for RCBC 18 and for RCBC 19, of which planning is currently underway.

RCBC Systems:

Intelligence RCBC Systems



Automated Direct/Indirect Mortar
Destroy/Suppress/Obscure



Lethal Miniature Aerial Munition
Defeat/Destroy Target



Obscure RCBC System

M58 Wolf
Obscure



Assault Breacher Vehicle
ABV

UK Terrier
Reduce/Proof



Suppress RCBC Systems

Reduce RCBC System



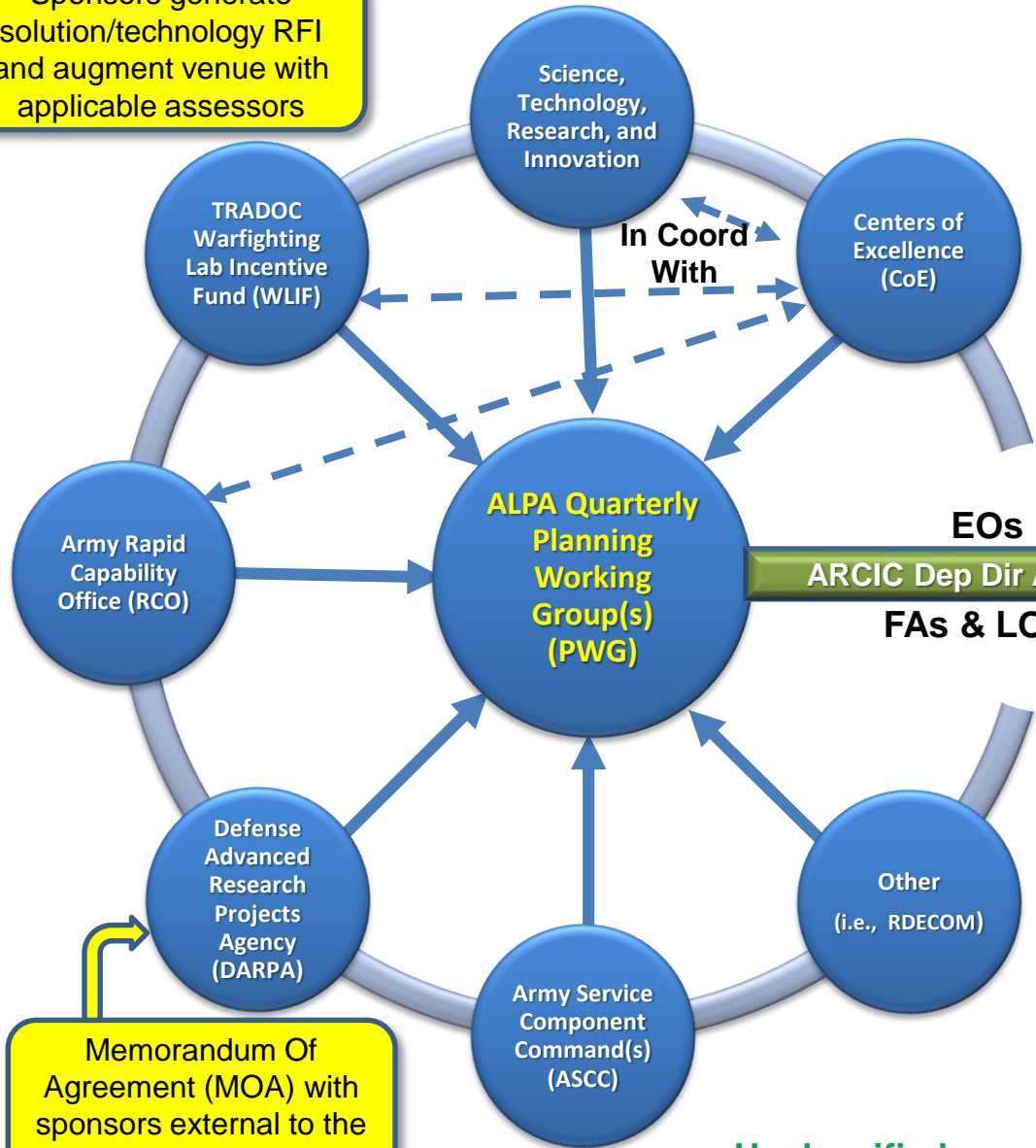
Unclassified

ALPA Sponsorship / Planning Working Group (PWG)



Discover

Sponsors generate solution/technology RFI and augment venue with applicable assessors



AEWE Experiment Objectives

1. How do we enable small units to conduct joint combined arms air-ground maneuver to defeat enemy organizations and accomplish missions in complex operational environments?
 Lead: ICoE: AFWFCs: 9, 10, 11, 15, 16, 18
 • Combat vehicle anti-armor protection
 • Combat vehicle protective armor weight reduction
 • Manned-Unmanned Teaming
 • Advanced rotorcraft
 • Optionally manned aircraft
 • Detection of threat observation measures
 • Integrated sights/ common sensor strategy
 • Improved long range security
 • Range speed/ payload performance
 • Improved team performance
 • Resilient Soldiers, adaptive leaders, cohesive teams
 • Improved Soldier performance and overmatch
 • Sleep, nutritional supplements, biomarker exploration
 • Physiological sensors, neuro-imaging, neuro-sensors
 • Improved tactical casualty combat care
 • Endovascular stabilizing capabilities, blood products
 • Hemorrhage control, burn wound repair, scar mitigation

2. How can Maneuver Support capabilities further enable the Maneuver Force? Lead: MSCoE, AFWFCs: 5, 12, 15
 • Improved chemical/biological decontamination of personnel, equipment, and vehicles
 • Terrain shaping
 • Hand-employed by non-MOS specific forces
 • Onsite Accord-compliant
 • Collection and analysis of forensic data and material
 • Analysis of geospatial data
 • Improved information and display on NETT Warrior
 • Reach or reduce obstacles in stride
 • Employment by non-MOS specific forces
 • Improved threat/hazard detection capability on robotic platforms
 • Chemical, biological, IED, human

3. How do fires forces enable small units to execute joint combined arms air-ground maneuver to defeat enemy organizations and accomplish missions in complex operational environments?
 Lead: FCoE, AFWFCs: 11, 13, 15, 17, 18
 • Counter-unmanned aerial systems (C-UAS)
 • Detection, identification, defeat
 • Target acquisition
 • Precision, remote
 • Enhanced call for fire
 • Electronic detection and identification

4. How do we provide the capability to extend endurance and operational reach, increase operational readiness, reduce demand, and execute responsive sustainment to widely dispersed units? Lead: SCoE, AFWFCs: 12, 16, 20
 • UAS - Micro resupply pod (5-25 lb payload)
 • UAS logistical resupply (25 lb payload)
 • Water from air capability
 • 3D printing or additive manufacturing

5. How can the Army engineer the tactical network to reduce user complexity, improve capacity, increase resiliency, maximize bandwidth efficiency, enable dynamic reconfiguration, improve cybersecurity, while becoming expeditionary? Lead: CCoE, AFWFC: 7
 • RF signature masking of the combat tactical network
 • GEO location capability for PDR radios
 • Communicate locally through a denied environment

6. How does the intelligence enterprise improve and facilitate the processing, exploiting, and dissemination of intelligence products in order to provide the Commander with situational understanding while operating in a complex environment?
 Lead: ICoE, AFWFC: 1
 • Sensor computing environment
 • Dynamic situational understanding
 • Interoperability with coalition partners

Enabling the Future - Force 2025 2018

Memorandum Of Agreement (MOA) with sponsors external to the Army

Event Execution [CoE Battle Lab]

Refine

Unclassified Manned Un-manned -Teaming (Ground) (MUM-T(G))

AWFC #1 Develop Situational Understanding
AWFC #11 Conduct Air-Ground Reconnaissance

• Provides improved squad situational awareness
 • Individual Soldier sensor employment

Cargo Pocket ISR
 Tactical aerial reconnaissance, security and surveillance
 Assess potential threats and share information with other systems

RQ-11B Raven
 Improve tactical aerial capabilities for

AWFC #15 Conduct Combined Arms Maneuver
AWFC #16 Set the Theater Sustain OPS and Maintain Foli
AWFC #18 Deliver Fires
AWFC #20 Develop Capable Formations

• Complicate threat observation
 • Operate from covered or concealed position
 • Increase lethality

ROSM-S (Obscuration)
 • Provide remotely operated area suppressive fires
 • Increase lethality
 • Operate dispersed while maintaining mutual support

S-MET HDT Protector
 • Improve unit mobility
 • Increase Sustainment and Mobility of formations
 • Increase small unit effectiveness

Nett Warrior
S-MET MUTT (Transport)

How do we increase situational understanding, lethality, and sustainment of maneuver forces while reducing manpower and risk?

Unclassified



Unclassified



Army Futures Command

- Five processes have been approved by LTG Wesley
 - Concepts
 - Experimentation
 - Requirements
 - Science and Technology
 - Business Practices
- Concurrently reviewing five COAs for high level organizational structure with projected decision the end of August
- EXORD signed 21 Aug
- Command stand up 24 Aug
- COAs approved are broken down into Directorate, Division, and Branch Level. Approval around Thanksgiving. Implementation 1 – 31 January 19
- Impact on STRACD and ALPA is unknown.

Unclassified



Unclassified



Conclusion

- ARCIC Live Experimentation is primarily focused on improving enabling concepts.
- ARCIC Live Experimentation venues can be leveraged by external TRADOC and pending future AFC organizations
- Army MOAs to be established to formalize ARCIC / CoE support to external organizations/agencies.
- ALPA is linked to the CoL by informing interim solutions to Capability Gaps, running estimates of AWFCs, O&O Development and progression of Army Force Modernization efforts.
- External organizations/agencies executing LOAs are not required to conduct experimentation to support the CoL.
- Army Futures Command is going to bring changes to all experimentation, Live, Virtual and Constructive. Quick turn around is going to be the key for most future prototype efforts.

Unclassified



Unclassified



Questions

Unclassified



Maneuver and Fires Integration Experiment (MFIx)

Purpose: Develop, evaluate and expand integrated concepts and material capabilities in order to inform how Fires enhances tactical operations at Brigade and below, retain current advantages over adversaries and accelerate investments on contested future capabilities in support of the Army's Campaign of Learning (CoL).

Method: The Maneuver Brigade's Fires Cell (FA, ADAM/BAE, Space, and CEMA) employs cross-domain fires in direct support to the Brigade Combat Team.



FY 19 Objectives

- Mission Command for Fires Synchronization and Integration in Multi-Domain Battle.
- Future Platforms that enable/facilitate cross-domain fires.
- Sensor to Shooter Linkages that will enable/facilitate cross domain fires, target acquisition, and transfer of data from sensor platform through positive identification.
- Provide an ALPA venue for CoE focused assessments and government demonstrations.

MFIx 19 Key Tasks

Establish Sensor to shooter linkages

Detect, identify, and defeat a wide range of aerial threats

Integrate sensors and shooters both organic and attached

Conduct tactical targeting

Provide close support and shaping fires

Integrate Army and joint capabilities at the tactical level

Learning (AWFCs 17/18 plus 11, 12, 13, 14, 15)



MFIX 2019



Key Dates

Systems Integration Event (SIE) #1: MAY 18

SIE #2: JULY 18

MFIX 2019: OCT – NOV 18

Technologies

System Highlights:

- 35 systems to include integrated Programs of Record participating at Brigade and below
- 10 New Systems (Government & Industry)
- 20 Returning Technologies
- 40 Total Tech Submissions

Experiment Design

- **FY 19 Objectives:** Mission Command for Fires
Future Fires Platforms
Cross-domain sensor to shooter
Non-Line of Sight Engagements
- **White Cell:** Maneuver and Fires Battalions
- **Tactical Units:** Brigade (-), ADA Battery, Maneuver Company
- **Cross-Domain Tactical Vignettes**
- **Above the Horizon Laser Engagements**
- **Support Maneuver Support Center of Excellence focused assessment**



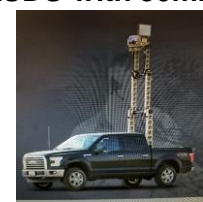
AUGS with 30mm



FIST-X



Kestrel Eye



Light Tactical Vehicle Surveillance System



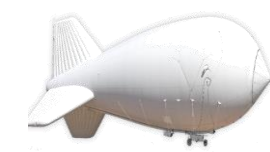
Mobile Expeditionary High Energy Laser



High Energy Laser Mobile Test Truck



High Energy Laser Weapon System



Aerostat



Brutus (Truck Mounted 155mm)



Maneuver Support, Sustainment, and Protection Integration Experiments (MSSPIX), 23 April – 9 May 2019

Purpose: MSSPIX serves as a venue to provide capability developers, the Science and Technology (S&T) community, and industry a repeatable, credible, rigorous, and validated operational experiment venue to support both concept and materiel development.

Method: Conduct physical integration, demonstration, assessments, and evaluations of Maneuver Support, Sustainment and Protection capabilities and technologies in an operationally relevant environment.

FY 19 Objectives

1. Better enable F2025B Soldiers to understand the operational environment. (Subterranean Mapping, Terrain & Infrastructure Assessment)
2. Conduct shaping activities to influence the local population and enemy forces. (Terrain Shaping Obstacles, Area/Route Clearance)
3. Better mitigate the effect of obstacles. (Breach Complex Obstacles and Clear/Breach Obstacles in Stride, WMD Operations)
4. Provide enhanced protection capabilities. (Enemy Detection, Improved Protective Structures, Base Camp Security)
5. Extend endurance and operational reach, increase operational readiness, reduce demand, and execute responsive sustainment to widely dispersed units. (Autonomous Resupply, Improved Tactical Power Management and Distribution, Enabled Mission Command)

MSSPIX 19 Key Tasks

Understand the operational environment and shape activities to influence the local population, enemy forces and other actors

Mitigate the effect of obstacles and provide enhanced protection capabilities

Sustain Operations and Maintain Freedom of Movement within the context of Multi-Domain Battle and Cross Domain Maneuver



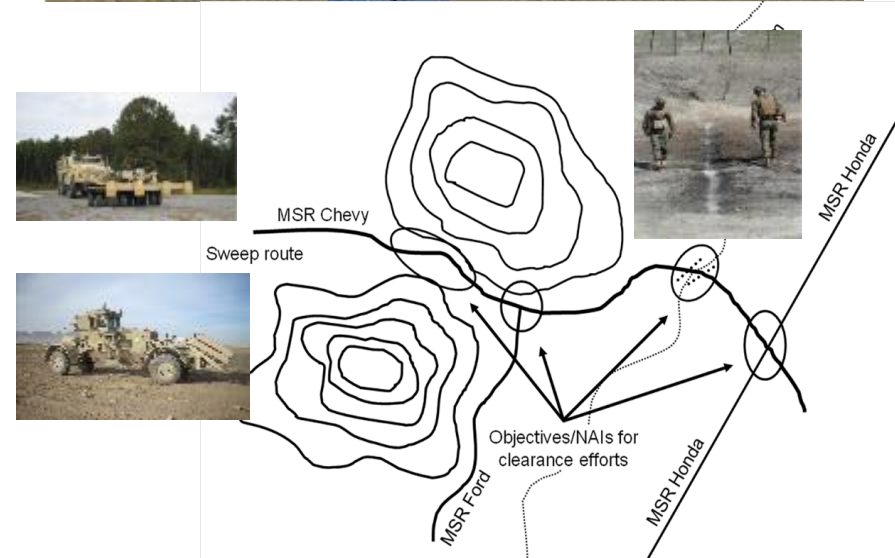
Base Defense & Security Scenario

- Small base camp to protect forward deployed forces while they sustain and project combat power
- Capabilities managed by a Base Defense Operations Center (BDOC)
 - Perimeter Defense Sensor Technologies
 - Advanced Materials/Structures
 - Decision Support Software Tools
 - Renewable Energy Technologies
 - Physiological Status Monitoring



Mobility Operations Scenario

- Capabilities will be projected from the base camp to mitigate the effects of obstacles to enable freedom of movement and maneuver for friendly forces.
 - Hazard Detection Sensor Technologies
 - Autonomous Route Clearance Technologies
 - Obstacle Reduction, Breaching, and Clearance Technologies





AEWE 2019

UNCLASSIFIED

Army Expeditionary Warrior Experiment



1 August 2018

UNCLASSIFIED



AEWE

AEWE 2018 Video



22 October 2018 – 15 March 2019

(Live Fires/Non-Networked: 22 Oct 18 – 25 Jan 19; Force on Force: 29 Jan – 15 Mar 19)

Purpose: AEWE is the Army's primary venue for small unit modernization, providing capability developers, Science and Technology (S&T) community, and industry a repeatable, credible, rigorous, and validated operational experiment supporting both concept and materiel development.

Method: AEWE campaign provides operational insights on experiment objectives by exploring new concepts, organizations, training methods and integrating prototype capabilities into an operational environment. Experiment is executed through Live Fire, Non-networked and Force on Force phases.

Key outcomes

- Informs Army concepts and strategies.
- Validates requirements.
- Serves as a risk mitigation venue for future programs.
- Advances Army Programs-of-Record.
- Frames Army requirements to steer industry internal research and development investment.
- Shapes Army S&T development.
- 5 year partnership with United Kingdom, growing relationship with Australia.
- Supports the broader Army Campaign of Learning including JWA.



AN/PSQ 20 Enhanced Night Vision Goggle



Early prototypes in AEWE since 2009. The goggle is now the POR night vision goggle.



Concepts, Doctrine, and TTPs Informed

- Consideration of 3rd Dimension
- Counter-UAS
- Virtual Reality Training
- Tactical CBRN Decontamination
- Armed UAS
- Command Post Manning
- 6x36 Common Scout Platoon

Soldier Borne Sensor



2,500 SBS purchase FY19. 276 larger quad rotor UAS purchased in 2016.

Nett Warrior



PEO Soldier fielding three brigades with the latest version of Nett Warrior dismantled mission command system.

MAFIA



RDECOM precision fires application on Nett Warrior transitioned to Program of Record for forward observers.

Electronic Warfare Signals Detection



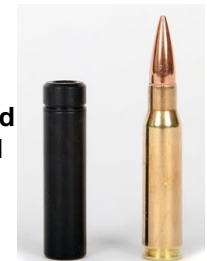
Prototypes demonstrated immediate impact--resulted in Rapid Fielding effort.

Robotics



Army purchasing 5,700 after iterative lessons learned in experimentation.

Cased Telescoped Ammunition and weapons



Cased Telescoped Ammunition and weapons reduce weight. Next Generation Squad Weapons technology.



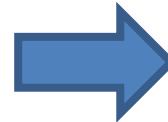
AEWE 2017 Observations

- **Expeditionary Additive Manufacturing** of ARL 3D printed UAS demonstrating a proof of concept: manufacturing at the point of need.



Rapid Fabrication via Additive Manufacturing on The Battlefield (R-FAB) – Repaired different capabilities, replaced HMMVV door handles, a HIPPO part and an LRAS mount.

- **Tactical Decontamination.** A U.S. Army Chemical School concept for a rapid, crew performed hasty decontamination capability reduced hasty decon time to 2 hours.

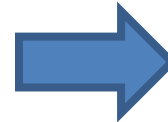


Mounted Maneuver Concept (GMV/LRV/MPF) – LRV w/ 30mm enabled CAV to fight thru disruption zone; MPF brought additional supporting fire protected GMVs and enabled attacks; logistics challenging; need prototypes for future assessments

Tactical Decontamination (Tactical Decon) - Proved operational utility following two iterations of simulated persistent nerve agent attacks; informed Future Force and met 2/1 IDs training objectives.

AEWE 2018 Observations

- **Cyber Electro Magnetic Activities (CEMA)** enabled pinpoint location of opposing forces.



Fire Support Team-Cross Domain (FIST-X) Directed Energy (DE) - DE weapon and ability of a 4x Soldier crew to call-for-fire while tracking a LSS UAV. The Army needs to continue improving and experimenting on this technology

Cyber Electronic Warfare Intelligence platoon (CEWI) – Enabled 2/1 ID to use the electromagnetic spectrum to engage targets; pinpointed OPFOR CDR and initiated CFF on his position; demonstrated clear utility on battlefield.

- **Robotic Complex Obstacle Breach** concept matured at AEWE and executed by MCoE MBL at JWA 18.1.



Location and Azimuth Determining System (LADS) - Provided precise location and azimuth of fire in a GPS-degraded environment. Gunnery SSG – “Even when we’ve been awake for 52 hours straight, the LADS software is easy to use and makes it hard to screw up”

Robotic Complex Breach (RCBC) – Manned-Unmanned teaming (M/UM-T) improved soldier survivability with minimal impact to operational tempo.



AEWE

AEWE 2019



Capabilities to Enable Cross Domain Operations at the Tactical Small Unit Level

1. How can we improve sustainment for mounted and dismounted Small Tactical Units?

- Assured resupply
- Precision aerial resupply
- Demand reduction solutions
- Automation of Soldier tasks
- Meet demand at point of need
- Water from air capability
- 3D printing or additive manufacturing
- Solutions to meet demand at point of need
- Soldier biofeedback devices (hydration, nutrition, sleep, distance, heartrate, core temp)
- Reduced power demand
- Power management solutions
- Demand reduction for 7-day semi-independent operations (task org, design configuration, new technologies)
- Push/pull aerial resupply solutions

2. How can we increase mounted and dismounted Small Tactical Unit mobility?

- Next Generation Combat Vehicle
- Robotic breach
- Reduced Solider load
- Robotic solutions to reduce physical & cognitive load
- Improved transportation for the main battle tank
- RAS for the mounted formation (bridging and platform recovery)
- UAS launch and recovery while mounted

3. How can we make mounted and dismounted Small Tactical Units more lethal?

- Indirect precision fires
- Directed energy weapons & energetics
- Precision shoulder launch munitions
- Advanced small arms fire control
- Advanced sensors
- Improved unmanned systems
- Unmanned systems swarming
- Turreted mortar
- On the move mounted manned-unmanned-teaming
- Unmanned systems which support lethality and joint fires
- Remote direct fire engagement at extended ranges
- Robotics and autonomous systems (RAS) for the mounted formation (ISR, artillery, mortar, platform direct fire, support by fire)

4. How can we increase mounted and dismounted Small Tactical Unit survivability?

- Active vehicle protection systems
- Advanced vehicle armor
- Advanced Soldier protection
- ISR denial/prevention
- Counter UAS (dismounted & mounted)
- Detect threat acquisition and targeting sensors (left of launch)
- Non-dedicated short range air defense
- Electromagnetic signature obscuration, reduction and decoy of mounted platforms, command posts, and small tactical units
- Survivable command post configurations for semi-independent operations
- RAS for the mounted formation (CBRNE detection and decon)

5. How can we improve mounted and dismounted Small Tactical Unit mission command?

- Expeditionary network communications
- Extended network range
- Low probability of detection communications
- Geospatial data transport solutions
- Link-16 radio for FO and FIST
- Real-time full motion video
- G2/OPEX tool for mission planning
- Situational awareness in degraded, denied, and disrupted space operations environments
- Improved/protected antenna
- RAS for mounted formations (air/ground retrans, offset antenna)

6. How can we optimize Soldier and Small Tactical Unit Performance through physical, cognitive and social (cohesion) training interventions?

- Collective simulator (gunfighter gym) to increase repetitions toward mastery
- Performance enhancement training using sports psychology methods
- Adaptive learning systems
- Squad Overmatch/Tactical Combat Casualty Care
- Tactical Athlete Performance Program Pilot - P3 Education, TAPC Facility, Enhanced PT Program



Phase I Live Fire/Excursions: ~15 October 18 – 25 January 19

- Company Training Meeting 20 August 18 (8 weeks out)

Phase II Force-on-Force: 29 January 19 – 15 March 19

- Allied troop arrival 29 January 19
- Tech Rodeo 30 January 19
- Technology Training 1 – 21 February 19
- Squad lanes 25 – 28 February 19
- Film Day 1 March 19
- Platoon Lanes 4 – 8 March 19
- Company Lanes 11-15 March 19

Insights Brief 19 March 19

Deliverables
 Final Report – JUL 2019
 CIEF – JUL 2019
 QAR – AUG 2019

Force-on-Force Event
 MAR 2019

EXFOR Tactical Training
 JAN 2019 – MAR 2019

FPC
 DEC 2018

Live Fire & Non-Networked Assessments
 NOV 2018 – JAN 2019

Network Integration
 NOV 2018 – Feb 2019

MPC
 AUG 2018

Supporting Plan Development
 - Simulation Support
 - Data Collection & Analysis
 - Technical Integration
 - Technical Training
 APR 2018 – FEB 2019

IPC
 APR 2018

Final Technology Selections Released
 O/A 15 JAN 2018

Tier 2 & 3 Technology Presentations
 07 DEC 2017

Tiering Results Released
 06 NOV 2017

Technology Tiering (CoEs)
 13 OCT – 30 OCT 2017

Technology Submissions Due
 06 OCT 2017

Technology Call Released
 O/A 01 SEP 2017





Case-Telescope intermediate caliber
Lightweight carbine



Lightweight carbine in an intermediate caliber designed to improve probability of hit and lethality.

Provides tactical small units with LOS/BLOS effects planning/coordination/synchronization tools to optimize effects

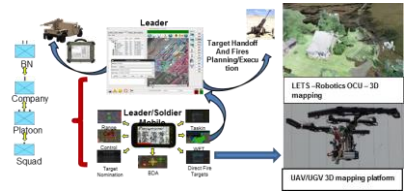
Drones launched from ground robots and controlled remotely increase standoff and situational awareness.

Cybersecurity software for defending mobile wireless tactical networks

Graphics and navigation heads up display ease cognitive load and speed decision making.

Improved UAS with extended flight time, better imagery, and integrated controls.

Leader/Soldier Effects Tool Suite



Cybersecurity software



UAV improvements



UAS launched from UGV and controlled remotely



Soldier **Augmented Reality** Heads Up Display (HUD)



Contact Us

Mark Winstead
mark.d.winstead.civ@mail.mil
(706) 545-9777



<https://www.facebook.com/armyaewe>



<http://www.benning.army.mil/mcoe/cdid/aewe/>



AEWE

Questions?