# ARMY FUTURES COMMAND

## AAAA Missions Solutions Summit

April 4, 2022

LTG General Thomas H. Todd III
DCG, Acquisition and Systems
Chief Innovation Officer

# WHO WE ARE

## OUR COMMANDS

**FUTURES & CONCEPTS CENTER**

FCC PROVIDES THE INTELLECTUAL FOUNDATION AND DISCIPLINED APPROACH TO DESIGN, DEVELOP, AND FIELD THE FUTURE ARMY

**COMBAT CAPABILITIES DEVELOPMENT COMMAND**

CCDC PROVIDES THE RESEARCH, ENGINEERING, AND ANALYTICAL EXPERTISE TO DELIVER CAPABILITIES THAT ENABLE THE ARMY

**MEDICAL RESEARCH & DEVELOPMENT COMMAND**

FROM ILLNESS TO INJURY, MRDC PROVIDES RESEARCH AND DEVELOPMENT TO ADDRESS ARMY MEDICAL REQUIREMENTS

**THE RESEARCH & ANALYSIS CENTER**

TRAC PRODUCES RELEVANT, OBJECTIVE, AND CREDIBLE OPERATIONS ANALYSIS TO INFORM KEY DECISIONS FOR AFC, ARMY, AND JOINT LEADERS

26,000 People
26 States
23 OCONUS Locations
11 Countries
5 Continents
16 Organizations
19 Standalone Facilities
2 Senior Commands

## OUR TEAMS

**CROSS-FUNCTIONAL TEAMS**

EIGHT CFTs ALIGNED AGAINST THE SIX MODERNIZATION PRIORITIES

**COMBAT SYSTEMS INTEGRATION DIRECTORATE**

CSiD IS THE FOCAL POINT IN AFC FOR INTEGRATION AND SYNCHRONIZATION WITH FCC, DEVCOM, ASA(ALT) , AND THE 12 PROGRAM EXECUTIVE OFFICES

**ARTIFICIAL INTELLIGENCE INTEGRATION CENTER**

LEADS, INTEGRATES, & SYNCHRONIZES THE ARMY'S AI STRATEGY AND IMPLEMENTATION PLAN

**ARMY APPLICATIONS LAB**

ACCELERATES THE DISCOVERY, EVALUATION, & TRANSITION OF DUAL-USE TECHNOLOGY AND BUSINESS PRACTICES FOR AFC

**ARMY SOFTWARE FACTORY**

INCREASES THE ARMY'S DIGITAL PROFICIENCIES WHILE LEVERAGING AGILE DEVSECOPS PRACTICES AND CLOUD TECHNOLOGIES TO BUILD ORGANIC SOFTWARE

## OUR SUPPORT

**75th INNOVATION COMMAND**

LEVERAGES THE UNIQUE SKILLS, OF AMERICA'S ARMY RESERVE TO DRIVE OPERATIONAL INNOVATION, CONCEPTS, AND CAPABILITIES

**ARMY TEST & EVALUATION COMMAND**

ENABLES MULTI-DOMAIN OPERATIONS THROUGH RIGOROUS DEVELOPMENTAL TESTING AND INDEPENDENT OPERATIONAL TESTS AND EVALUATIONS.

## OUR PARTNERS

**ASSISTANT SECRETARY OF THE ARMY (ACQUSITIONS, LOGISTICS, & TECHNOLOGY) – ASA(ALT)**

ARMY STAFF

ARMY COMMANDS

SISTER SERVICES

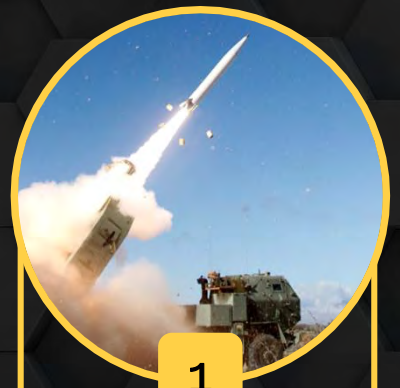
TRADITIONAL INDUSTRY

SMALL BUSINESS

ACADEMIA

ALLIES & PARTNER NATIONS

# ARMY MODERNIZATION PRIORITIES



1

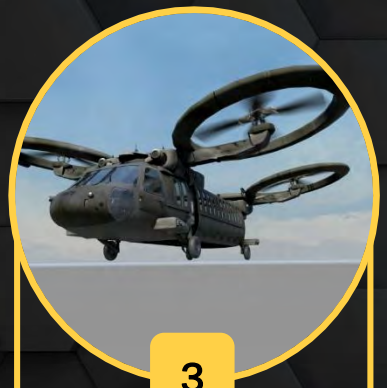
## LONG RANGE PRECISION FIRES

- Strategic Fires
- Operational Fires (Precision Strike Missile)
- Tactical Fires (Extended Range Cannon Arty [ERCA])

2

## NEXT GENERATION COMBAT VEHICLES (NGCV)

- Optionally Manned Fighting Vehicle (OMFV)
- Robotic Combat Vehicle (RCV)
- Mobile Protective Fire Power (MPF)
- Armored Multi-Purpose Vehicle (AMPV)



3

## FUTURE VERTICAL LIFT (FVL)

- Future Attack Recon Aircraft (FARA-CS1)
- Future Unmanned Aircraft Systems (FUAS)
- Future Long Range Assault Aircraft (FLRAA-CS3)
- Modular Open System Approach (MOSA)

4

## NETWORK/C3I

- Unified Network
- Common Operating Environment
- Joint Interoperability/Coalition Accessible
- Common Post Mobility/Survivability
- Mounted APNT (APNT)
- Enterprise Enablers (APNT)
- Situational Awareness (APNT)

5

## AIR & MISSILE DEFENSE

- Mobile – Short Range Air Defense (M-SHORAD)
- IFPC – Indirect Fire Protection *Capability (Iron Dome)* bridging capability
- LTAMDS – Lower Tier AMD Sensors
- AIAMD – Army Integrated AMD

6

## SOLDIER LETHALITY

- Next Gen Squad Weapon – Automatic Rifle
- Next Gen Squad Weapon – Rifle
- Integrated Visual Augmentation System
- Enhanced NV Goggles
- One World Terrain
- Virtual Trainers (Air/Ground)
- Training Sim Software
- Squad Immersive Trainer
- Training Management Tools

# Near Future Efforts

*Technologies for the Multi-Domain Battlefield*

# NEAR FUTURE

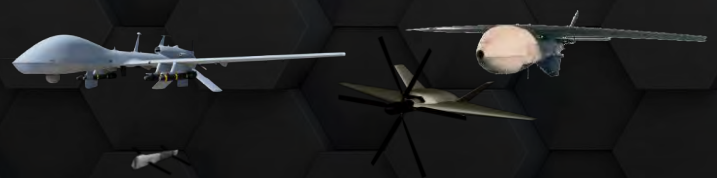
*Modernization Priorities*

Future Vertical Lift will develop next generation vertical lift aircraft to address current identified aviation capability gaps against peer/near peer competitors. The CFT will address these gaps by accelerating the following four (4) technologies:

## FARA Capability Set 1

**WHAT**: Future Attack Reconnaissance Aircraft (FARA)
**WHY**: Fill the armed reconnaissance capability gap
**HOW**: Increase responsiveness, reach, endurance, lethality, and survivability;

## FUAS



**WHAT**: Future Unmanned Aircraft Systems (FUAS)
**WHY**: Provides revolutionary advances in maneuverability, agility, lethality, reach, and survivability.
**HOW**: Increase operational reach, payload, runway independence, weather hardening, and endurance.

## FLRAA Capability Set 3

**WHAT**: Future Long Range Assault Aircraft (FLRAA)
**WHY**: FLRAA provides more lethal, survivable, and effective Assault and MEDEVAC capabilities.
**HOW**: Increases speed, range, endurance, and endurance at range.

## MOSA

**WHAT**: Modular Open Systems Approach (MOSA)
**WHY**: Enable rapid changes to digitally-enabled capabilities.
**HOW**: Increase ability to rapidly and affordably evolve aircraft avionics and mission equipment.

# AVIATION S&T TRANSITIONS

*Next-Gen Platform Technology*

## Transitions to PM Future Long Range Assault Aircraft (PM FLRAA)

- Technology demonstrator aircraft, performance attributes, digital thread design tools and Government/Industry airworthiness partnerships
- Handling qualities simulation experiment to inform requirements to ADS-33
- Model-Based Systems Engineering approach (MBSE) piloted and transitioned

## Transitions to PM Future Attack Reconnaissance Aircraft (PM FARA)

- FARA Competitive Prototype (CP) program transitioned to PM FARA following CDR with two aircraft configurations/industry competitors in final design and build process
- Modular Effects Launcher (MEL) demonstrated at PC21
- Handling Qualities Requirements for FVL

## Transitions to Aviation Turbine Engine Office (PM ATE)

- Advanced Affordable Turbine Engine Technology provided the basis for the ITE engine to be installed within the FARA platform
- Replacement of T700 (class) engines on enduring fleet

## Transitions to PM Unmanned Aircraft Systems (PM UAS)

- Inform program requirements and specifications for ALE small
- Provided draft architecture models for ALE

# AVIATION S&T TRANSITIONS

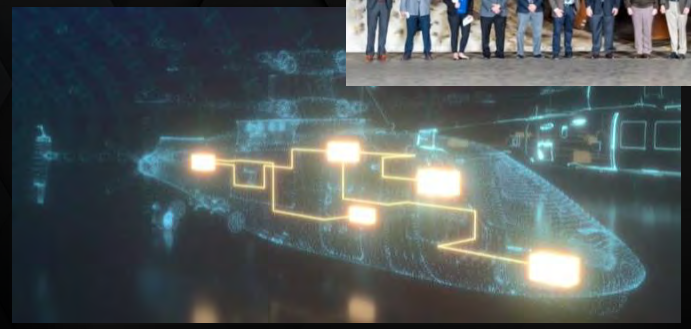
*Next-Gen Tools & Mission Systems Technology*

## Modular Open Systems Approach (MOSA)

- Enterprise MOSA/Integrated Mission Equipment (IME) focused on: Comprehensive Architecture Strategy (CAS), Joint Common Architecture (JCA), Architecture Centric Virtual Integration Process (ACVIP), System Theoretic Process Analysis (STPA), Future Airborne Capability Environment (FACE), and Model-Based Systems Engineering (MBSE)
- Resulted in development of the FVL Architecture Framework (FAF)

## Modeling and Simulation

- Multiple Effector System Identification identified flight dynamics models
- Integrated software tool-set for risk reduction in development of flight control systems
- Computational aerodynamic simulations diagnosed and identified corrective actions for fielded aircraft
- Conceptual Design and Analysis for future vertical lift



## Survivability

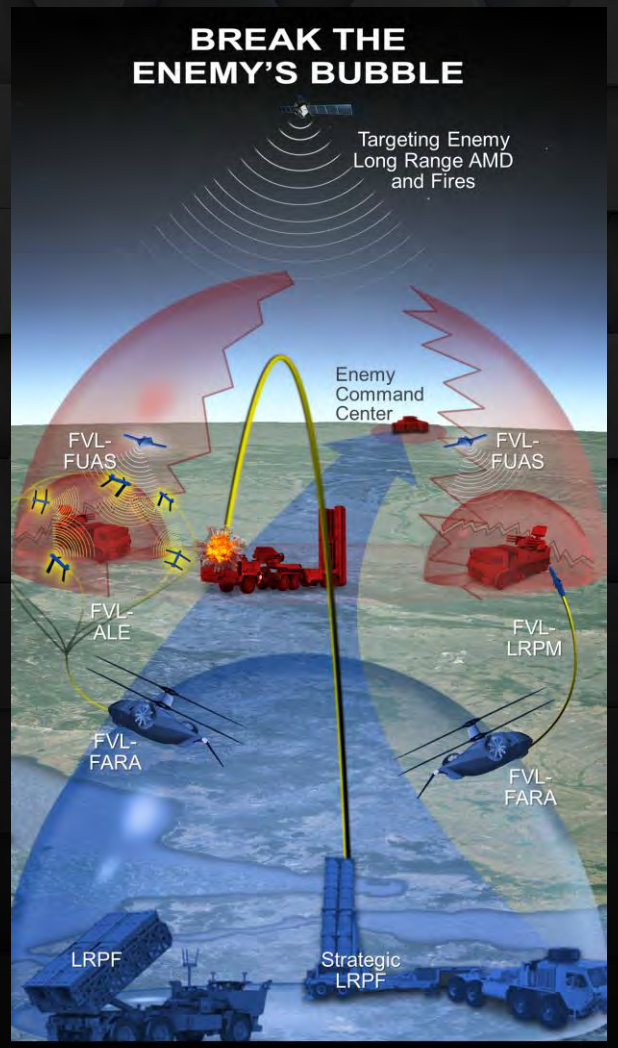
- Study of current and near-term future threats that UAS systems will encounter
- Measured radar cross sections for enduring fleet
- Low-altitude survivability enhancements to a threat engagement model
- Survivability studies inform requirements

# Far Future Efforts

*Technologies for the Future Battlefield*

# DEVCOM AvMC S&T

*Enabling Future Warfare*




Aviation assets and long-range fires break the enemy A2/AD bubble, creating corridors for Joint Force maneuver.

To do this we need…

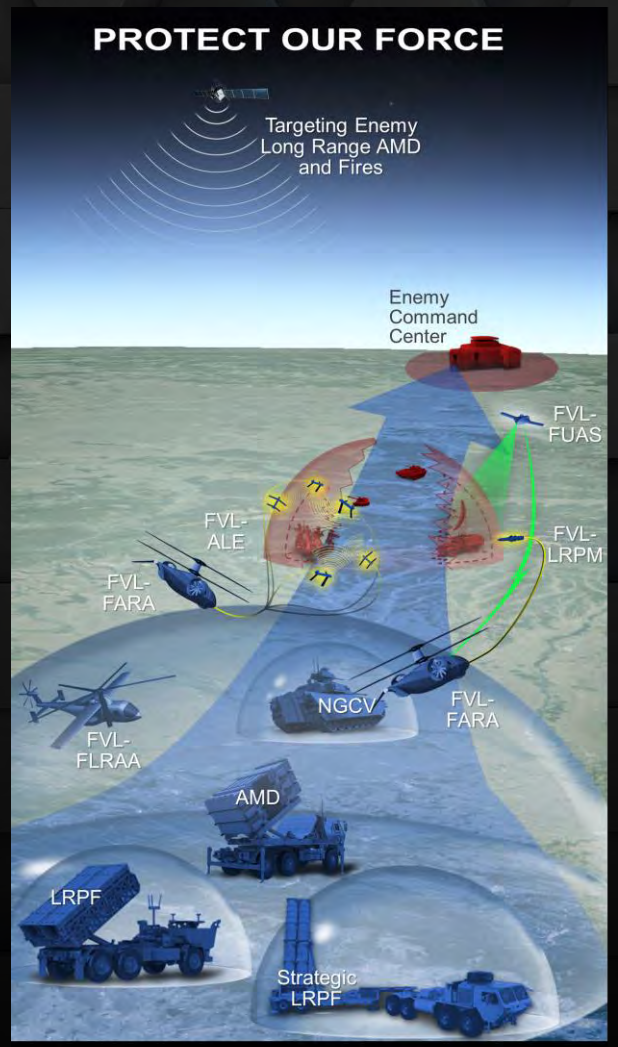
- Greater speed and range
- Operating in a highly contested environment (e.g. GPS denied, RF contested; secure, anti-jam, long-range communications)
- Better survivability against emerging threat systems
- More lethal payloads
- Reduced platform and mission systems weight
- Aided target acquisition, recognition, and situational awareness

Technologies that we are investing in include:

- Alternate navigation techniques (e.g. Vision Based)
- Active and passive signature control/reduction (RF, IR and acoustic)
- Air Launched Effects (ALE)
- Kinetic & non-kinetic payloads for full spectrum of targets
- Autonomy (e.g. AI) and teaming for multi-system collaborative behaviors
- Semi-autonomous launcher with greater firepower, magazine depth, & mobility

# DEVCOM AvMC S&T

*Enabling Future Warfare*




## Layered AMD protects individual Army units at all echelons.

### To do this we need…

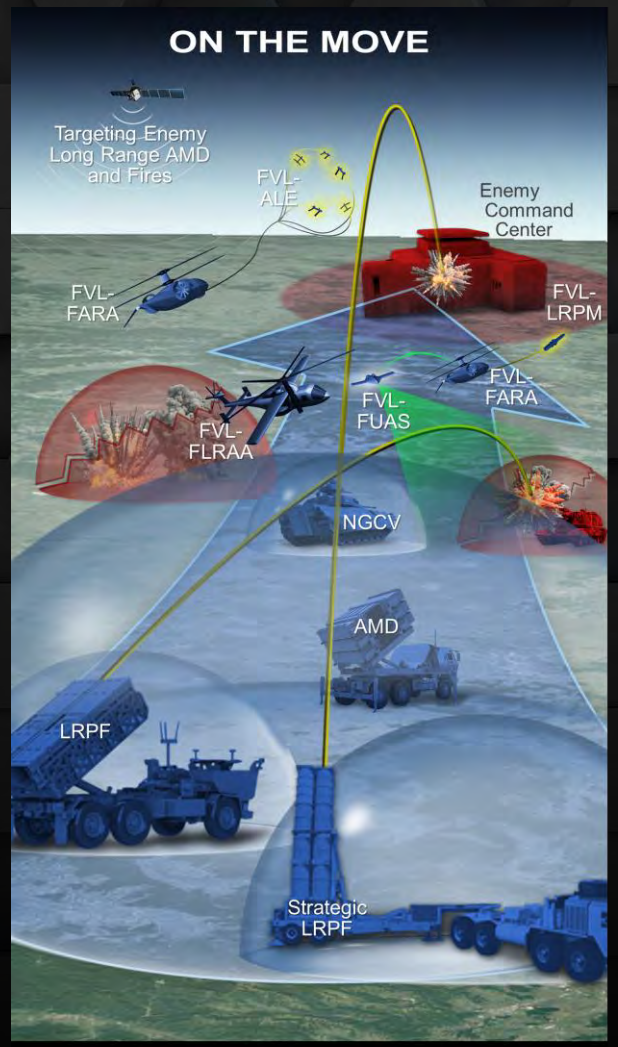
- Improve ability to move/land/take off in rugged, unimproved terrain.
- Increased survivability against close threats
- Greater awareness and understanding for tactical commanders
- Widely dispersed force sustainment
- Lower cost AMD with greater range & magazine depth
- Protection from UAS swarms and other emerging threats

### Technologies that we are investing in include:

- Low weight structures for crashworthiness and ballistic protection
- Reliable and reparable systems
- AI decision aids for optimized fire control
- Fused battlefield awareness
- Optimized warheads
- Semi-autonomous launchers
- Day/night sensing of low signature UAS

# DEVCOM AvMC S&T

*Enabling Future Warfare*




AGILE MANEUVER TO CONTACT

Agile / mobile missile and aviation technology allows our force to survive, flip the cost curve, and take the fight to the enemy.

To do this we need…

- Maneuverable platforms and munitions
- Operate widely dispersed with or without net comms
- Survivable against advanced threat systems
- Tropical to Arctic environmental hardening
- Fuel/Energy efficiency
- Maintain high availability

Technologies that we are investing in include:

- Wide dynamic range guidance, navigation, and control
- Networked guided weapons
- Scalable lethality
- Autonomous terminal engagement for high value targets
- Next-generation anti-armor missiles
- Electrification / multi-mode / hybrid propulsion systems
- Machine learning algorithms for data management

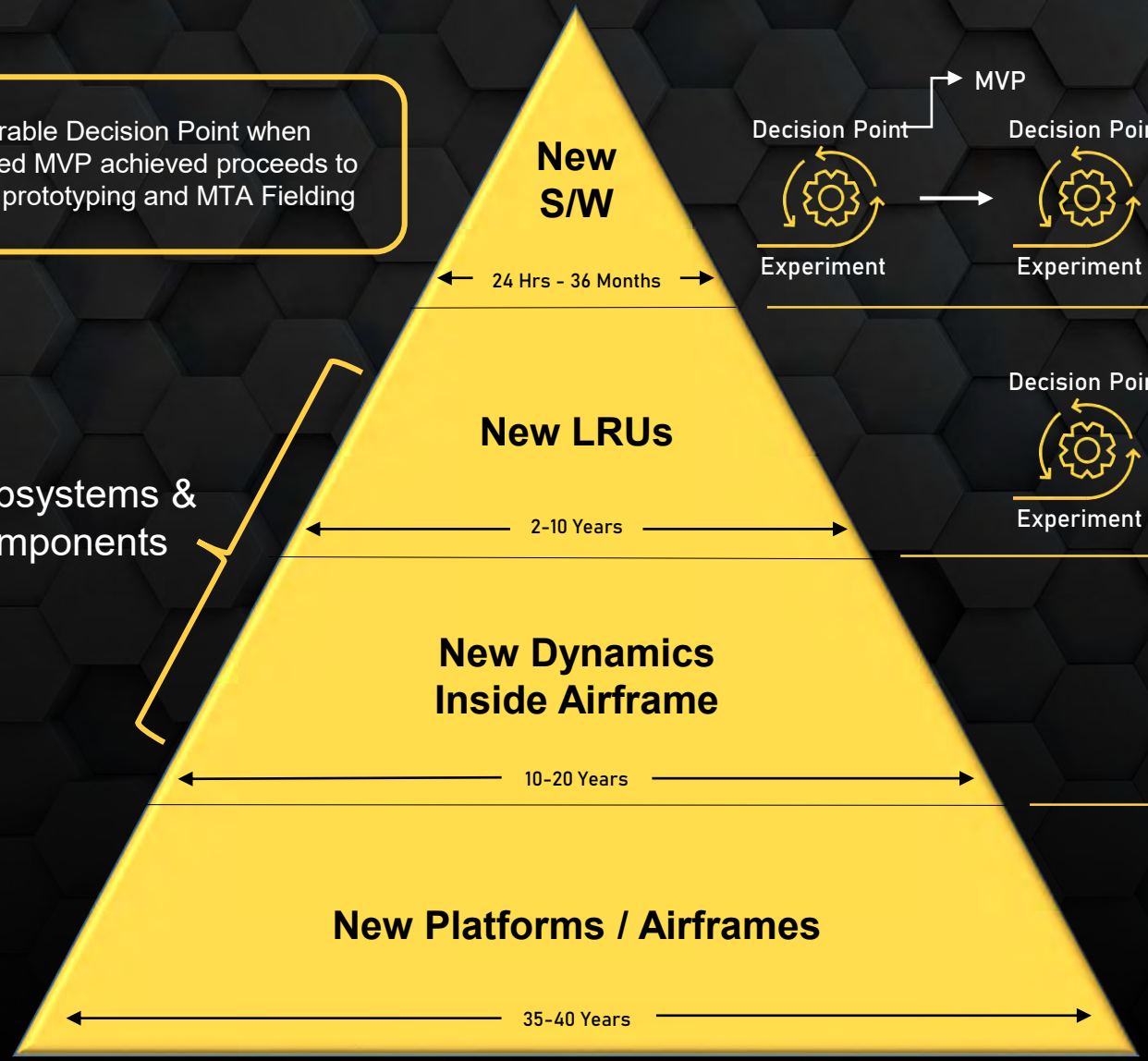
# Persistent Modernization

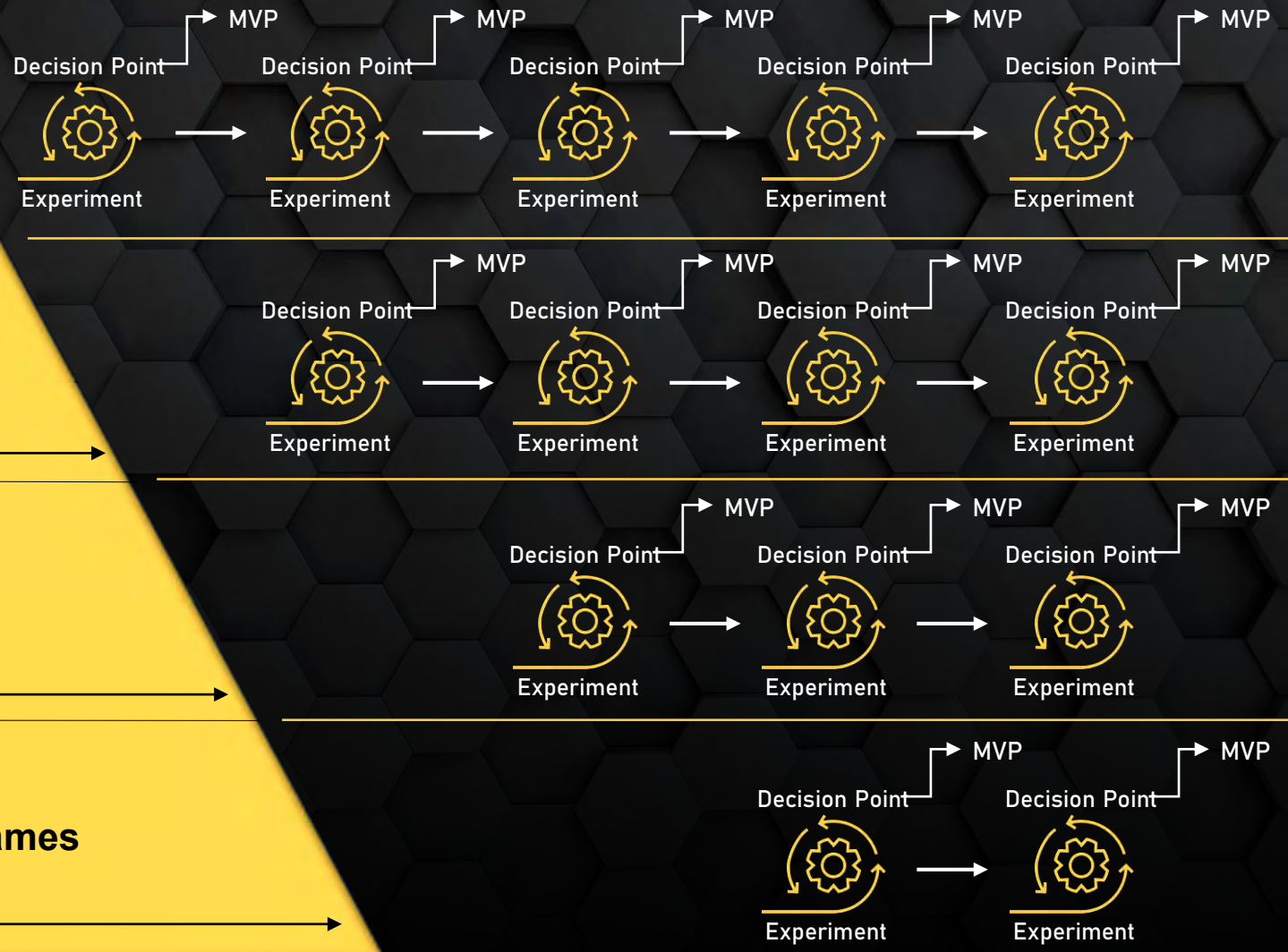
*Deliver Now and Often*

# PERSISTENT MODERNIZATION - *Now & Often*

*Experimentation, Test, Development Rhythm*

Favorable Decision Point when desired MVP achieved proceeds to MTA prototyping and MTA Fielding



# AAL Aviation Efforts

## Autonomous Takeoff and Landing

- Near Earth Autonomy Phase II SBIR CL I UAS
- Near Earth Autonomy PH III SBIR collaboration with AI2C, AVMC & FVL

## UAS Propulsion

- Compact lightweight motor-generator system for future electrified unmanned aircraft system (FY21 SBIR to be released 14 Apr 22)

## Survivability

- Aircraft Survivability for Countering Directed Energy Weapon Threats (C- DEW) (FY21 SBIR to be released 30 Apr 22)
- Developing  SBIR for highly reflective microstructures for the 1030 to 1070 nm range for continuous wave (cw) laser light to protect and allow uninterrupted operation of visible sensors. (potential 1st QTR 23 SBIR)

## Tethered UAS

- Develop and advance Te-UAS enabling technologies that make the capability more suitable and capable to operate in combat. (SBIR PH II Downselect Apr 22)

# Experimentation Venues

## Army Futures Command:

- Project Convergence (PC) (FCC/DEVCOM)
- Position, Navigation and Timing Assessment Exercise (PNTAX)(APNT/S)
- Sensor-to-Shooter (S2S) Experimentation (APNT/S & LRPF CFT)
- Experimentation Demonstration Gateway Event (EDGE)(FVL CFT)
- Network Modernization Experiment (NetMod X)(Net CFT)
- Joint System Integration Lab (JSIL)(DEVCOM)
- Joint Warfighting Assessment (JWA)(JMC)

## Army Live Prototyping Assessment (ALPA) Events:

- Army Expeditionary Warrior Experiments (AEWE)
- Maneuver and Fires Integration Experiments (MFIX)
- Maneuver Support, Sustainment, Protection Integration Experiments (MSSPIX)
- Cyber Network & Electromagnetic Integration Experiments (Cyber Quest)

## FORSCOM:

- Scarlet Dragon (XVIII ABC)
- NTC and JRTC OPFOR

## ASCC Experimentation:

- Dynamic Front (USAREUR-AF/EUCOM)(S2S focus)
- Defender Europe (USAREUR-AF)
- Valiant Shield (USARPAC/Indo-PACOM)(MDTF / Competition focus)
- Defender Pacific (USARPAC)

# 2035+ SCIENCE SHAPES CONCEPTS


Network with a Robust Data Fabric

Energetics

Quantum Technologies

Power Generation

Energy Storage


Artificial Intelligence

Robotics and Autonomy

Synthetic Biology

Adaptive Manufacturing

The next break through …