



ARMY AVIATION

DECISIVE IN LAND WARFARE

MG Michael McCurry
USAACE Commanding General





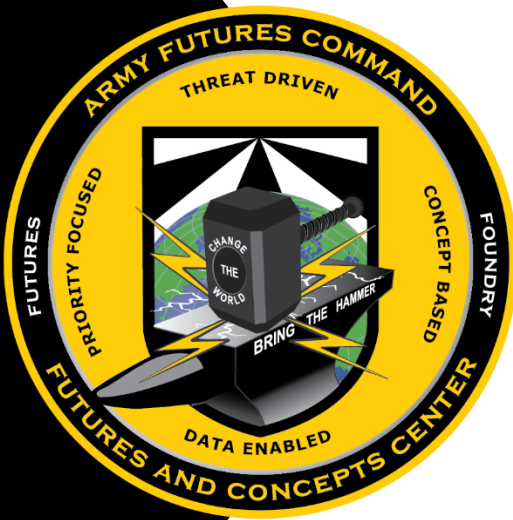
ARMY AVIATION

DECISIVE IN LAND WARFARE

LSCO Way Ahead







Future Studies Program: Future OE

BG Stephanie Ahern
Aviation Industry Day
3 Aug 2022



U.S. ARMY®

Bringing Sustainment from the Industrial Age to the Information Age in order to support LSCO

MG Todd Royar
CG, AMCOM
3 August 2022

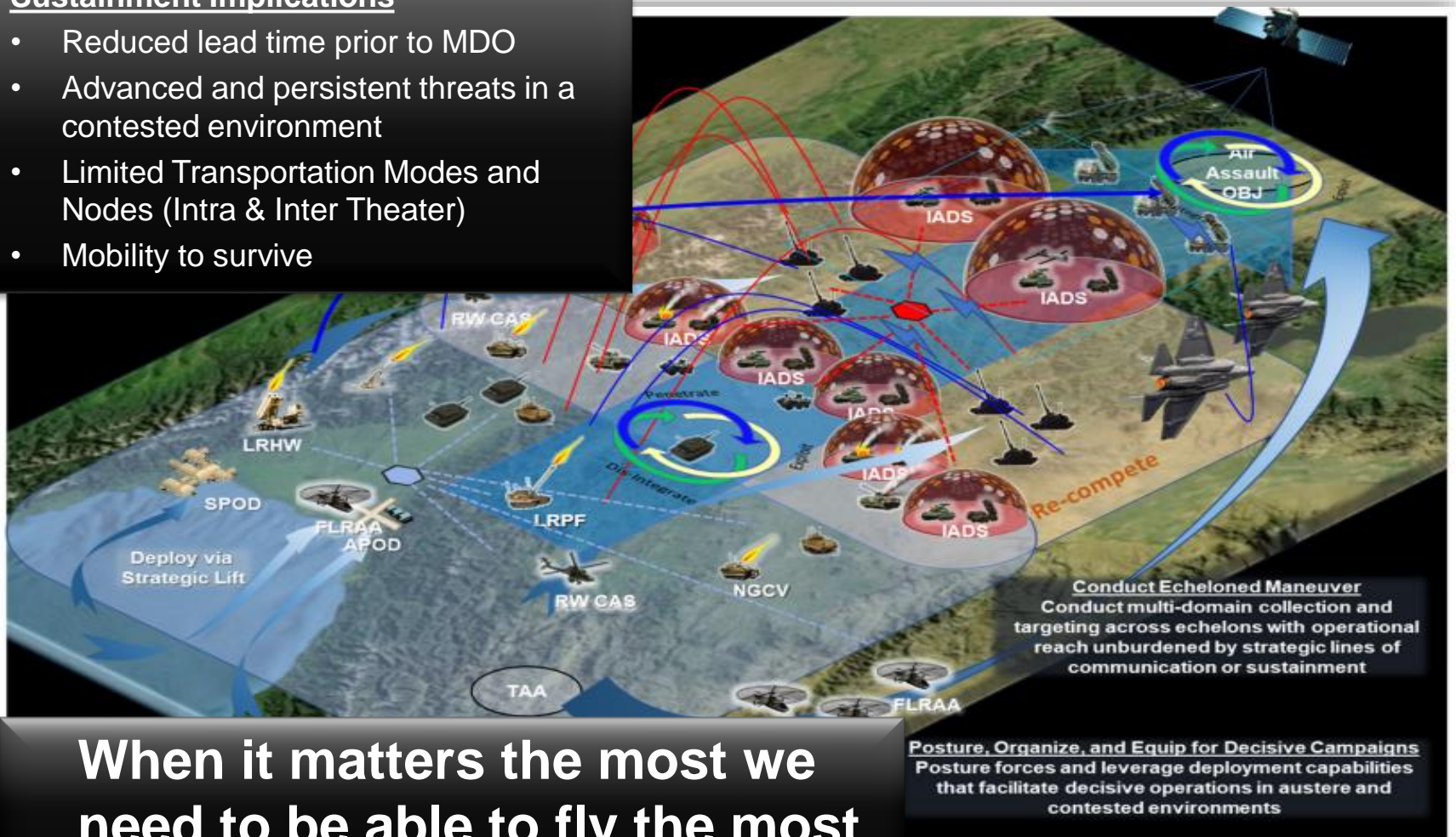




Sustainment in LSCO

Sustainment Implications

- Reduced lead time prior to MDO
- Advanced and persistent threats in a contested environment
- Limited Transportation Modes and Nodes (Intra & Inter Theater)
- Mobility to survive



**When it matters the most we
need to be able to fly the most**





Army Aviation Enterprise Sustainment Strategy

LOE 1:
Future Fleet
Acquisition &
SUST Modernization

LOE 2:
Enduring Fleet
Acquisition & SUST
Modernization

LOE 3:
Fleet Sustainment
Capacity and
Capability Integration

LOE 4:
SUST Processes,
Practices and
Doctrine

LOE 5:
Organization &
Personnel Force
Development

LOE 6:
Sustainment
Requirements and
AESM Integration

LOE 7:
Sustainment
Policy, Regulation
and Reporting

MEANS

WAYS

ENDS

VISION

Provide Army Aviation generating and operational maneuver forces integrated aviation sustainment capability, capacity and sustainment infrastructure that supports an agile, adaptive and modernized expeditionary aviation force capable of winning during Large Scale Combat Operations across Multiple Domains

AESM OPRs

FVL CFT

PEO AVN

AMCOM

USAACE DOTD

USAACE OPFD

HQDA G3/5/7

HQDA G4 AVN

AFC – CDID

TRADOC CoEs

/ CASCOM

OPERATIONAL ENVIRONMENT: Large Scale Combat Operations across Multiple Domains – (Maritime, Air, Land, Cyber and Space)

NEAR-TERM
2019-2021

MID-TERM
2022-2028

FAR-TERM
2029-2034

LOE 1 - Future AV Fleet Acquisition and Sustainment Modernization

LOE 2 - AV Fleet Acquisition, Sustainment and Integration

LOE 3 - AV Fleet Sustainment Capacity and Capability Integration

LOE 4 - AV Sustainment Processes, Practices and Doctrine

LOE 5 - AV Organization & Personnel Force Development

LOE 6 - AV Sustainment Requirements and AESM Integration

LOE 7 - AV Sustainment Policy, Regulation and Reporting

R
E
A
D
I
N
E
S
S

OBJECTIVES

Expeditionary
Aviation
Force

Reduced
Logistics
Footprint

Increased
Organic
Capability

Improved
Operational
Availability

Decreased
Total Life
Cycle Costs

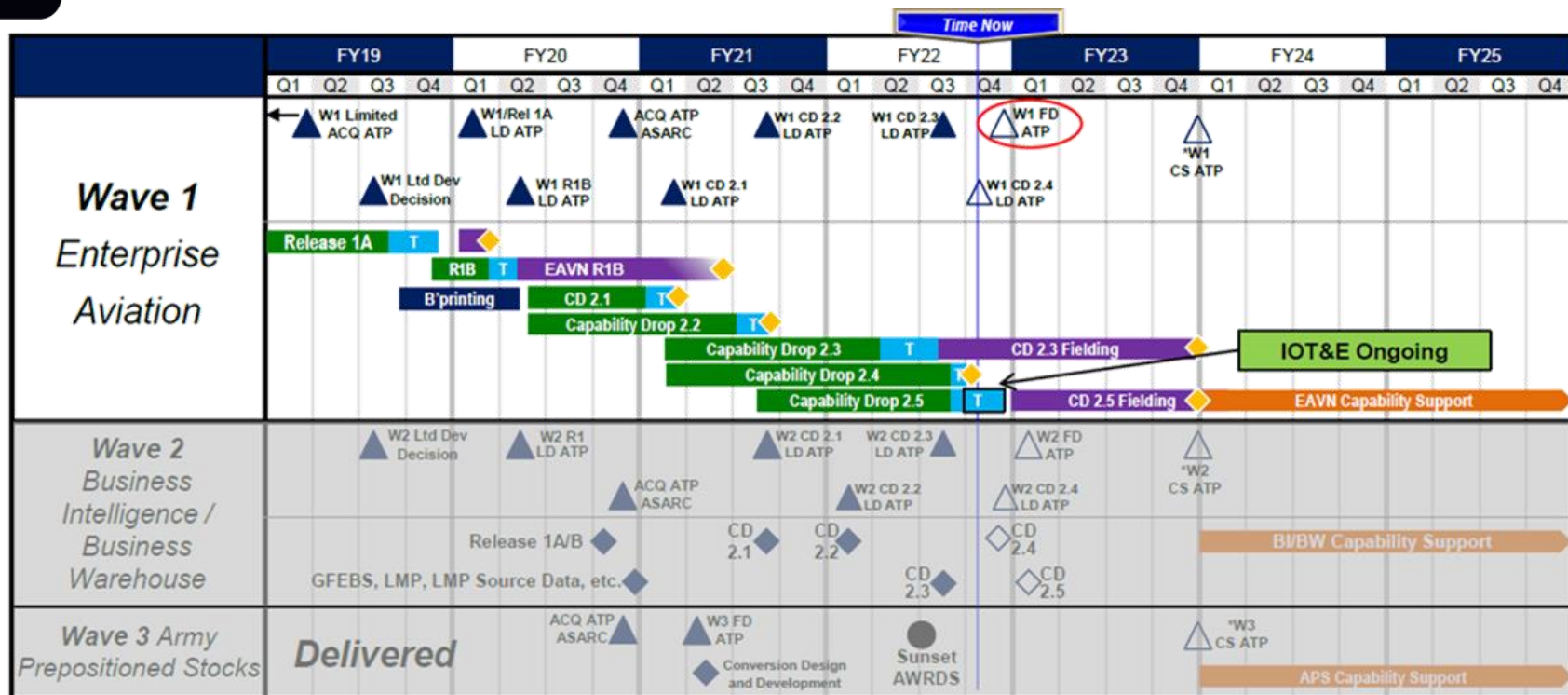
ENDSTATE

Integrated Army and Army Aviation sustainment and maintenance capabilities supporting LSCO across Multiple Domains. Leveraging Army and Army Aviation Enterprise equities providing fiscally sound expeditionary readiness, increased reliability and aligned and modernized sustainment forces with the same fidelity as future force system and maneuver force development



U.S. ARMY

Seeing Ourselves



Release 1A: Aviation Master Data maintained in AESIP Hub
 Release 1B: Aviation 2410 Equipment Records in G-Army;
 Record Off-Platform 2410 component maintenance in G-Army

CD 2.1: Aircraft Logbook Data (1) – Faults, Hours, Operational Status
 CD 2.2: Aircraft Logbook Data (2) – Weapon Data and Aviation
 Readiness

CD 2.3: Integrated Tech Supply, Aircraft Historical Records
 CD 2.4: 2410 Process (sunset interface from ACN to MCDS)
 CD 2.5: End-to-End DMA, MWO, Safety Message Tracking

Legend

Design Develop Test Field Sustain

▲ Completed Program Milestones	△ Incomplete Program Milestones
◆ Completed Event	◇ Incomplete Event
● Program Sunset	◆ Release/Capability Drop Complete

ACQ – Acquisition
 APS – Army Prepositioned Stock
 ASARC – Army Systems Acquisition Review Council
 ATP – Authority To Proceed
 AWRDS – Army War Reserve Deployment System
 CD – Capability Drop

CS – Capability Support
 Dev – Development
 EAVN – Enterprise Aviation
 FD – Full Deployment
 GFEBS – General Fund Enterprise Business System
 IOT&E – Initial Operational Test & Evaluation

LD – Limited Deployment
 LMP – Logistics Modernization Program
 Ltd – Limited
 R/Rel – Release
 W – Wave

* Pending AAE Approval to combine Waves 1, 2, and 3 CS ATPs





Where we need your help

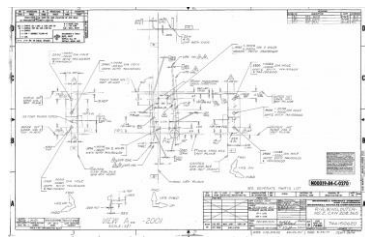
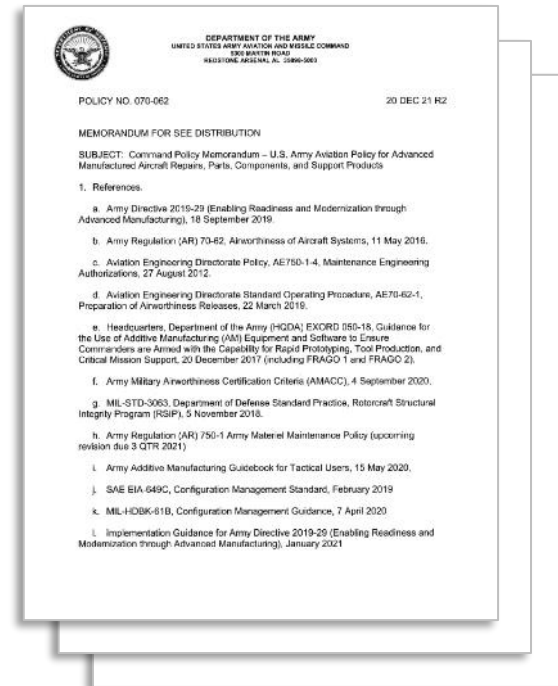
- Assisting the PMs with cataloging of current parts
- Ensuring new systems can be ingested within Army ERPs



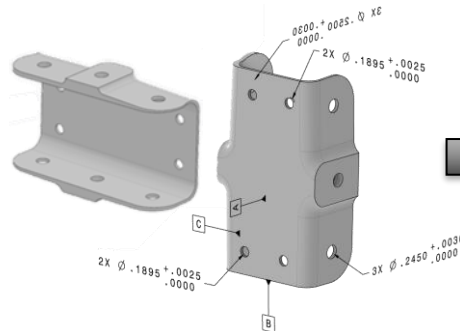
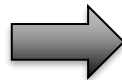


Advanced Manufacturing

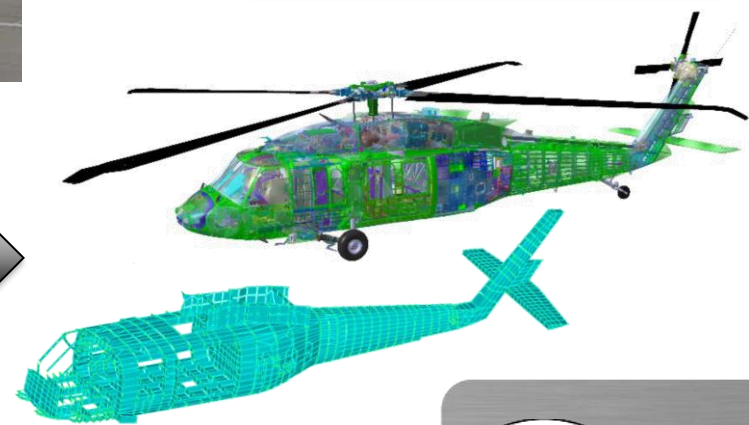
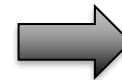
- Airworthiness Policy
- Digital Twins



2D Drawings



3D Drawing





Where we need your help

- Participate in our policy development
- Design in a 3D environment
- Work with us on the IP





- Use of data to reduce maintenance burden
- Establishing Standards





Where we need your help

- Actively look for ways to minimize requirements
- Get on board with common standards for the industry





Sharing of Information

- AM tools
- Heavy Metal Alternatives

AMCOM Hexavalent Chromium Technology Exchange

Date: 8 August 2022 @ 0800 CDT

Location: Redstone Arsenal - Bldg 5309 (Sparkman Center) or Microsoft TEAMS

Invite/RSVP: <https://einvitations.afit.edu/inv/anim.cfm?i=686756&k=0469440E7E51>

MS TEAMS Link: https://dod.teams.microsoft.us/l/meetup-join/19%3adod%3ameeting_e2220ee283d840d9829dfc67f377d60a%40thread.v2/0?context=%7b%22Tid%22%3a%22fae6d70f-954b-4811-92b6-0530d6f84c43%22%2c%22Oid%22%3a%223b44b1e7-a2f7-4f22-9416-0d061332b64c%22%7d





Questions





Aviation Industry Day 2022

Future Vertical Lift CFT Update

COL Chad Chasteen

FVL CFT Operations Director

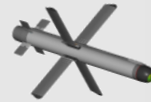




Additional Program Highlights

Long Range Precision Munition

- 4Q FY22 shoot-off.
- Inform performance and reliability characteristics



Air Launched Effects

- Updated A-CDD for ALE-Small and ALE-Large
- Swarming, EWS



High Endurance Aerial Tier Network Relay

- A-CDD informed through EDGE21, PC21, EDGE22
- PC22 expands payloads and operational roles



T901 Improved Turbine Engine

- On course for 1Q FY23 delivery FARA vendors



Modular Effects Launcher

- Demonstrated at PC21 and EDGE 22
- ALE drones, rockets, Hellfire launch complete



XM915 20mm Rotary Cannon

- >50% of 150k round test plan complete
- Dispersion, reliability, and environmental





Closing Comments

Future Attack Reconnaissance Aircraft



*Survivable, lethal
in the lower tier of
the air domain*

*Increased speed,
range, endurance
to penetrate,
disintegrate IADs*



Future Long Range Assault Aircraft

*Multi-role, long
range platform for
MEDEVAC,
assault, resupply*



*Increased speed,
range, endurance,
maneuverability for
MDO*

Future Tactical Unmanned Aircraft Systems



*VTOL, C2
on the move*



*Scalable
control*



Modular Opens Systems Approach





U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND AVIATION & MISSILE CENTER

APBI USAACE

Mr. Jeffrey Langhout
Director, DEVCOM Aviation & Missile Center

DISTRIBUTION STATEMENT A.
Approved for public release:
distribution unlimited.



PRIMARY MISSION AREAS

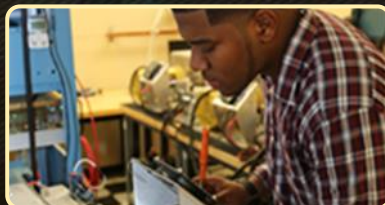
1.

Develop and integrate next generation technologies to ensure aviation and missile dominance.



2.

Provide world class functional engineering expertise to our PEOs, MDA, RCCTO, and other critical partners.



3.

Provide world class sustainment engineering expertise to our AMCOM partners.



4.

Recruit and develop the engineering talent to achieve areas 1-3.





BY THE NUMBERS

12,367
FY22 Strength



2,983
Civilian

26
Military

~9,358
Contractor

FY21 Funding

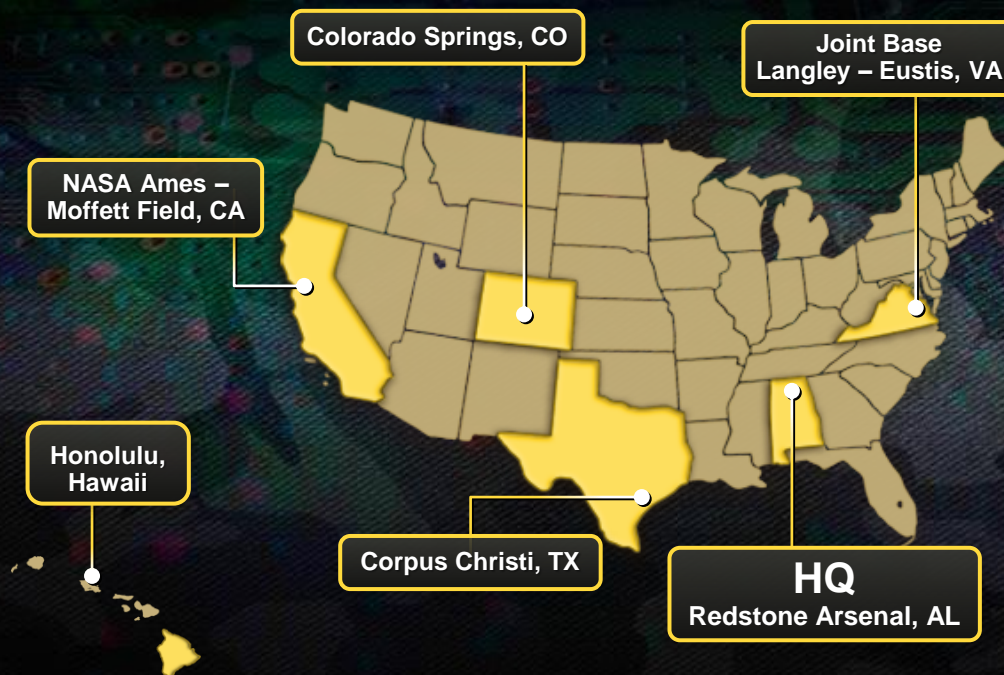
\$4.4B

6%
Aviation S&T

5%
Missile S&T

68%
Army

21%
Other



Core Competencies

Science and Technology:

- Missile Seekers, Guidance, Navigation and Control
- Missile Materials and Structures
- Missile Propulsion, Warhead Integration, and Fuzing
- Air Defense Sensors & Fire Control
- Aviation Platforms & Air Mobility
- Aviation Autonomy, Teaming, Avionics & Survivability

Life Cycle Engineering:

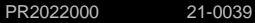
- Airworthiness
- Product Performance
- Modeling and Simulation
- Multidiscipline Acquisition and Project Engineering
- Prototype Design and Development
- Software Engineering
- Systems Engineering, Integration, and Interoperability
- Weapons Assurance



S&T CONTRACT UPDATES

DESCRIPTION	OBJECTIVE	TYPE	EST. \$	FUTURE AWARD DATE
End to End (E2E) Survivability	Develop a team based, real time Holistic Survivability planning capability that includes susceptibility and vulnerability reduction behaviors for significantly improved mission effectiveness. This builds upon the SAINT program ownership capability extended to the Blue Force team operating in a peer threat environment.	CPFF - IDIQ	\$20M 4 Year Contract (2-3 awards)	Aug-23
Improved Fuel Cell Program	Develop a next generation fuel cell for rotorcraft that provides improved ballistic tolerance and crash resistance at a much lower weight.	CPFF - IDIQ	\$3M 3 Year Contract	Jan-23
Complex Advanced Teaming Operations (CATO) Subsystems Technologies	<p>Develop and demonstrate Advanced Teaming technologies needed to facilitate collaborative MUM-T operations in complex environments.</p> <ul style="list-style-type: none"> •Leverage and enhance existing Advanced Teaming and Air Launched Effects products •Address unique challenges associated with autonomy, teaming, range, communication, navigation and mission operations in maritime and urban environments •Sustain MOSA strategy for rapid insertion and affordability 	<p>BAA in FY23</p> <p>Cost Based Contracts & Agreements</p>	TBD	4QFY23-FY24
R&D Support for DEVCOM AvMC	The objectives are to provide hardware development and delivery for air and ground-based weapons technologies to identify current threats, system vulnerabilities, and develop solutions to provide engineering & programmatic support for aviation and ground mission systems and platforms in support of the DEVCOM AvMC.	OASIS	\$248M 5 Year Contract	Apr-23
Aviation Missile Technology Consortium (AMTC) OTA	Transaction Agreement to foster collaboration among government, industry, and academia to develop, transition, and mature innovative aviation and guided weapons systems technologies to rapidly and affordably enhance warfighter lethality, survivability, and combat effectiveness.	Other Transaction	\$10.2B 10 Year Vehicle	Awarded (Available for Use)

ON THE MOVE



AGILE MANEUVER TO CONTACT



Program Executive Office, Aviation

Army Aviation Industry Days Expo

Modernizing Aviation for Large Scale Combat Operations



BG Rob Barrie

Program Executive Officer, Aviation

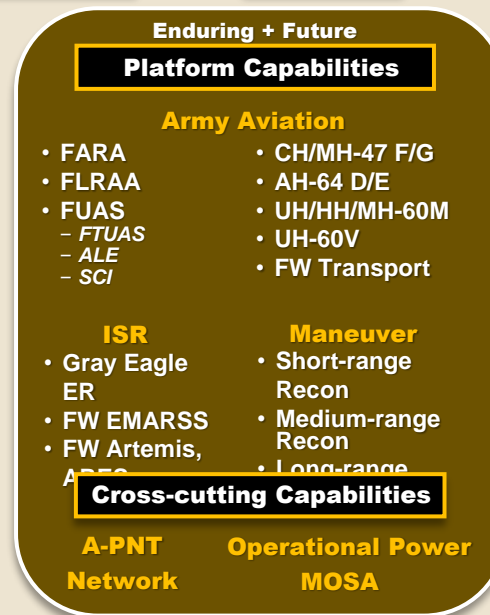
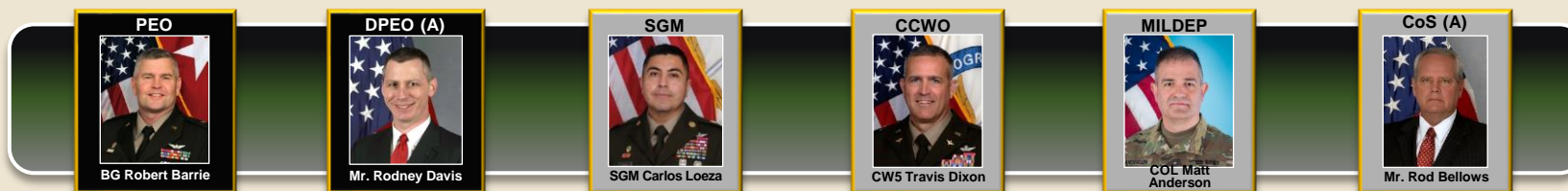
DISTRIBUTION STATEMENT A:
Approved for Public Release.
Distribution Is Unlimited.

3 August 2022



PEO Aviation

As of 22 July
2022





PEO Aviation – Aligned and Future Focused with Army Objectives



Modernize, Equip, and Sustain the Army of 2030 to Successfully Conduct MDO as Part of an Integrated Joint Force



Cultivate More Equipped, Capable, and Interoperable Allies and Partners

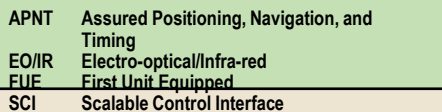


Foster a Diverse and Professional Workforce That Enables an Agile and Innovative Acquisition Enterprise





FTUAS





Advancing Air Launched Effects (ALE) Solutions with MOSA

Air Launched Effects (ALE) Prototyping & Technical Maturation Initiatives

ALE-Architect
Defined ALE MOSA architecture driving integration **across** platforms and sensors

ALE-Weapon System
Integrate MOSA components for a **fully functional ALE**

ALE-Enablers
Provide MOSA compliant components **to** the weapon system

All efforts converge to baseline capability

Scalable Control Interface

ALE-S Prototype

ALE-L Prototype

FY28

Aligned with FVL Ecosystem

ALE Production/Fielding SMALL and LARGE Solutions

FY25 Initial Operational Capability (IOC) Milestone

Army 2030

ALE Program Priorities

- ALE designed to achieve the Modernized Attack/Recon Ecosystem
- Initial Mission Set: DILR (Detect, Identify, Locate, Report) and Decoy
- Maximum transfer of ALE related S&T into the program
- MOSA designed, produced, and sustained



PM AMSA - Aviation Mission Computing Environment

AMCE Inc 1

Mod/Conf. Proc

Processing

Open Sw Arch

Open Transports

Graphical Interfaces

Sw Field Loading

BSP Decoupling

DAL Coverage

- **Matures and Brings Expanded Relevancy of AMCE**
- **Introduces Product Line Approach to Mission Computing**
 - Enables Reusable Hardware/Software Components
 - Leverages Inc1 Hardware/Software Resources
- **Multi-DAL Safety Critical Hardware/Software**
- **Landing Pad for Future Capabilities such as JADC2**

AMCE Inc 2

Mod/Conf. Proc

Processing

Open Sw

Open Transports

Graphical

Interfaces

Sw Field Loading

BSP Decoupling

DAL Coverage



AMCE FoS

Informed By:
DAL Requirements

Enterprise Opportunities

Existing Processing Resources



AMCE Increment 1: Aviation Mission Common Server (AMCS)

AMCE Increment 1 Drives Key Technical and Business Changes to How We Operate

- **Family of Systems** (Multiple Form Factor LRUs)

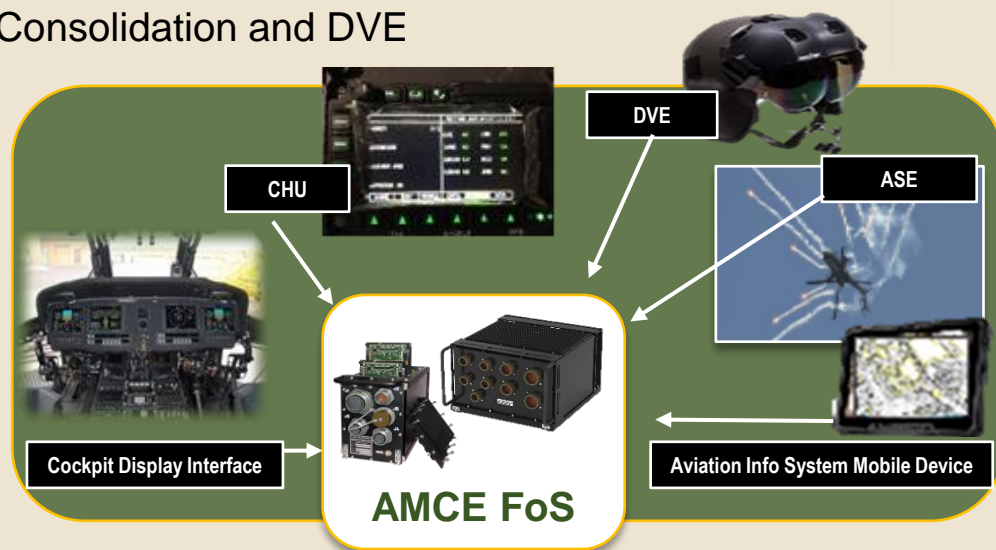
- LRU1 is a Form-Fit **Replacement for IDM 401 with 50x Computing Power**
 - **IOC FY25** Enabling Air Ground Network Radio (**AGNR**)
 - DVE Capable Processing
- LRU2 is Larger Form Factor, Targeting ASE Consolidation and DVE

- **Modular/Configurable Processing**

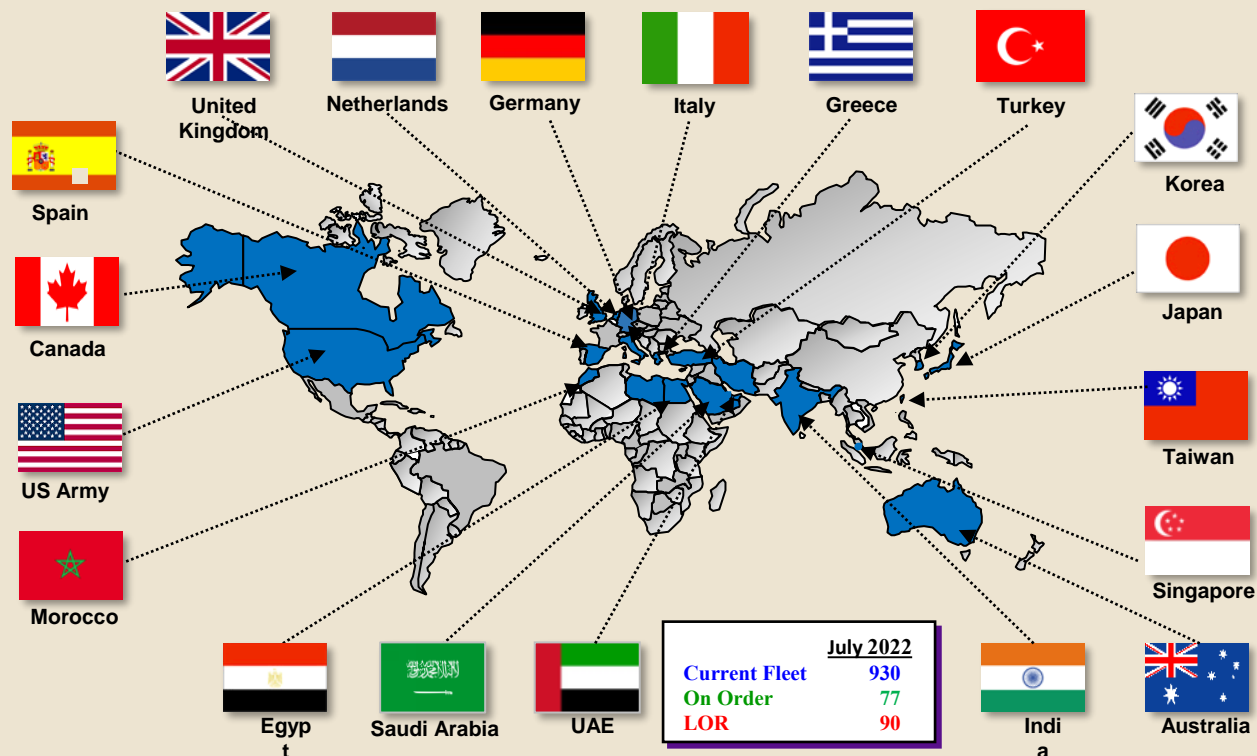
- **Open Software Architecture**

- Breaks Vendor Lock; 1 Capability \neq 1 LRU

- Enables  Approach



CH-47 Foreign Military Sales (FMS) Efforts



Production

CH-47F Block I for Netherlands, Saudi Arabia, Spain, Australia recently completed

CH-47F Block II

- Scheduled to complete Engineering, Manufacturing and Development (EMD) in FY23
- Finalizing remaining requirements for a Systems Verification Review in the next 1+ year
- Ongoing test and assessment efforts in anticipation of Production Decision

On The Horizon

Interest in Extended Range (ER) and Air-to-Air Refueling (AAR) CH-47F Capability

Countries represented include both Foreign Military Sales and Direct Commercial Sales
CH-47F Block 1 and CH-47D Sustainment in highlighted countries



Closing Comments and Questions



Website

<http://www.army.mil/peoaviation>

Facebook

<http://facebook.com/peoaviation>

DVIDS

<https://www.dvidshub.net/unit/PEO-A>

LinkedIn

<https://www.linkedin.com/company/peo-aviation>





AMERICA'S ARMY

People First - Winning Matters

U.S. ARMY

HQDA | DCS | G-3/5/7



OVERALL CLASSIFICATION: **UNCLASSIFIED**



HQDA, G-3/5/7, DAMO-AV

MG Taylor

Director, Army Aviation

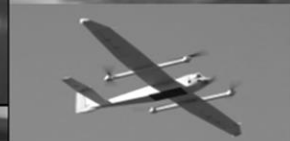
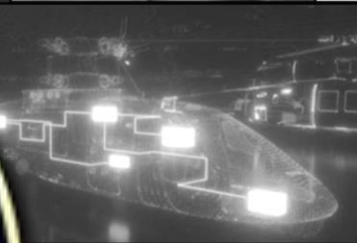
3 August 2022



ARMY AVIATION

DECISIVE IN LAND WARFARE

Modernization Overview



Colonel Josh Higgins
Capability Development and Integration
U.S. Army Aviation Center of Excellence

3 August 2022



Purpose: Provide Aviation Industry Day Participants with information on key US Army Aviation capability development activities

Agenda:

- CDID Organization
- Vision, Mission, Key Tasks
- Concepts-to-Capabilities
- Pacing Threats
- Army Concept for Aviation
- DOTMLPF-P Approaches
- Modernization Priorities
- Discussion / Questions

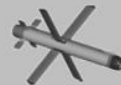
Future Attack Reconnaissance Aircraft



Future Long Range Assault Aircraft



Long Range Precision Munition



Scalable Control Interface



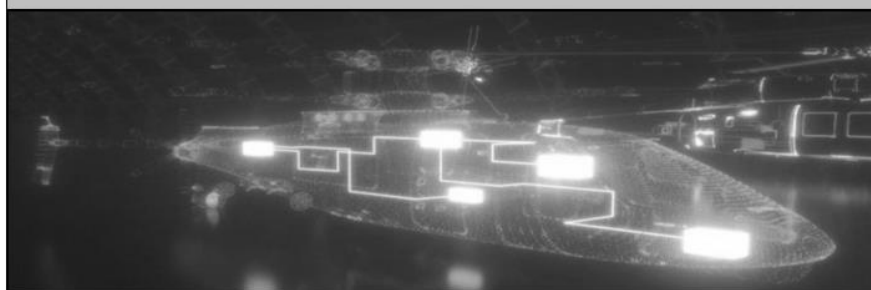
Air Launched Effects

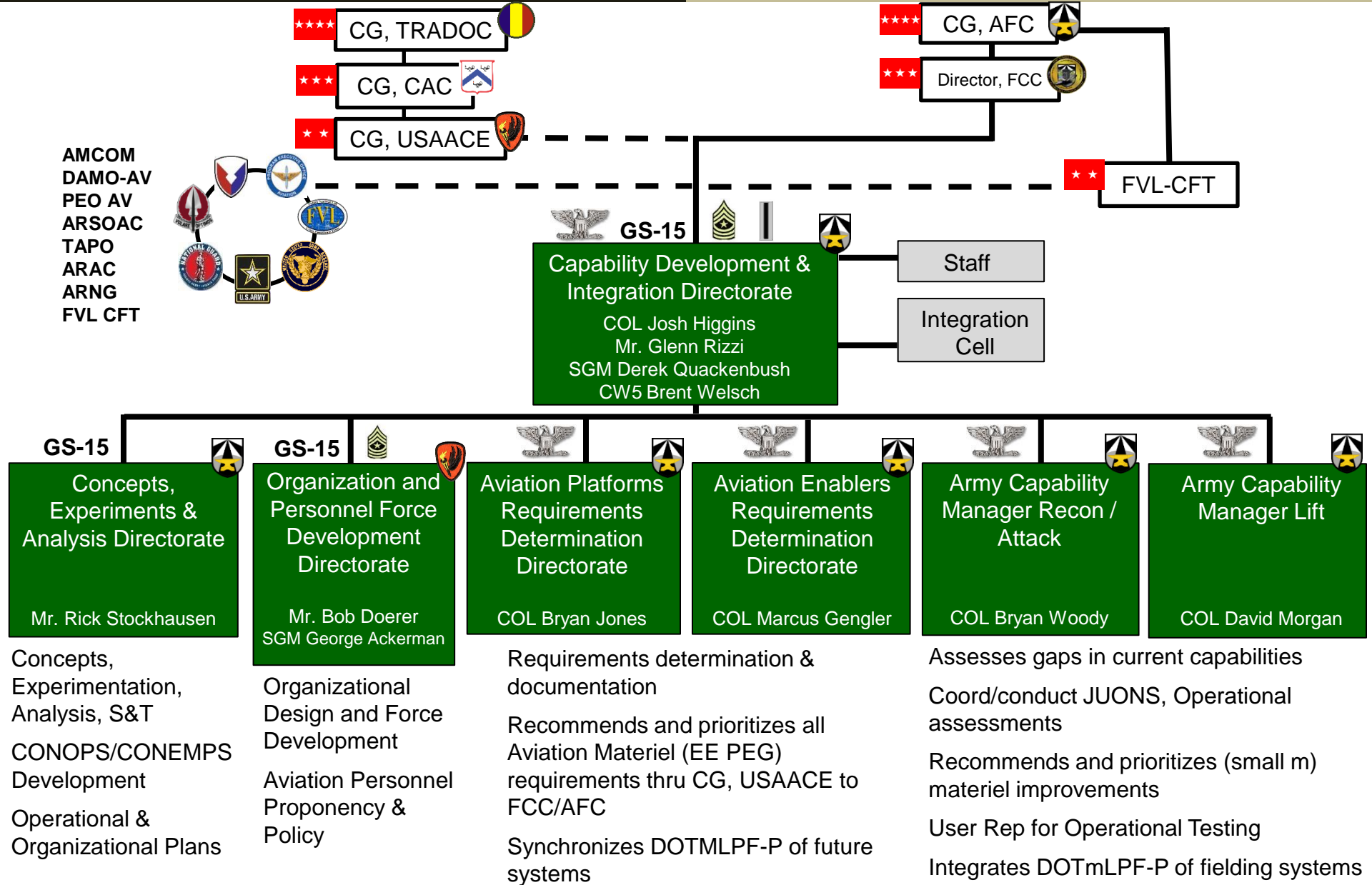


Future Tactical UAS



Modular Open System Approaches







Vision

The Aviation CDID is a cohesive team of highly effective professionals focused on developing future warfighting concepts and organizations while executing comprehensive analysis to set the foundation for modernizing Aviation capabilities through the integration and synchronization of the Modernization Enterprise to win in Large Scale Combat Operations.

Mission

Aviation CDID develops future concepts, supported by comprehensive experimentation and analysis to develop required capabilities and force structure integrated across the DOTMLPF-P to build readiness and field the best Aviation force for our nation.

Key Tasks

- **Concepts:** Develop future operational and organizational concepts for Army Aviation
- **Experimentation:** Conduct experimentation, analysis and studies to identify capability gaps, assess risks and validate concepts for DOTMLPF-P modernization solutions
- **Requirements:** Develop Material and non-Material capability requirements for both the enduring and future fleet of aircraft and enablers
- **Integration:** Develop, synchronize and execute Aviation modernization strategies through prioritized investments into Reach, Survivability, Lethality and Sustainment





National Defense Strategy National Security Strategy National Military Strategy Army Strategy
Combatant Commander Operational Needs Joint Warfighting Concept Army Operating Concept

Concepts

Studies / Experiments /
Demos / Prototypes

Requirements

Integration

Army Aviation
must:

See
Move
Strike

Theater Fires
Formation Design
Echelons

Joint / Multi-national
Warfighting

Overmatch near-peer
adversaries across multiple
domains requires
increased:

Reach
Survivability
Lethality
Sustainment

at MDO-relevant
distances

Doctrine
Organization
Training
Materiel
Leadership
Personnel
Facilities
Policy



Concepts and analysis inform the DOTMLPF-P solutions required to ensure dominant Aviation fires and maneuver throughout Large Scale Combat and Multi-Domain Operations

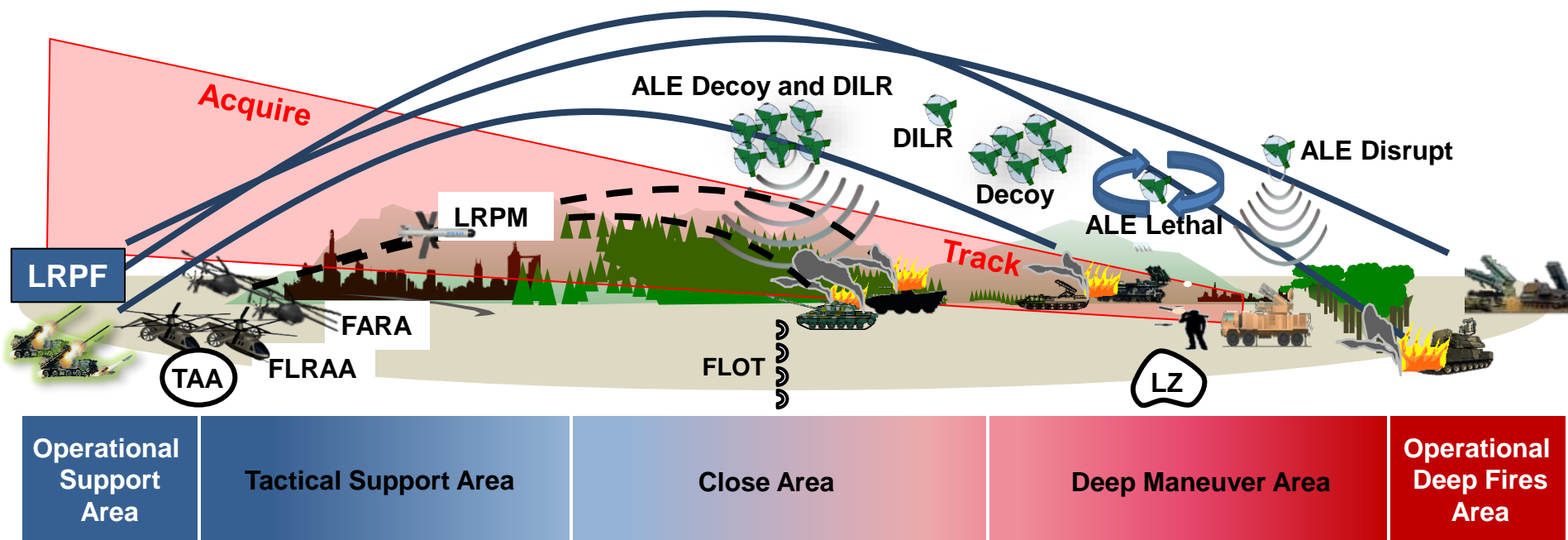


Advanced Threat A2/AD systems create multiple layers of stand-off:

- MANPADs
- SAMs
- Active and Passive Detection
- Lethal and Non-Lethal Effects

Army Aviation will operate across the full breadth of the theater – exploit IADS limitations:

- Decisive in the Lower Tier of the air domain
- Integrate operations as part of the Combined Arms / Joint Force
- Advanced TTPs – terrain masking / avenue of approach selection
- Agile ASE – rapid technology insertions
- **Increased Speed, Range, Endurance = Survivability**



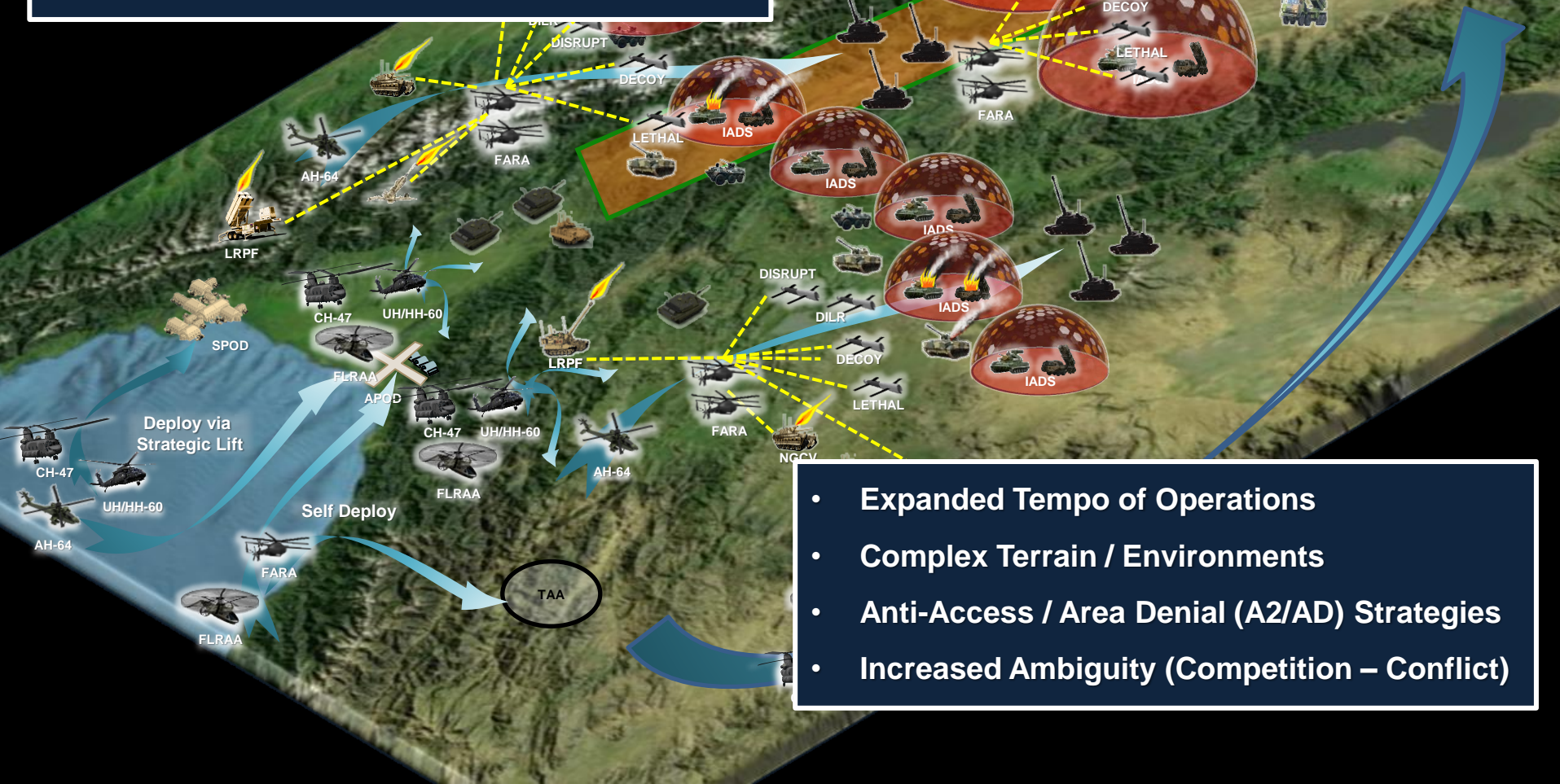


ARMY AVIATION

DECISIVE IN LAND WARFARE

The Operational Environment

- Contested in all Domains
- 'Congested' in all Domains
- Operations Expanded in Space and Time
- Increased Lethality



- Expanded Tempo of Operations
- Complex Terrain / Environments
- Anti-Access / Area Denial (A2/AD) Strategies
- Increased Ambiguity (Competition – Conflict)



Problem

Based on the Future OE, how does Army Aviation conduct air-ground operations in support of Army/Joint forces in multi-domain operations?

Required Capabilities

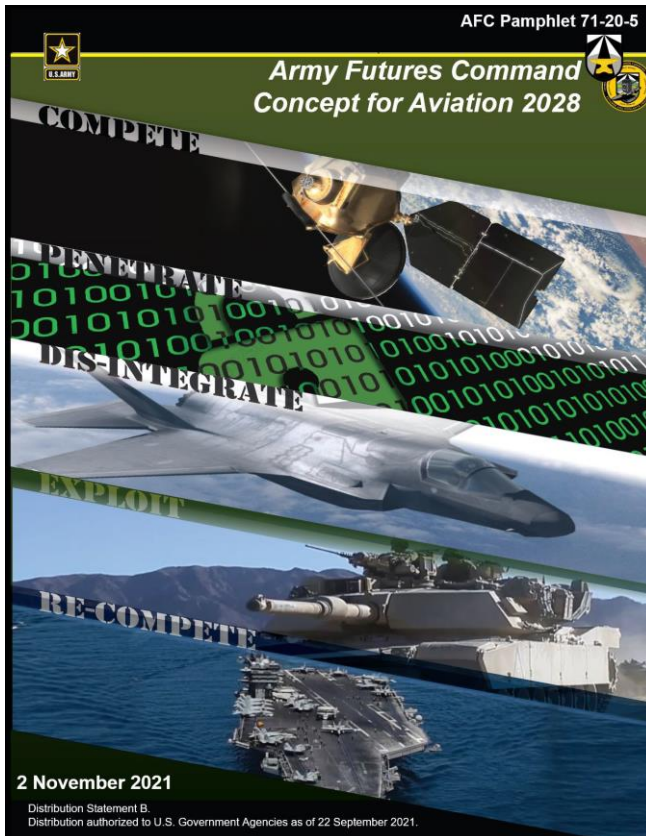
Extend Reconnaissance and Security Reach – **See**
Move Personnel, Equipment and Supplies by Air – **Move**
Destroy or Neutralize Enemy Forces – **Strike**

Enabled by:

Aircraft and Aircrew Survivability
Sustainment and Maintenance
Command and Control

Central Idea

Army Aviation increases **Reach**, **Survivability**, **lethality** and **Sustainment** to enable Army forces, as an element of the Joint Force, to prevail in competition; penetrate, dis-integrate, and exploit to defeat adversaries in armed conflict; and consolidate gains to force a return to competition on more favorable terms.





ARMY AVIATION

DECISIVE IN LAND WARFARE

Army Aviation DOTMLPF-P Execution

1 Jan 2021

United States Army Aviation
2021 DOTMLPF-P Integration Plan

FM 3-04
Army Aviation

Table of Contents

Introduction

Army Aviation Modernization Decision Points

Chapter 1. The U.S. Army Concept for Aviation

1-1. Introduction

1-2. Logic Map

1-3. How Army Aviation will contribute to solving MDO problems

1-4. Aviation Contributions to Competition

1-5. Aviation Contributions to Armed Conflict

1-6. Aviation Contributions to Return to Competition

Chapter 2. Army Aviation Modernization Framework & Central Narrative

2-1. Description

2-2. Nesting with the Arm Plan (TAP) and Army Modernization Strategy

2-3. Enabling Army Aviation to Execute MDO

2-4. Army Organizing for MDO

2-5. Readiness

2-6. Aviation's Central Narrative and Roadmap Overview

2-7. Risk

Chapter 3. Aviation DOTMLPF-P Modernization

3-1. Doctrine

3-2. Organization

3-3. Training

3-4. Materiel

3-5. Leader Development

3-6. Personnel

3-7. Facilities

3-8. Policy

Chapter 4. Conclusion

Appendix A. Aviation Science and Technology

Appendix B. Experimentation, Analysis and Learning

Acronyms

ARMY AVIATION
EQUIPMENT MODERNIZATION
STRATEGY

Table of Contents

Army Aviation Vision.....3

Purpose.....3

The Strategic Environment.....3

Army Aviation Required Capabilities.....6

Gaps.....6

Ends.....8

Ways.....8

Means.....10

Targeted Modernization.....12

Army of 2030.....22

Conclusion.....26

Annex A: Lethality

Annex B: Unmanned Aircraft Systems

Annex C: Aircraft Survivability Systems

Annex D: Aircrew Survivability Systems

Annex E: Degraded Visual Environment Systems

Annex F: Communications Systems

Annex G: Mission Command / MOSA Systems

Annex H: Tactical Sustainment

Annex I: Experimentation

Table of Figures

Figure 1: Pacing Threats

Figure 2: Army Aviation in MDO

Figure 3: Aviation Gaps

Figure 4: AAEMS Ways, Means, Ends

Figure 5: Modernizing the Aviation Force

Figure 6: Top Aviation Priorities Roadmap

May 2022

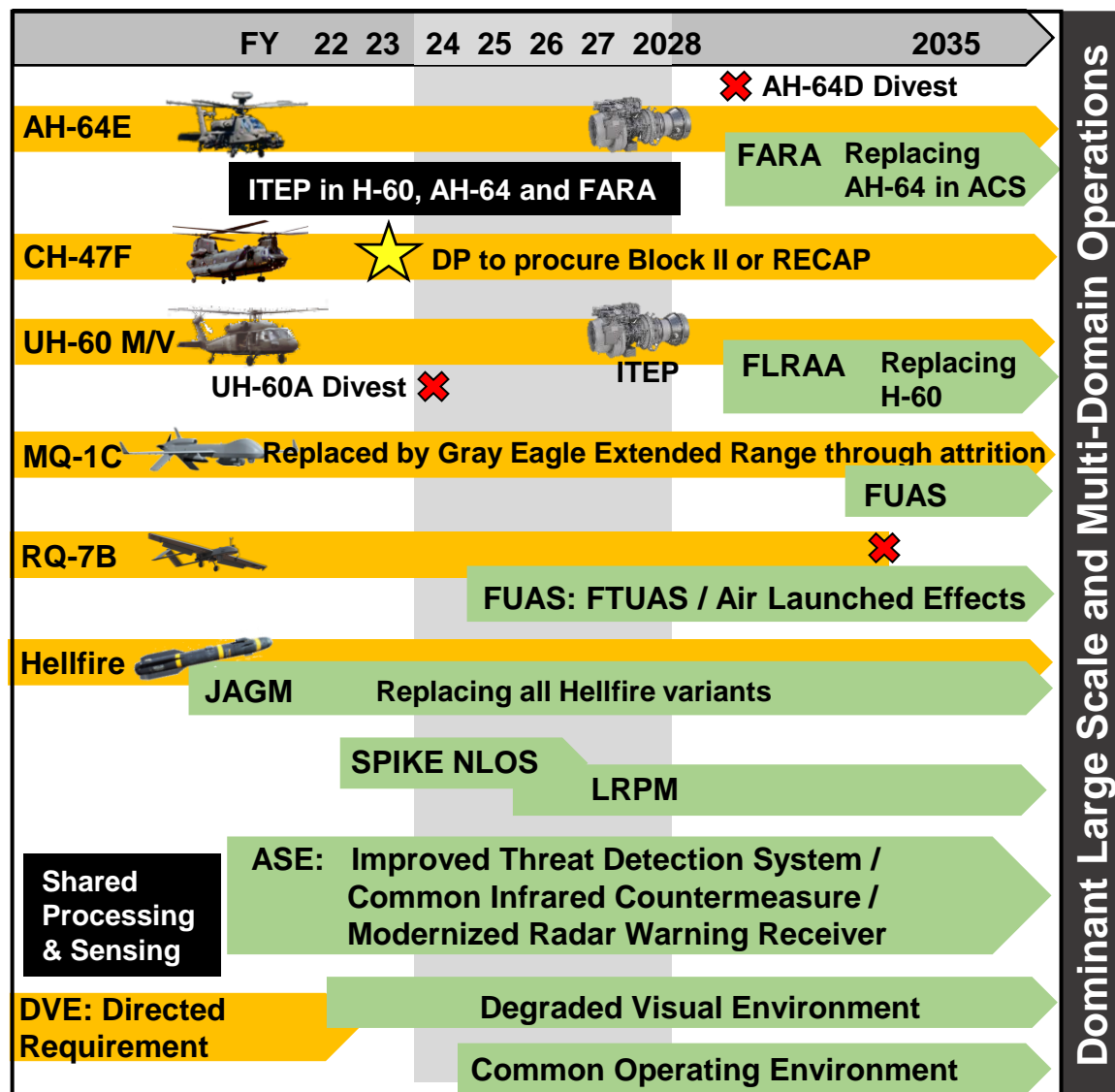
Controlled By: OPS

Category: OPS

Distribution / Dis

POC: COL Jos

Army Aviation is changing the way we are trained, organized and equipped for Large Scale Combat and Multi-Domain Operations



Top Aviation modernization priorities:

- Future Attack Reconnaissance Aircraft
- Future Long Range Assault Aircraft
- Future Tactical UAS
- Scalable Control Interface
- Air Launched Effects
- Long Range Precision Munitions
- Improved Turbine Engine
- Aircraft Survivability Equipment / DVE
- Modernized Munitions
- Targeted Modernization of enduring aircraft and enabling capabilities





Questions?





Aviation Industry Days 2022

FVL CFT Experimentation Update

COL Chad Chasteen

FVL CFT Operations Director



Participants: 23 x DoD Organizations, 5 x CFTs +ISR TF, AI2C

7 x International Partners

67 Technical Objectives:

- Network: Cross-Domain Solution + Interoperability
- Interactive Drone Swarm (Advanced Teaming/ Adaptive C2)
- Reach (Physical & Digital)
- Electronic Warfare: Sense, Attack, C-UAS
- Fires

17 FVL Related Technologies + Enhanced Sustainment

34 First Time Events:

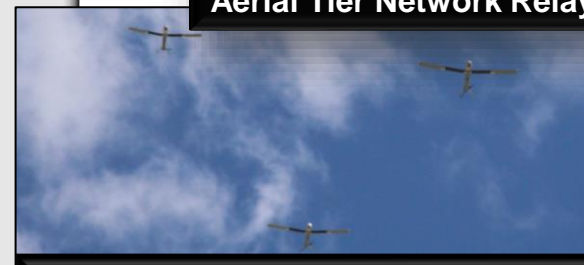
- Network (+IMPACT)
- Air Launched Effects-Small swarm
- Air Launched Effects-Large
- Coalition Interoperability
- APR-39 D(V)2
- Full Spectrum Targeting (FST)
- Deep Autonomous Recon & Targeting System (DARTS)
- Integrated Visual Augmentation System (IVAS) + APARI
- Multiple Simultaneous Engagement System (MSET)
- Aerial Tier Network Relay and SIGINT (Kraus)
- Modular Effects Launcher (MEL) with EWS
- Scalable Control Interface (SCI)
- Grizzly (AI2C)



Modular Effects Launcher (MEL)



Aerial Tier Network Relay (Kraus)



Drone Swarm (Wolfpack)



Interoperability

Upcoming Events

- **PROJECT CONVERGENCE 22**
- **NETMOD X**
- **PNTAX**
- **NORTHERN EDGE 23**

Highlights

- **Teaming** with various DoD and Industry partners
- Experimentation against **live threat emitters**
- **Soldier Touchpoints** with Division HQs, Combat Aviation Brigade, and Ground Force
- **FVL Technology Focus Areas**
- **Network** Cross Domain & Reach
- **Multi-INT Sensors**
 - ALE behaviors - Advanced Teaming
 - Adaptive C2 with innovative sensors
 - ATR, AI, FST
- **Electronic Warfare**
- **Modular Open System Approach**
 - Modular Effects Launcher (MEL)
 - Easily swappable tailorable mission payloads





Closing Comments

Future Attack Reconnaissance Aircraft



*Survivable, lethal
in the lower tier of
the air domain*

*Increased speed,
range, endurance
to penetrate,
disintegrate IADs*



Future Long Range Assault Aircraft

*Multi-role, long
range platform for
MEDEVAC,
assault, resupply*



*Increased speed,
range, endurance,
maneuverability for
MDO*

Future Tactical Unmanned Aircraft Systems



*VTOL, C2
on the move*



*Scalable
control*



Modular Opens Systems Approach





FY22 USAACE Industry Days

PM AMSA Update



COL Burr Miller

Project Manager
Aviation Mission Systems & Architecture

COL Marcus Gengler

Director
Aviation Enablers Requirements Determination Directorate

DISTRIBUTION STATEMENT A: Approved
for Public Release, Distribution Unlimited.

4 August 2022



PM AMSA Capabilities In Support of LSCO

Modernizes Legacy Fleet and establishes Initial MOSA Architecture

HOW

- Increased Operational Capability
- **Rapid** Integration and Fusion of Technology/ Capability

WHY

- Future Operational Environment
- Threat Adaptability

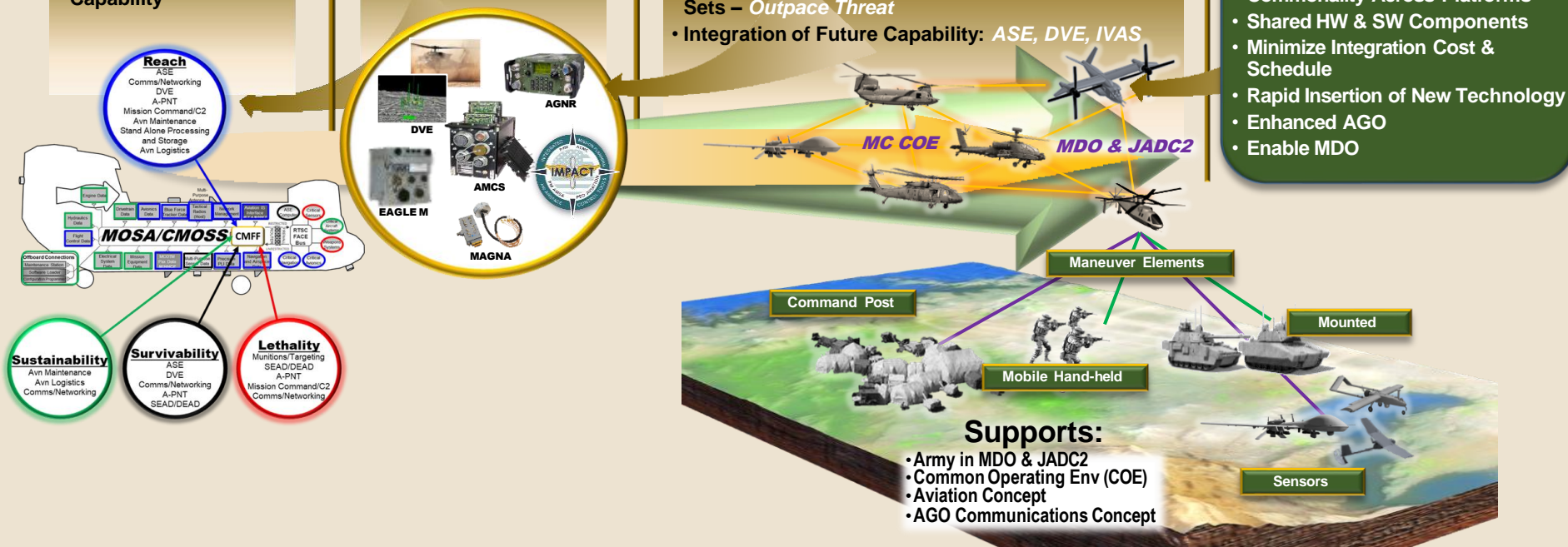
WHAT

- Aligned with **PEO Aviation MOSA Transformation**
- Facilitates MSN CMD COE Convergence
- Enables Sensor Fusion
- Delivers Capability in Bi-Annual Capability Sets – **Outpace Threat**
- Integration of Future Capability: **ASE, DVE, IVAS**

SO WHAT

Operational Benefits

- Reduce SWaP-C
- Commonality Across Platforms
- Shared HW & SW Components
- Minimize Integration Cost & Schedule
- Rapid Insertion of New Technology
- Enhanced AGO
- Enable MDO



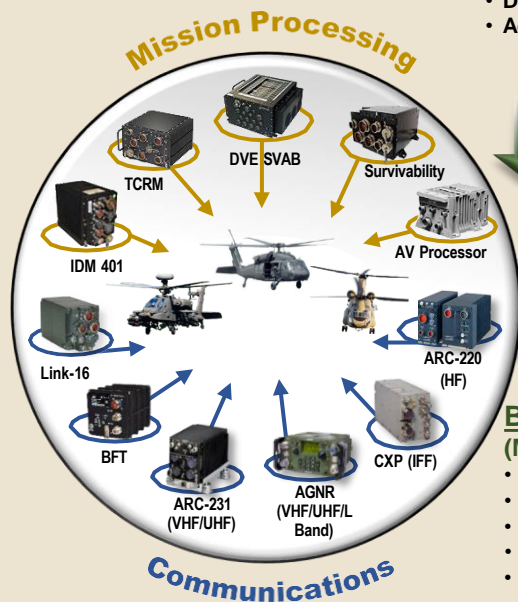


Proposed Communications and Mission System Processing Way Ahead

Transitions From LRU Designs To Modular Open System Product Line Approaches

Current State

Legacy System Boxology



ENDURING (AMCS LRU #1)

- IDM S/W App Application
- ARCM/AGNR
- E-ABE
- DVE-Lite
- Additional Apps

FVL (AMCS LRU #2)

- IDM S/W App
- ARCM/AGNR
- E-ABE
- DVE + HUEO
- ASE SW Applications
- DAMPE/ IMPACT
- Additional Apps

FUTURE (LRU TBD)

- AI/ML Apps
- Flight Control Computing
- Adjunct Processing

Future State



FY25

FY25-29

FY27-30+

FY28

FY30

FY26

Block 1 (MVP ISO FARA EMD)

- Chassis
- Initial SW Defined Radio
- Initial Crypto
- Initial Multi Layer Sec (MLS)
- Single Board Computer (SBC)

Block 2 (SPT FARA LUT)

- Additional VHF/UHF/L Band
- Link 16
- Initial Adv. Teaming
- BFT-3
- Crypto
- MLS
- IFF

Block 3 (Future Capabilities)

- MUOS
- Enhanced Adv. Teaming
- HF
- Crypto Update

Need Industry Investment In Modular HW Designs & SW Applications That Are CMOSS & FACE Conformant



ARMY AVIATION
DECISIVE IN LAND WARFARE

DISTRIBUTION A: Approved for public release; distribution is unlimited.



U.S. Army Aviation Industry Days

Fort Rucker, AL

August 4, 2022

UNMANNED AIRCRAFT SYSTEMS

COL Bryan Jones

Director, Aviation Platforms-
Requirements Determination Directorate



COL Scott Anderson

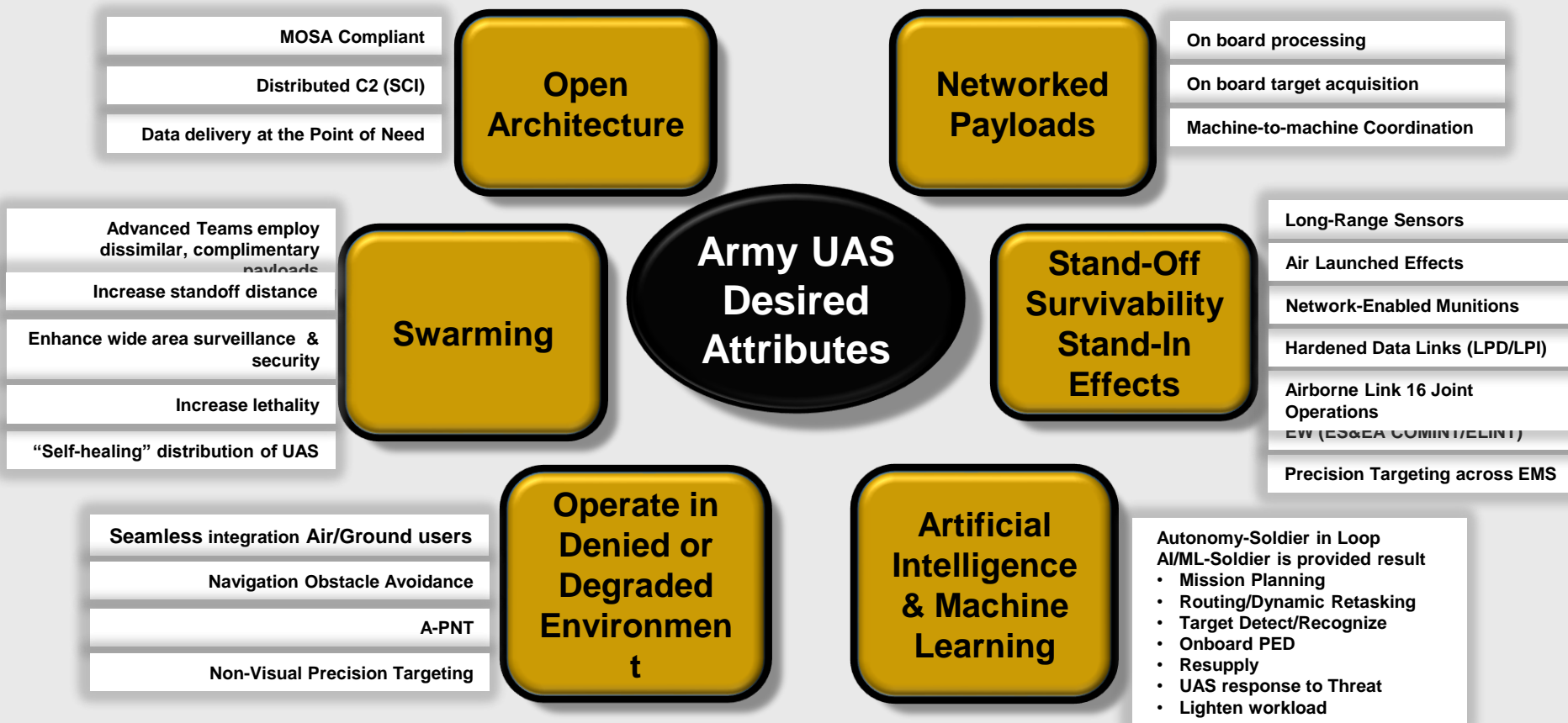
Project Manager, Unmanned Aircraft Systems



DISTRIBUTION A: Approved for public release; distribution is unlimited.

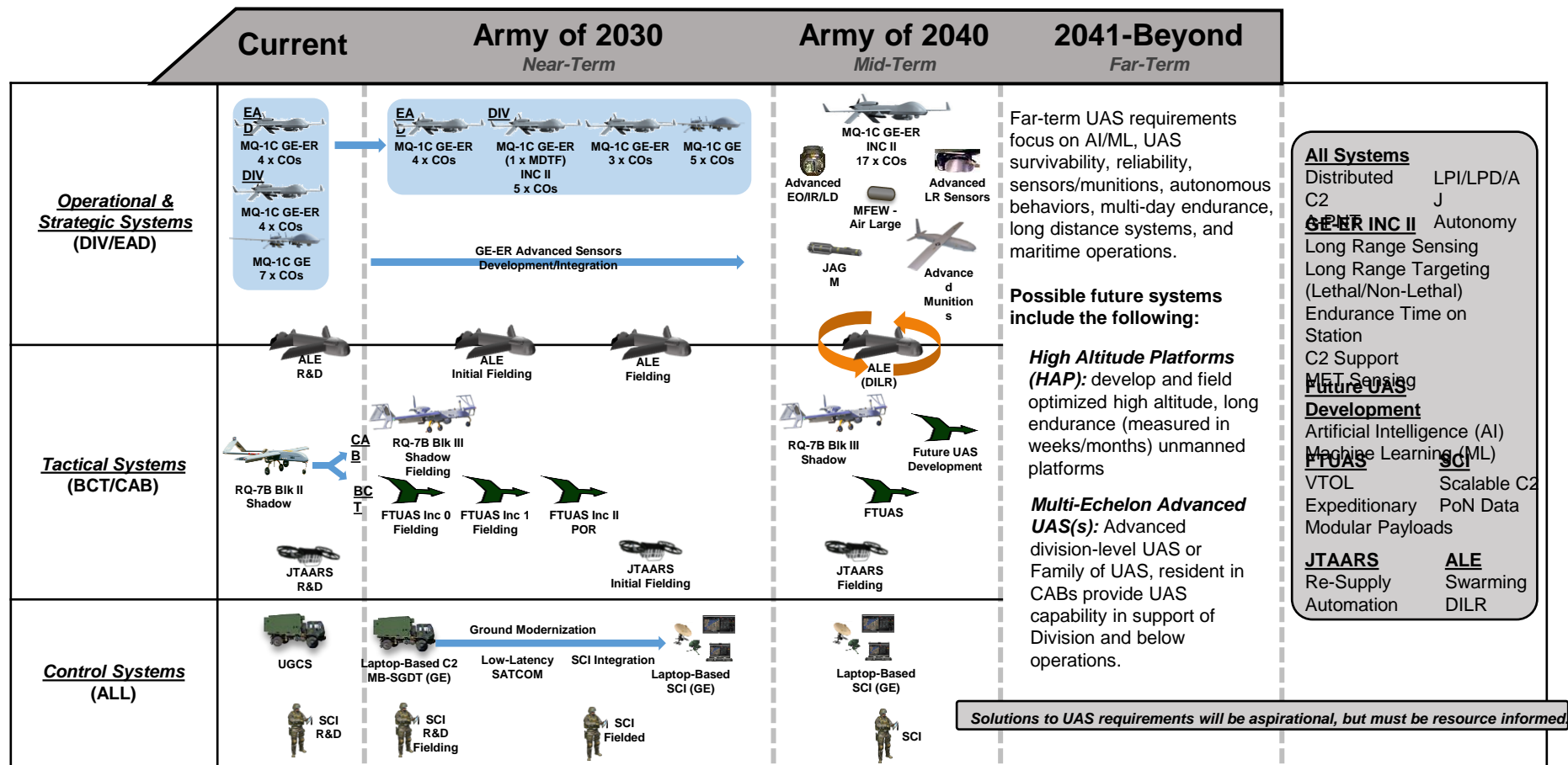


Desired UAS Capabilities





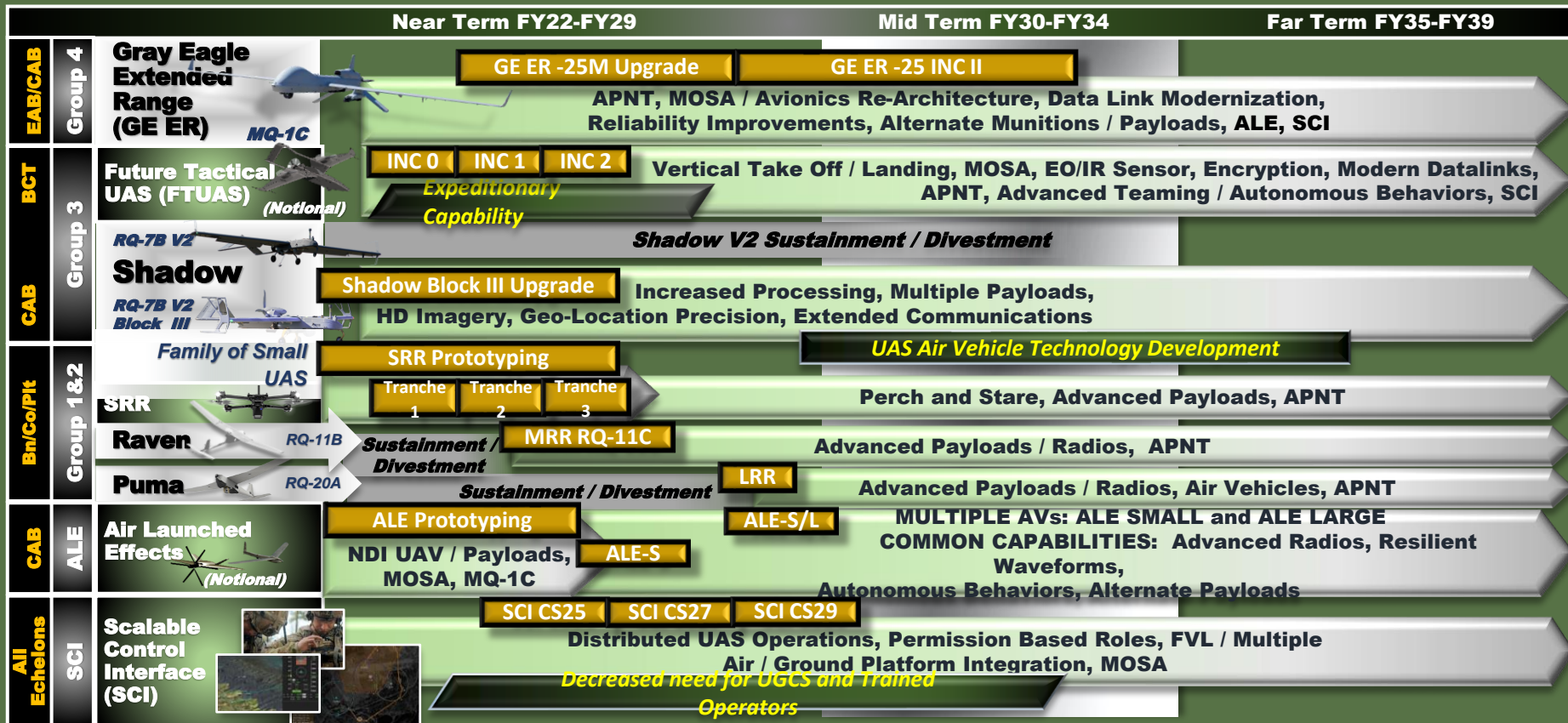
UAS Road to MDO





UAS Capability Roadmap

DISTRIBUTION STATEMENT A: Approved for Public Release; Distribution is Unlimited
REVIEW PENDING





Future UAS Desired Capabilities

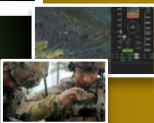
**Air Launched
Effects (ALE)**

(Notional)

**Future Tactical
UAS (FTUAS)**

(Notional)

**Scalable Control
Interface (SCI)**



Gray Eagle



**Short Range
Reconnaissance(SRR)**



**Long Range
Reconnaissance(LRR)**

**Robotic and Autonomous
Command & Control
(RAC2)**

***FUAS
Modernization***

***Platform
Upgrades***

***New Platforms
/ Products***

OPEN ARCHITECTURE

SWARMING

***OPERATE in DENIED or
DEGRADED ENVIRONMENT***

NETWORKED PAYLOADS

***STAND-OFF SURVIVABILITY
STAND-IN EFFECTS***

***ARTIFICIAL INTELLIGENCE
and MACHINE LEARNING***



Upcoming Army UAS Acquisition Events

Air Launched Effects (ALE)

(Notional)

Future Tactical UAS (FTUAS)

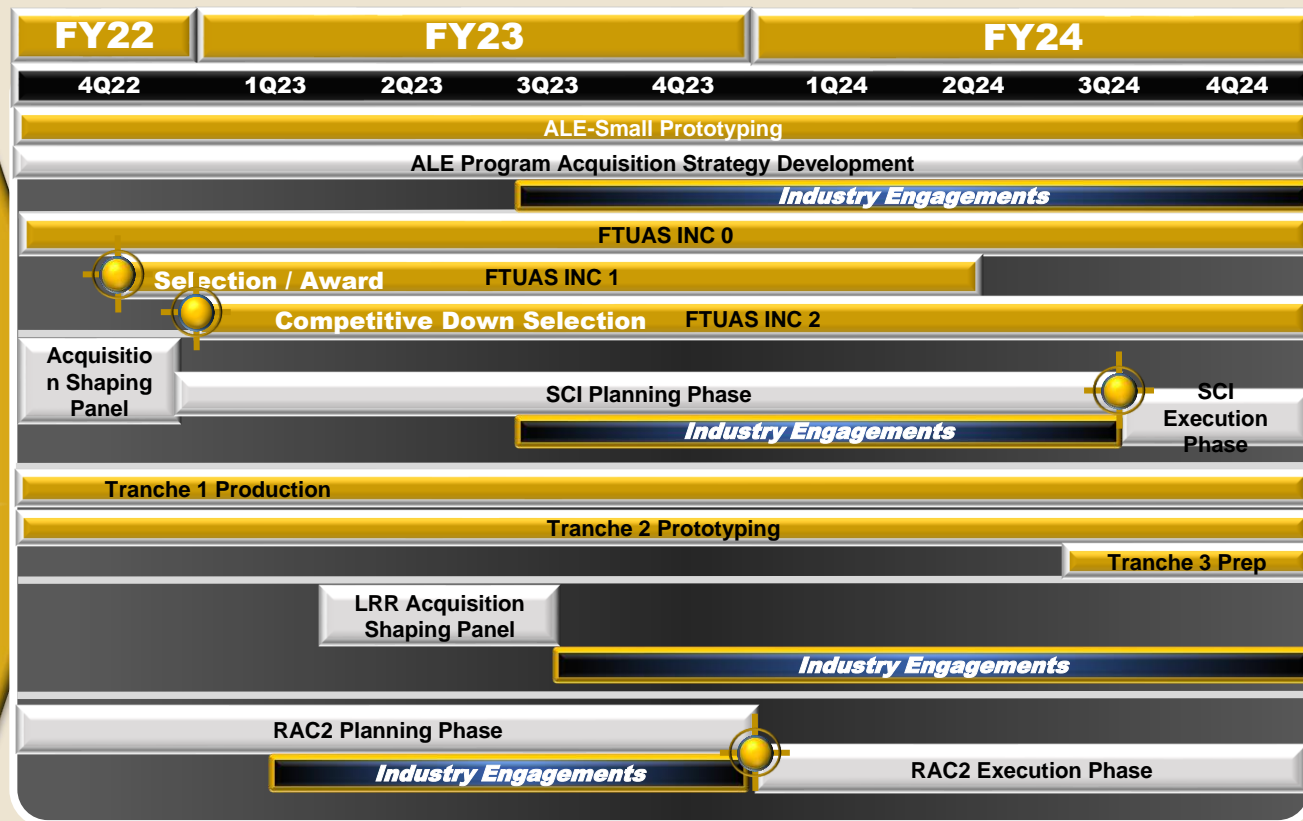
(Notional)

Scalable Control Interface (SCI)

Short Range Reconnaissance (SRR)

Long Range Reconnaissance (LRR)

Robotic and Autonomous Command & Control (RAC2)





QUESTIONS

UNCLASSIFIED



Apache Overview



COL Jay Maher & COL Bryan Woody
Attack Project Manager / Army Capability Manager Recon/Attack

DISTRIBUTION STATEMENT A:
Approved for Public Release;
Distribution is Unlimited

4 August 2022

UNCLASSIFIED



Apache

The AH-64 Apache is a twin-engine, four bladed, multi-mission attack helicopter designed as a highly stable aerial weapons-delivery platform.



Name: AH-64E Apache

Value: ~ \$32M (new build cost)

Produced: The Boeing Company, Mesa, AZ

Key Contractors: Boeing, Lockheed-Martin,
Northrup-Grumman, GE, L3Harris

US Army Stationing: CONUS, Korea, Germany,
Iraq

International: 16 countries have a version of Apache
in their inventory

Characteristics

Crew	2
Combat mission speed	164 knots (max speed)
Combat range	260 nautical miles
Combat endurance	2.5 hours
Max gross weight	20,260 pounds
Ordinance	16 Hellfire missiles
	76 2.75 inch rockets
	1,200 30mm rounds

Ground and Maritime Operations

- Attack (Deliberate and Hasty)
- Movement to Contact
- Reconnaissance/ Security

Reconnaissance

UAS

NAI
NAI
NAI

Movement to Contact/ Attack

Enemy Armor Element > Company

LPRM, JAGM, Hellfire, APKWS

Close Area

Deep Maneuver Area

Penetration

- ✓ Deliberate Attack
- ✓ Hasty Attack

LRPF

LRPF

Enemy tAS

LPRM, JAGM, Hellfire, APKWS

Close Area

Deep Maneuver Area

UAS: Unmanned Aircraft System

LRPF: Long Range Precision Fires

LRPM: Long Range Precision Munitions

Level of Interoperability 2-4 / AAG / MRFI

Networked (Link-16 / BFT2 / AFAPD)

Security

UAS

S

S

Hellfire, APKWS, 30mm

LZ



AH-64E Version 6 Capabilities

Manned Un-Manned Teaming – eXpanded (MUMT-X)

- Level of Interoperability (LOI) 1 – 4 UAV Control
- Extended frequency range (C/L/Ku/S bands)

Gen 2 Fire Control Radar (FCR)

- Extended Range
- Air Targeting
- Maritime Targeting
- Single Target Track
- JMAC (Combat ID)

Gen 2 Radar Frequency Interferometer (RFI)

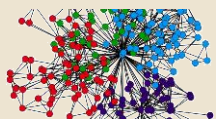
- ESM Quality Radar Detection
- Passive Ranging / Geolocation

Cognitive Decision Aiding System (CDAS)

- Fratricide Prevention
- Workload Reduction
- Automated Route Reprogramming to Avoid Detected Threats
- Synchronized Weapons, Fire for Simultaneous Time on Target

Data Correlation

- Correlation of Link 16, BFT, AAG, AFAPD Icons
- Fratricide Prevention



Joint Interoperability & Networking

- Link 16

AGP Upgrade

Navigation Enhancements

- TACAN
- RNP
- RNAV
- VNAV
- DAFIF
- DigMap
- ADS-B Out
- Vertical Obstacle Display

Gen 2 Pilot Night Vision Sensor (PNVS)

- Longwave Pilotage Certified FLIR
- Electronic Image Intensifier (EI2) Camera

Gen 3 Day Sensor Assembly (DSA)

- Longer Range Target Detection & Identification (178x Zoom)
- FLIR + Short Wave IR + Color TV
- More Powerful Laser Designator
- Eye Safe Laser Ranging
- 2 Color Laser Spot Tracker
- Integral NVG Laser Pointer



30mm Gun Accuracy Improvements

ARC-231 Maritime Voice Radio

- Supports Littoral Operations

Improved PVI

- First Limit Indicator
- Improved Onboard Performance Data

JAGM & AGM-114R

- Fully Integrated Joint Air to Ground Missile
- Latest Fielded Hellfire

Air-to-Air/Ground – eXpanded (AAG-X)

- Streams Apache Gen 3 Target Acquisition Designation Sight (TADS) Video to Ground Commander or Wingman

Upgraded Multi-Core Mission Processors (MMP)



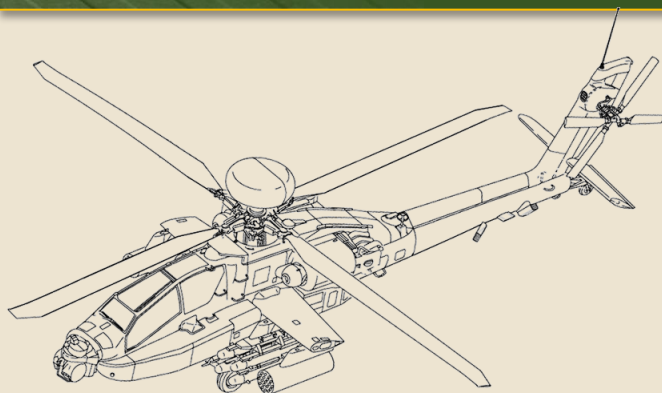
Cyber Security / IA Compliance



System Level Embedded Diagnostics (SLED)



AH-64 Capabilities Progression



AH-64D

- Digital Cockpit
- Fire Control Radar (FCR)
- Radar Frequency Interferometer (RFI)
- Radar Guided Missiles
- Modernized Infra-Red Sensors
- Integrated Aircraft Survivability Equipment (ASE)
- Manned/Unmanned Teaming (MUMT)

AH-64E Version 1 / Version 2.2

AH-64D PLUS: Aircraft Performance

- New Airframe
- Full 701D Engine Power
- Improved Drive System
- Composite Main Rotor Blades

Lethality

- Radar Electronics Unit (REU)
- Integrated Laser Pointer

Navigation

- IFR Certified
- Standby Flight Display

Communications

- Dual ARC-231 w/Emer backup

Aircraft Architecture

- Mission Processor

AH-64E Version 4

AH-64E v1 PLUS: Aircraft Performance

- RCEFS

Situational Awareness

- Link-16 baseline
- Blue Force Tracker Block II (BFT-2)
- Air-to-Air-to-Ground (AAG) Video
- System Level Embedded Diagnostics (SLED)
- Smart Tool for Apache Maintenance Picture (STAMP)

Navigation

- Enroute RNP / RNAV / VNAV

Aircraft Architecture

- Cyber Security Improvements

AH-64E Version 4.5+

AH-64E v4 PLUS: Aircraft Architecture

- Multi-core Mission Processor (MMP)

AH-64E Version 6

AH-64E v4.5 PLUS: Aircraft Performance

- Engine First Limit Indicator

Lethality

- FCR Extended Range
- FCR Maritime & UAS Targeting
- JAGM
- MRFI Maritime Detection
- MRFI Ranging / Geo-location
- Modernized Day Sensor Assembly (MDSA) Extended Range
- MDSA HD Color Video (IFF)
- MUMT Extended Range (MUMT-X), C/L/Ku/S bands

Situational Awareness

- Expanded Link-16
- Expanded STAMP / SLED
- Data Correlation
- Cognitive Decision Aiding System (CDAS)

Navigation

- Full RNP / RNAV / VNAV
- ADS-B (out)
- TACAN

Communications

- ARC-231 Maritime Frequencies

Aircraft Architecture

- ARINC 653 RTOS

MDO Capability in Development

AH-64E Version 6.x

Aircraft Performance

- Legacy Sensors Backward Compatibility
- FOTE 2 "Fixes"
- Hydraulic Pressure Monitoring

Lethality

- IDM 01 Interoperability Update
- CIRCUM PVI Integration
- JAGM Improvements
- Removes Cluster Munitions (FMS)
- 30MM AWS Improvements
- Rocket Improvements
- MUMT-X Workload Reduction
- MRFI: Pilot Reporting/Blanking
- FCR: Priority Scheme / JMAC Classification

Situational Awareness

- TAWS
- SLED over non-BFT
- Synthetic Vision
- DVE Cueing Symbolology
- CDAS Improvements

Navigation

- EAGLE EGI / MAGNA
- TACAN

Communications

- Crypto-Mod for ARC-231A
- Coyote PVI

Aircraft Architecture

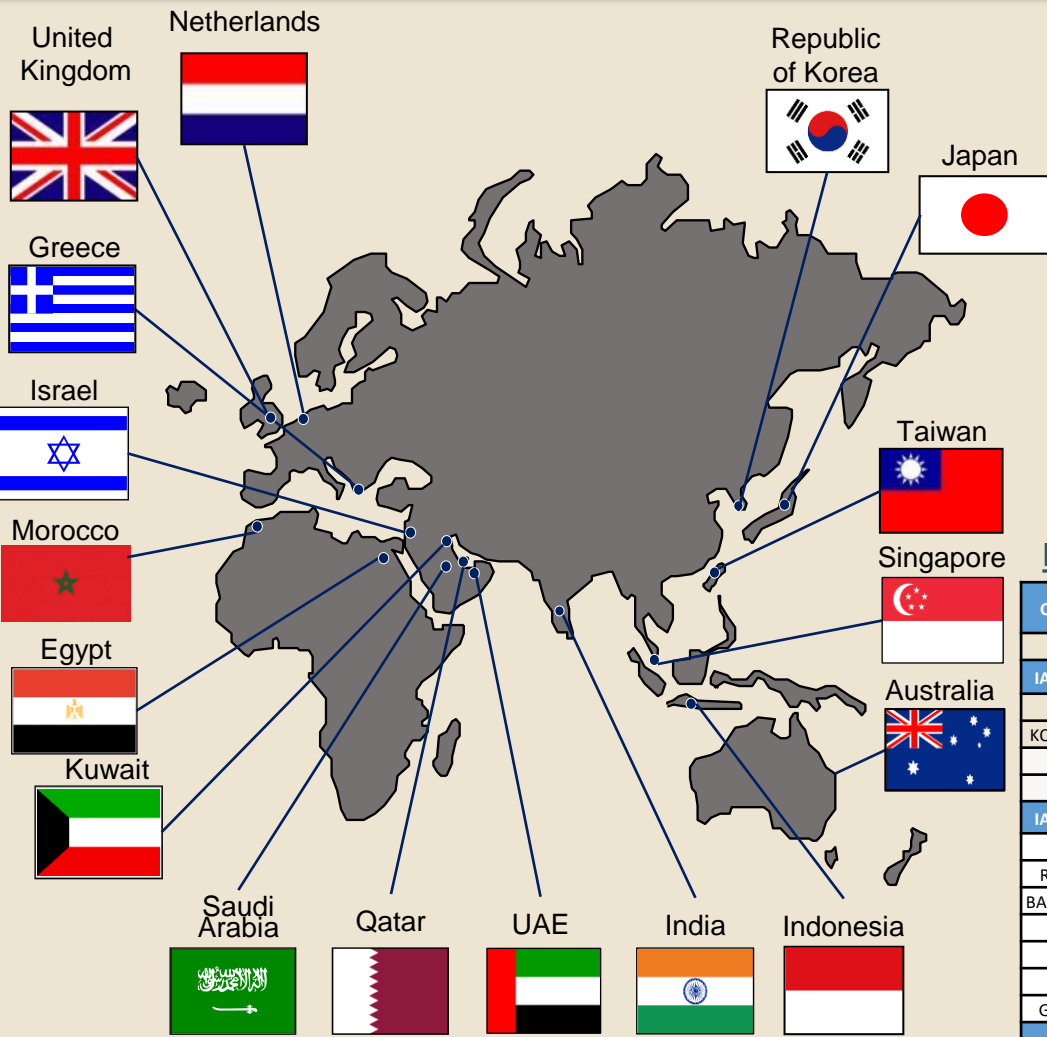
- Open Systems Interface (MOSA)
- Encrypted Data at Rest
- G2T Software Hooks
- Common Configuration



International Apache Fleet

International Fleet

COUNTRY	MODEL			QTY
	A	D	E	
AUSTRALIA			29	
EGYPT		18	25	43*
GREECE	19	10^		29 (9)
INDIA (AF)			22	22
INDIA(Army)			6	6*
INDONESIA			8	8
ISRAEL	26			26
		20		20
JAPAN		13^		13 (12)
KUWAIT		16		16
MOROCCO			24	24*
NETHERLANDS			28	28*
QATAR			24	24
REPUBLIC OF KOREA			36	36
SAUDI ARABIA (RSLFAC)		10		10 (9)
			35	35
SAUDI ARABIA (MNG)			36	36**
SINGAPORE		20		20
TAIWAN			30	30 (29)
UAE			36	36*
UK		16^	50	66**
TOTALS	45	123	389	557 (352)



Future / Potential AH-64E

COUNTRY	New Build	Reman	STATUS
KUWAIT	8	16	LOA Offered
IA Working	8	16	LOAs
EGYPT	0	18	LOR for P&A
KOREA Army	36	0	LOR for P&A
JAPAN	18	12	LOR for P&A
POLAND	32/64	0	LOR for P&A
IA Working	118	30	P&As
GREECE	9	9	P&A (Hold)
ROMANIA	24	0	P&A (Hold)
BANGLADESH	8	0	P&A (Hold)
QATAR	6	0	LOR (Hold)
RSFLAC	0	9	LOR (Hold)
INDIA	11	0	Interest
GERMANY	8	0	RFI/ROM
Future	66	18	Interest
Total	192	64	

◆ DCS/FMS Hybrid
* Pending 1st Aircraft Delivery
** Aircraft DD250s In Progress
^ DCS
() Current Qty Due to Attrition
BLUE Qty – Current Production

Totals Based on Potential Max Quantity

Lethality - Increase lethal, non-lethal effects with precision and area target capabilities. Modular munitions with multiple stowed kills, selectable warhead types/effects.

1. **Air to Ground Munitions** (extended range, increase accuracy, with robust warhead/ fuze capability)
2. "Next-Gen" Launcher System
3. Lethality Common Operating Picture (JADC2)
4. Long Range Precision Munitions Interoperability
5. ALE (Air Launched Effects) Interoperability
6. Directed Energy

Reach - Execute mission from relative sanctuary, Detect Identify Locate Report (DILR) last 1/3 threat WEZ, Degraded Visual Mission Execution (DVME)

1. **Generator Improvements**
2. **Improved Turbine Engine T901**
3. **Tail Rotor & Tail Rotor Drive Train (ITRB, ITRDS)**
4. Fused Pilotage and Targeting (Sights & Sensors)
5. **Binocular Color Helmet Display**
6. "Next Gen" Beyond Line-Of-Sight Comms (Mobile User Objective Systems, Blue Force Tracker 3)

Protection/ Survivability - Ability to detect, defeat, target (Threat to Self) and populate Common Operating Picture (Threat to Team)

1. **Generation 2 Radio Frequency Interferometer (G2RFI) Basis of Issue (BOI) - All**
2. Advanced Aircraft Survivability Equipment (Common Infrared Countermeasures, Limited Interim Missile Warning Systems)
3. Assured Precision Navigation and Timing (aPNT)
4. Electronic Warfare Capabilities (Multi-Spectral Detection and Targeting)

Sustainment/ Safety - Increase maintenance free operating periods

1. **Open Systems Architecture**
2. GEN2 Turret
3. Conditions Based Maintenance
4. Improved Transmission / Nose Gear Box
5. System Level Embedded Diagnostics (SLED)

Near Term FY 23 – 28

- Version 6x Software
- **GEN2 RFI & MDSA BOIP**
- **Generator Improvement**
- Increased Sensor Processing Power
- **Binocular Color Helmet Display**
- **Open Systems Architecture**
- MAGNA Antenna, EAGLE M

Prep

Mid Term FY28 – 35

- **Improved Turbine Engine**
- **Tail Rotor Blade & Drive System**
- "Next Gen" Launcher System
- Condition Based Maintenance Improvement
- Advanced ASE Integration
- Advanced Munitions
- Next Generation Communications

Dominate

Far Term FY 30 – 40+

- **Fused Pilotage**
- **Fused Targeting**
- Modernized Radar
- Electronic Warfare Capabilities
- JADC2 Interoperability
- ALE Interoperability
- Transmission / Nose Gearbox
- Directed Energy

Large Scale Combat Operations



Questions





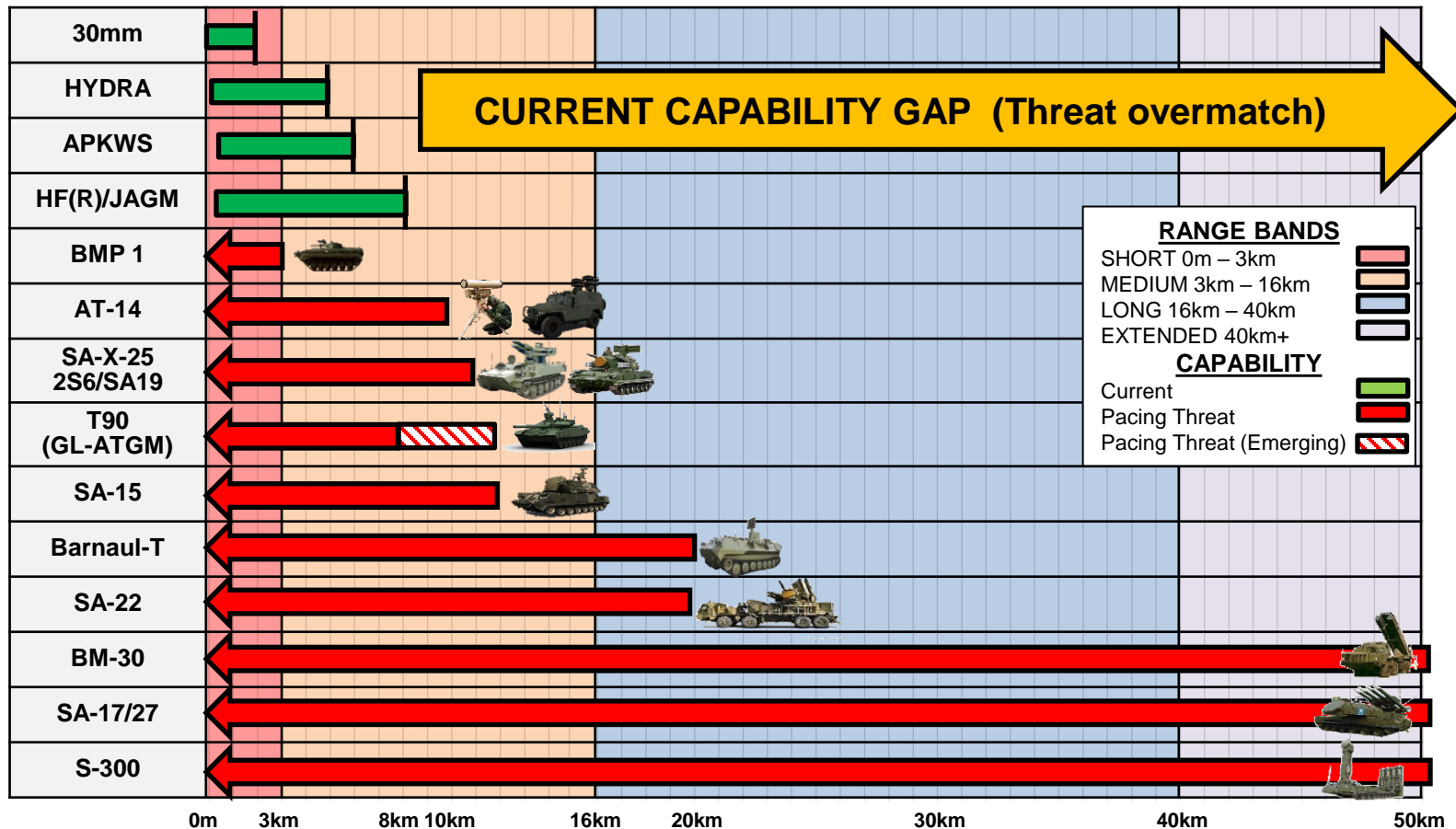
Presenter: COL Bryan Woody
Director, ACM-RA
U.S. Army Aviation Center of Excellence
Fort Rucker, AL

Purpose: Provide information on Army Aviation Weapon Systems improvements and future weapons to achieve the Large Scale Combat-Dominance.

Agenda:

- Weapon Capabilities
 - Current
 - Future





GAP AREA	ACoE CAPABILITY GAPS FOCUS	RISK LEVEL
#4 Lethality Options		Extremely High
#7 SEAD/DEAD		High
#9 Counter Reconnaissance Against Aerial Threats		High





Current

Hydra Rockets

Hydra Family of Rockets provides lethal and non-lethal effects

- High explosive, flechette, MPSM
- Smoke screening, marking, illumination

APKWS



APKWS – Precision Rocket

- M151 HE Warhead
- Accuracy similar to HELLFIRE



HELLFIRE

HELLFIRE – Anti-Armor, Buildings, Bunkers, Maritime

- AGM-114L Longbow – Radar Guidance
- AGM-114R Romeo – SAL Guidance, Selectable Fuzing



M260/M261 Launchers

Rocket Launchers

- M260 – 7 shot
- M261 – 19 shot



M230E 30mm



M789 & XM1211 Prox

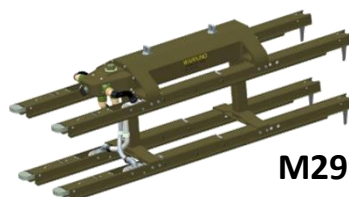
Apache Cannon – Self Protection

- M789 HEDP armor piercing
- XM1211 Prox fuzing C-UAS & Troops in the open



JAGM

- JAGM – Multi-purpose, Armor, Buildings, Bunkers, Maritime, CUAV
- Combines Radar & SAL Guidance
- Selectable Fuzing
- Improved Countermeasure Capability



M299 Launcher

Missile Launcher

- Carries and Launches HELLFIRE & JAGM
- Digital 2-way communications

Future



XM915 20mm



PGU-28A/B

FARA Gatlin Gun – Self Protection

Hydra II

Hydra II – Potential for:

- Precision Guided
- Area Guided (IMU) with lower cost

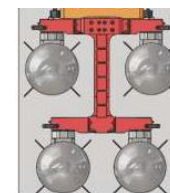


LRPM & Spike NLOS



Long Range Precision Munition

- Future program
- Target Set – Radars, C2 Nodes, Rocket Artillery,
- SPIKE is Interim LRPM, limited fielding per Directed Requirement



Modular Effects Launcher

FARA – Single Launcher System

- Carries & Launches multiple munitions
- In development





ARMY AVIATION
DECISIVE IN LAND WARFARE



Futures and Concepts Center Army Capability Manager-Lift Industry Day Update

04 August 2022

COL David Morgan
Director, Army Capability Manager-Lift
Futures and Concepts Center
Fort Rucker, AL

Lift Interests

Black Hawk

- UH-60M Targeted Modernization
- Improved Turbine Engine Integration
- UH-60V Production
- UH-60M Integrated RNAV

Lakota

- UH-72B Production and Fielding
- UH-72A Cascade Plan
- UH-72B Sustainment

Chinook

- CH-47F Targeted Modernization
- Block II Improvements
- CAAS / DAFCS upgrades

Fixed Wing

- High Accuracy Detection & Exploitation System (HADES)
- Enduring Fleet Sustainment/Modernization (SEMA & ITA)
- Future Modernization Efforts



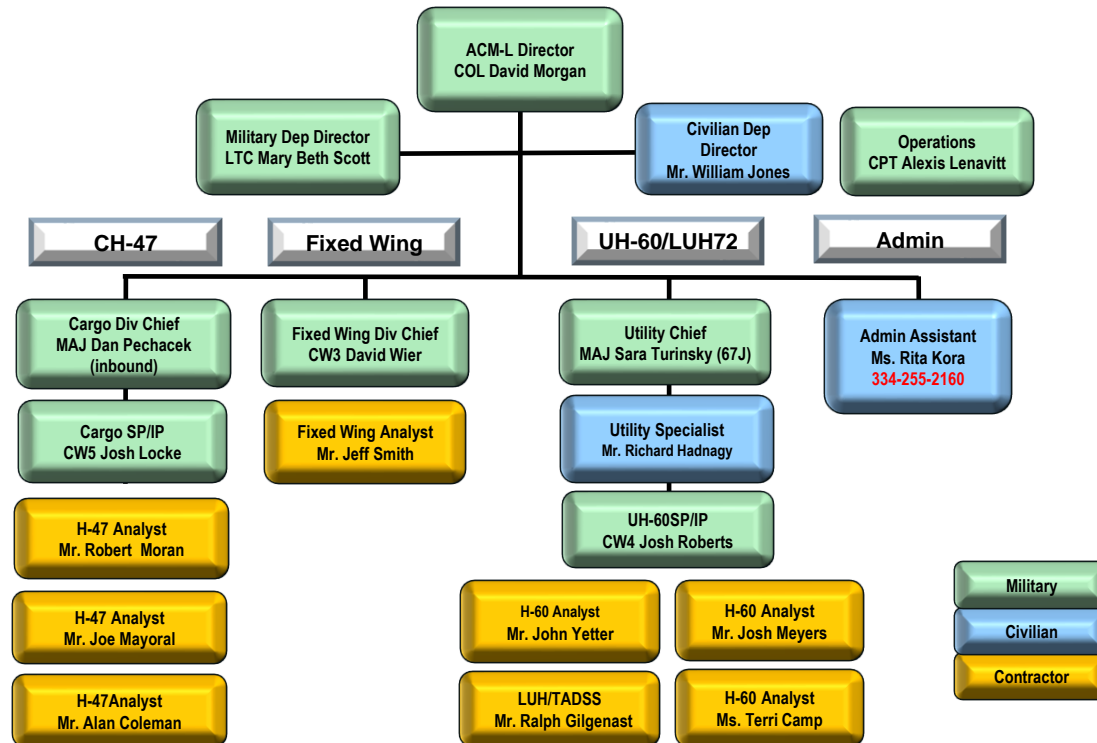
Approximately **3,500**
Total Aircraft

Cross Cutting Enablers

- MOSA Infrastructure
- Air Ground Network Radio
- Aviation Mission Common Server
- Assured – Position Navigation Timing
- Advanced Countermeasures
- Aviation Mission Planning
- Degraded Vision Enhancement
- Cybersecurity



ACM-Lift Organization



ACM-L Provides User Representation and Advocacy ...
through Post Deployment Collection Visits / CTC Visits / Operational Test Participation / Integration with PMs / Industry / DOTMLPF-P Integration across platforms / Engagement across the Aviation Enterprise
...To Achieve a Modernized and MDO Capable Enduring Fleet



Industry Days: Fort Rucker, Alabama Utility Helicopters Project Office



COL Calvin J. Lane

Project Manager, Utility Helicopters



3 – 4 August 2022



UH-60M Overview

Tactical Assault/MEDEVAC Mission Capability

- **Achieving Reach**
 - Improved Turbine Engine (ITE), (Q1FY26)
- **Increasing Aircrew Effectiveness**
 - Integrated Digital Cockpit
 - Digital Maps
 - BFT/BFT-2
 - Fully Coupled Flight Director
- **Improving Capabilities**
 - Integrated Area Navigation (I-RNAV), (FY23)
 - Crashworthy External Fuel System (CEFS)
 - Multi-Platform Anti-Jam GPS Navigation Antenna (MAGNA), (Q3FY23)
 - Upturned Exhaust System (UES) 2, (FY24)
- **Open Architecture**
 - Leveraging H-60V, AMCS (FY25), studies and CRADAs to develop a roadmap to meet Modular Open Systems Approach (MOSA) objectives





UH-60V Overview



Analog UH-60L



Digital UH-60V



- **Provides State-of-the-Art Digital Cockpit**
 - Implements Modular Open Systems Architecture (MOSA)
 - Enhances Situational Awareness
 - Global Air Traffic Management (GATM) Capability
 - Multicore Processing
- **Maximizes organic Corpus Christi Army Depot (CCAD) industrial base**
- **Includes new electrical harness**
- **Leverages UH-60L investments**
- **Reduces UH-60 training costs**
- **Government owns Technical Data Package**

Program Milestones

- **First Unit Equipped (FUE): July 2021**
- **Operational Test & Evaluation (OT&E): July-Aug 2022**
- **Full Operational Capability (FOC): Q1FY23**
- **Full Rate Production Decision Point: Q2FY23**



UH-72 Overview

- **Mission Comms/ARC-231A Integration:** CTCs will lead the way
- **Mission Comms/P25 Civil Radio Upgrade:** JRTC and ARNG
- **CV/FDR RIPS Battery:** expands the recording window
- **Hoist Payload:** restoration of 600 lb. capacity

• Equipping the ARNG

- Fielding of the UH-72B
- S&S Moving map & monitor improvement: significant multi-year effort
- Side Facing Seats: ambulatory patients on MEDEVAC aircraft
- Jettisonable Cockpit Doors: multi-year effort, start with coastal states

• Maintaining the Training Fleet and CTCs

- Completing the ARNG to USAACE cascades
- VARTOMS I to II Service Bulletin
- Engine Module Inspections and TBO: Mod 3 & 5
TBO extensions and Mod 1 and 3 calendar removals

DP 1: Initiated C-BA
DP 2: Research SLEP, RECAP or Replace
DP 3: End of Economic Life without SLEP

