



Establishing An Operationalized MOSA Approach

AADL/ACVIP Users Day 2021

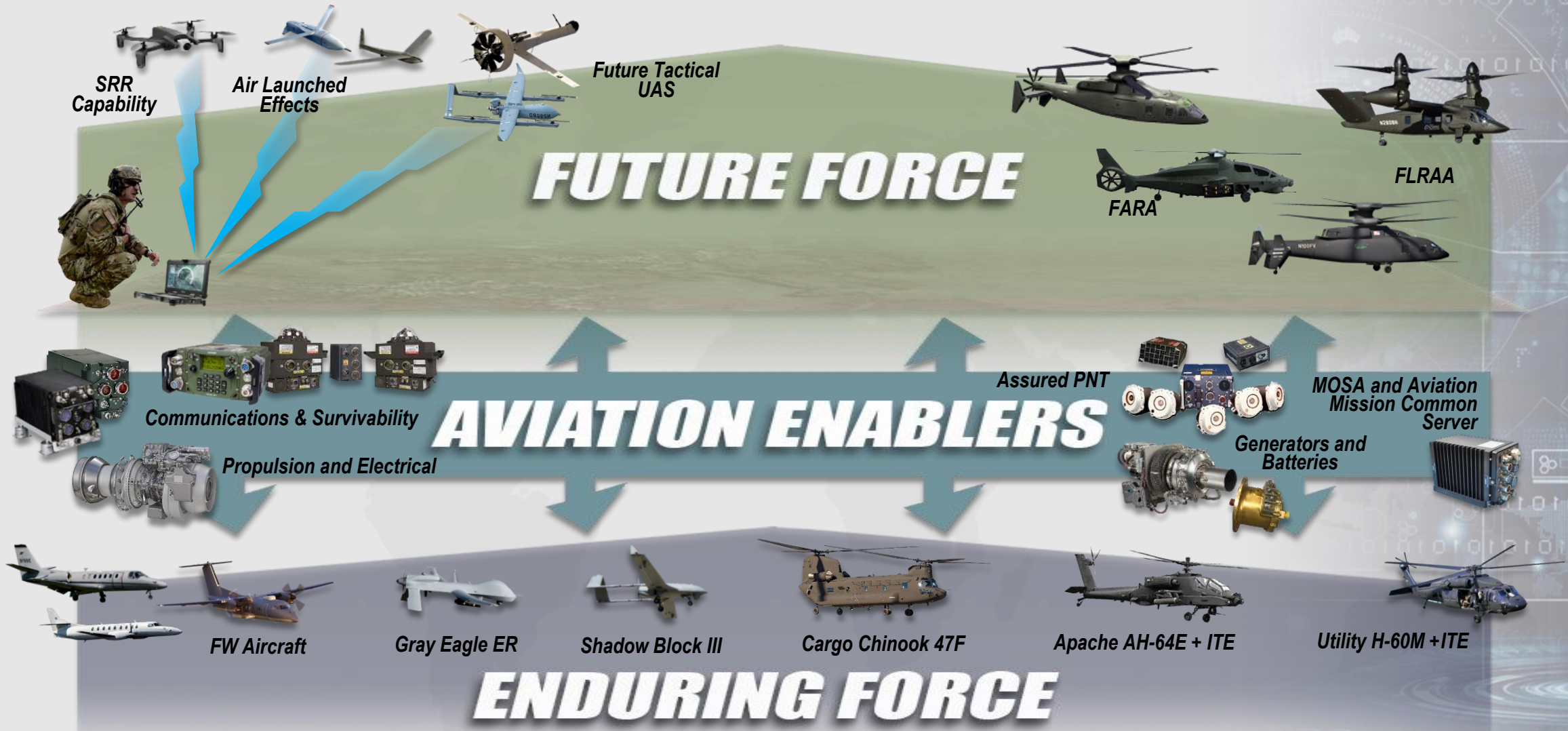
Mr. Patrick Mason

Deputy Program Executive Officer, PEO Aviation

3 February 2021



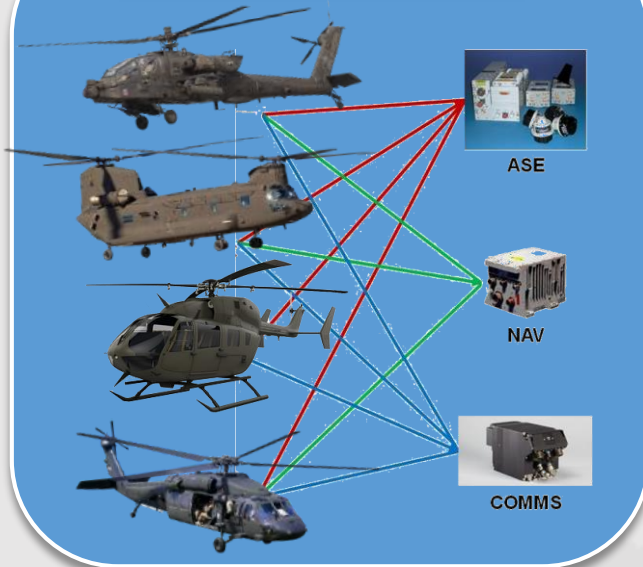
Advancing Army Aviation



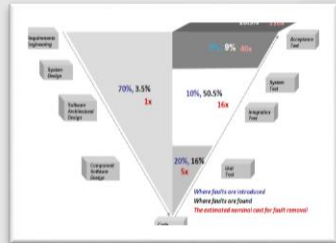
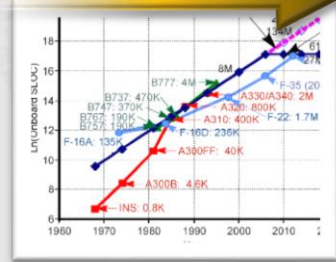
Increasing Reach, Protection, Lethality, and Mission Command

Setting the Stage – The Architectural Evolution

Yesterday



Transition



Tomorrow



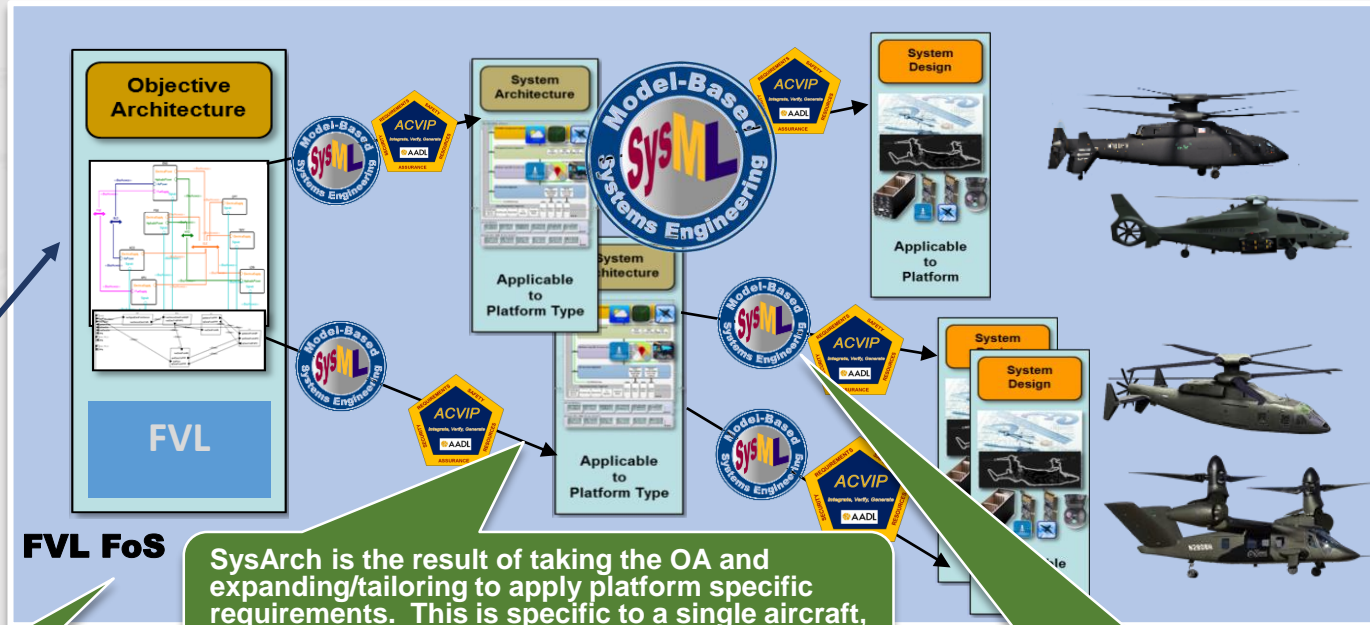
- Closed Hardware Architectures
- Closed Software Architectures
- Tightly Coupled Hardware/Software
- Many Unique Integrations
- Hardware Reuse (LRU Level)
- Opportunistic Software Reuse
- Document oriented procurement
- Isolated analysis
- Test-fix-test mentality



- Gov't Prescribed Open Architecture
- Open Hardware Architectures
- Open Software Architectures
- Software portability & interchangeability
- Shared Integrations (partial qualification credit)
- Strategic Reuse (HW, SW, artifacts)
- Model-based procurement
- Model-based Systems Engineering (MBSE)
- Architecture Centric Virtual Integration/Analysis

AADL/ACVIP & Future Vertical Lift (FVL)

RefArch is a consolidated list of architectural resources such as FACE, JCA, HOST, reusable assets (e.g. IDM, 231, etc), domain specific data models, AV/MSA interface, use cases/CONOPs, policies and directives, and applicable standards, tools, practices such as MBSE, ACVIP, STPA etc.



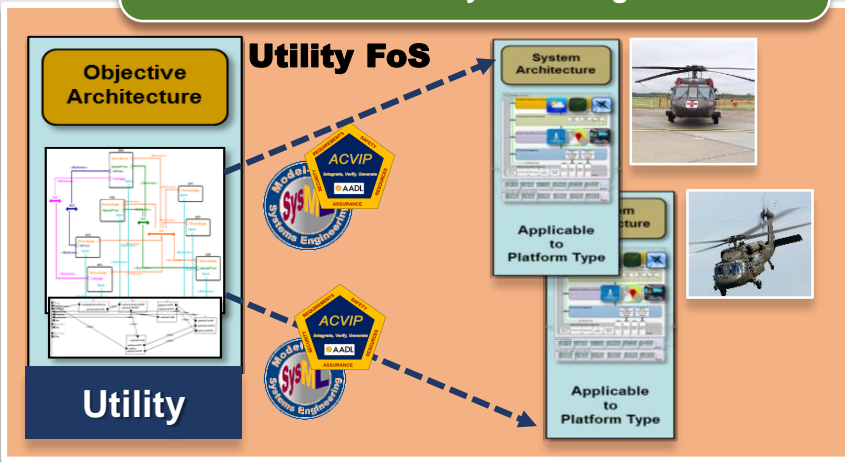
SysArch is the result of taking the OA and expanding/tailoring to apply platform specific requirements. This is specific to a single aircraft, and from this comes a system design.

MBSE Leveraging SysML is applied to wide system level requirements modeling & analysis

+

MBE with ACVIP Leveraging AADL is applied to embedded computing system level modeling & analysis to mitigate integration issues

ObjArch is a selection of applicable RA content and applying it to a set of AVs that we intend to share a common set of attributes (could think of this as all sharing a "CAAS" or "MCAP" architecture, displays, etc). It is beginning to look like a system architecture, but it still is not specific to a single aircraft.





From S&T to Production & Fielding

FLRAA: Defiant



FLRAA: v280



FARA: Raider



ALE



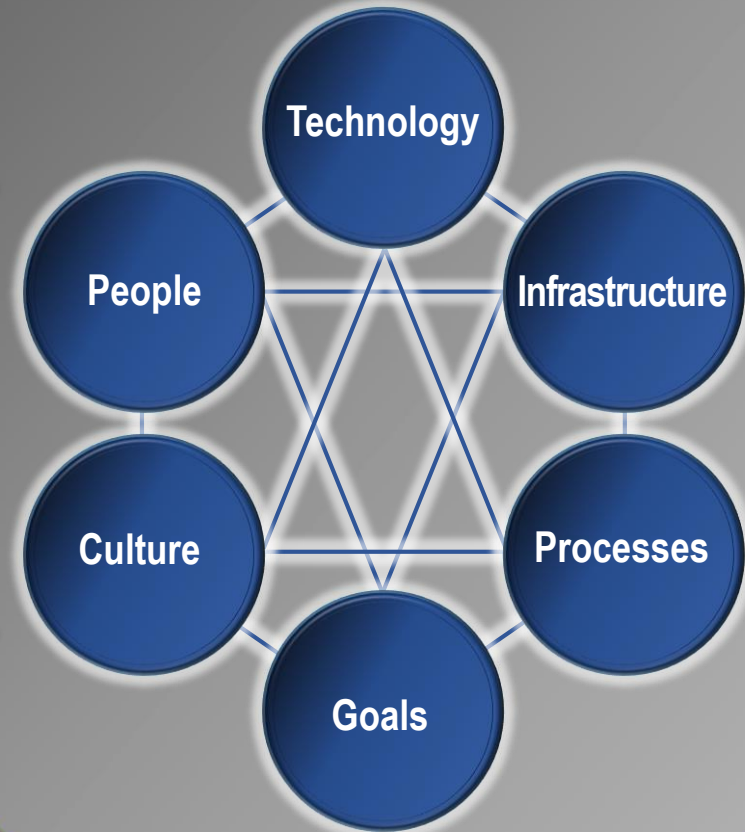
FARA: Invictus



- Generating the “Great Idea”
- Engineering “Know-How”
- Business “Savvy” to Make it Happen

Transition

Transition



Production Is a Complex, Socio-Technical System

FTUAS



MOSA





MOSA Objectives



MOSA TO Designed to Achieve
Outcomes ...

... While Supporting Broader PEO
MOSA **Objectives ...**

...and Aligned with MOSA ICRD
Objectives

More Effective with
Aligned Program Objectives
and a Common End State

More Efficient with
Reduced Duplication of
Effort

Credible to Industry
with Consistent
Communication and
Tangible Actions

**Improved
Affordability**

**Increased
Readiness**

**Enhanced
Capabilities**

**Reduced Schedule
Pressure**

**Reduced Supply
Chain Risk**

**Threat Based
Capability Adaptability**

**Faster Fielding of
Innovation to Achieve
Overmatch**

**Total Lifecycle
Affordability through
Competition**

Enabling Commonality



PEO Driving MOSA Transformation Effort

Aligning People, Tools, Processes for Successful Execution



Current State

Industry

Science & Technology

ACWG/ICWG

The ACE Collaboration Challenge

Industry MOSA Investments

MOSA 9 LOEs

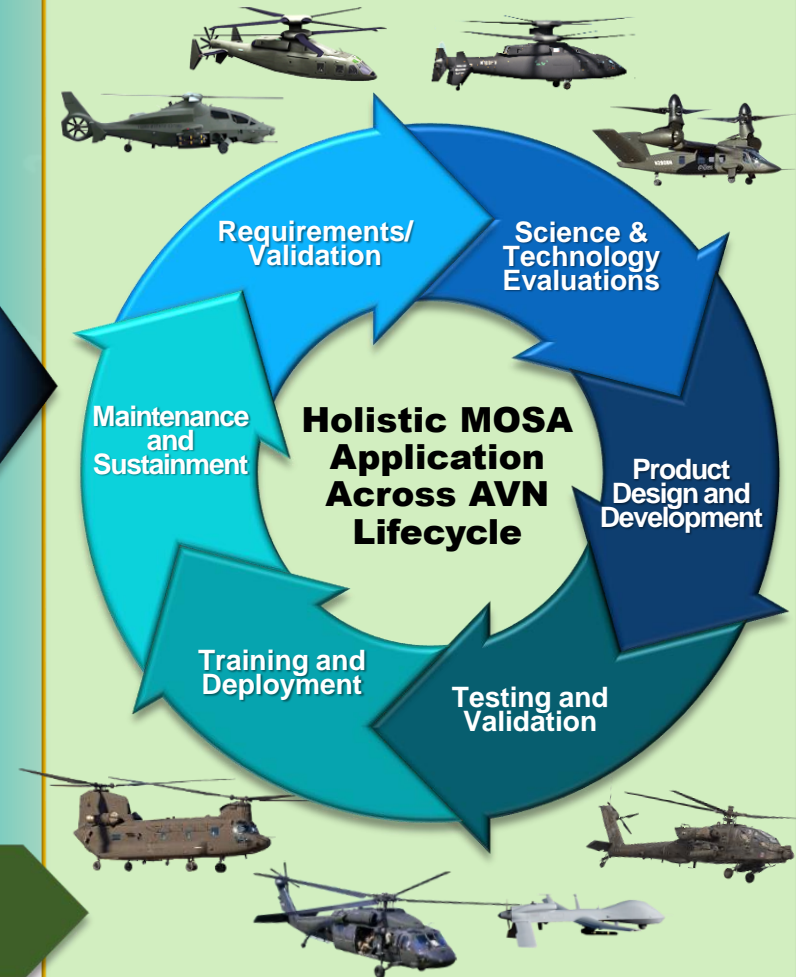
Creating standardization, Increasing communications, Applying lessons learned, Eliminating stovepipes

1. Governance & Policy
2. Architecture & Standards
3. Software Development
4. Collaborative Digital Environment
5. MOSA Conformance Center
6. Qualification & Material Release
7. Affordability & Savings
8. Contracting Efficiencies
9. Strategic Communications

'Ready to Catch' Modernization Efforts

Future State

Integrated, Aligned, Synchronized





Management Structure

Steering Committee led by PEO

Bi-monthly Meeting

AMC, FVL CFT, AVNCOE, AMCOM,
DAMO-AV, ACC, ARSOAC, CCDC AvMC

DPEO Bi-weekly Reviews

Transformation Office
(Dir. Matt Sipe, Dep. Tabitha Horrocks)

Governance &
Policy

Architecture &
Standards

MOSA
Conformance
Center

Software
Development

Collaborative
Digital
Environment

Qualification and
Material Release

Affordability,
Funding &
Savings

Contracting
Efficiency

Strategic
Communications

Enterprise-wide MOSA
Governance

Maximize Competitive
Environment

Prep USG for New
Industry Relations

Steering Committee Led by PEO and Comprised of Army Aviation Executives to Drive Decision Making, Maintain Accountability, and De-conflict issues.

DPEO Serves as Day-to-Day Leader of This Effort, with **Enterprise Oversight** and **Accountable** for Results

Surge Support **Empowered to Stand Up Governance Model**; Responsible for Tracking Progress, Elevating Critical Decisions

MOSA Implementation to be Reviewed Thematically Across 9 Lines of Effort (4-5 LoEs Reviewed Every Two Weeks)

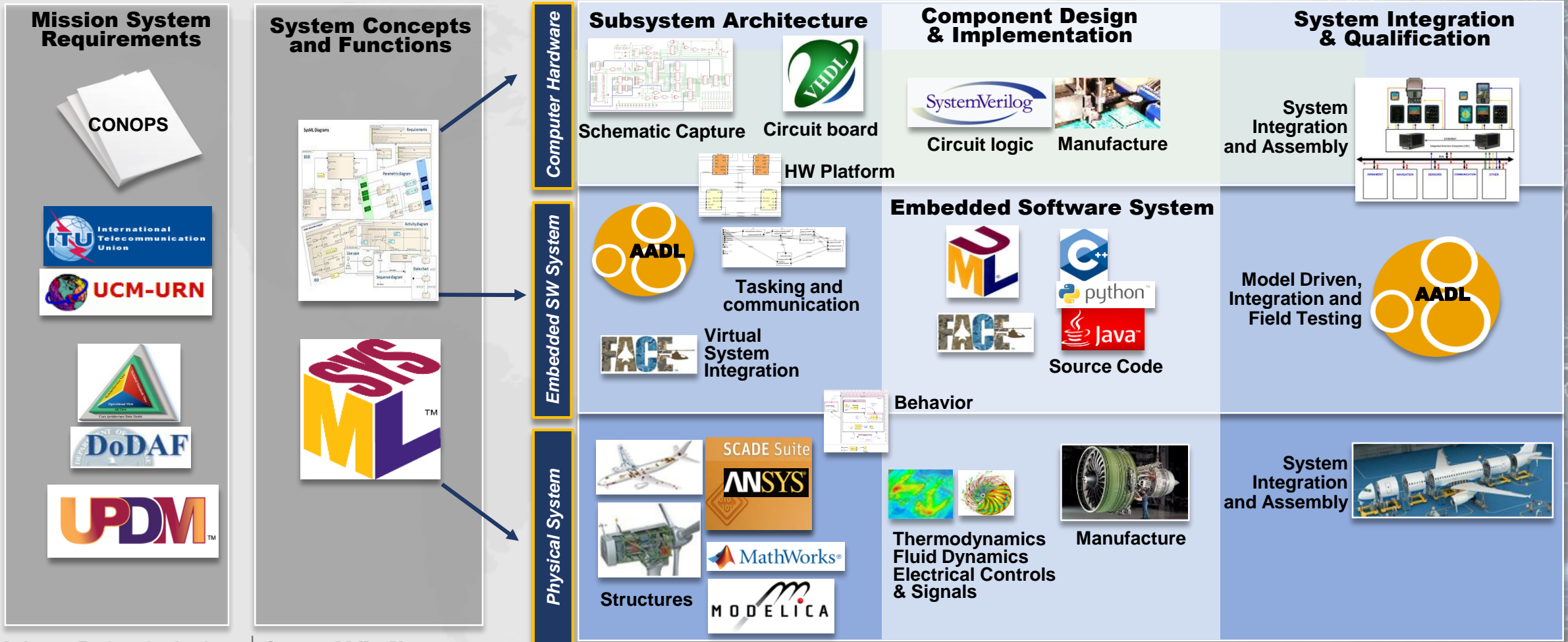
LoEs Are Working Groups, Each with an Assigned Leader From One of the PMs as an Extra Duty. Steering Committee May Provide Leaders with Surge Support to Accelerate Progress

Each LoE Lead Selected Based on His/Her Expertise – and to Ensure Balanced Representation of Enduring Fleet & FVL



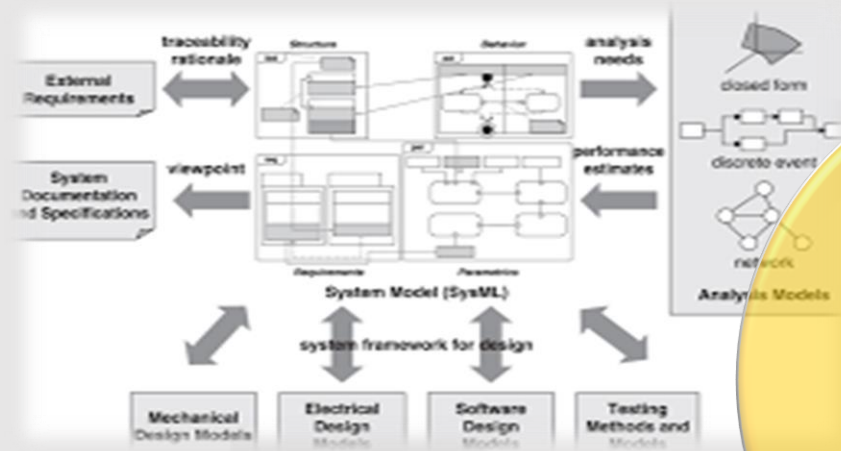
Complementary Languages and Tools

Filling the Modeling and Analysis Gap for Cyber-Physical System

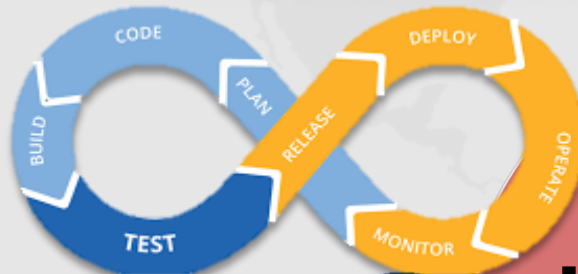
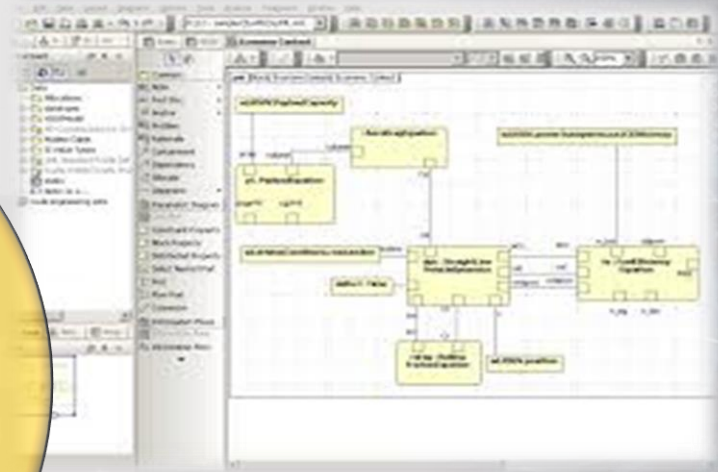




Development Environment Enablers



Digital Engineering/ MBSE



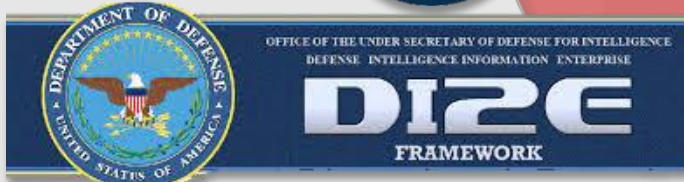
MOSA Enabled Environment

DEVSECOPS



Integrated Software Development Environment

MOSA Verification Environment



Development Environment, Tool Chain, and Process Controls Are Critical to Success



Near-term Efforts



- Issue Initial PEO Aviation MOSA **Policy and Guidance**
- Establish PEO Aviation MOSA **Governance** Body to Oversee Policy Implementation and Execution of MOSA Transformation Roadmap
- Identify, Prioritize, and Synchronize Cross-cutting Opportunities **Focused on Major System Components** ('Crown Jewels') for MOSA Implementation and Align Budgets Accordingly
- Develop PEO Aviation Reference Architecture and **Component Boundaries**
- **Establish Contract Vehicles** to Enable MOSA Implementation
- Identify **Sustainable Business Model** that Incentivizes Industry Implementation of MOSA
- Solicit **Industry Feedback** Through MSI RFI
- Invest in **Infrastructure** to Support Digital Environment and **Tool Chains**
- Focus on **Software** Development and **Acquisition** (Reuse, SDKs, USG Software Factory)
- Identify **Business Model** Elements to Incentivize Industry Implementation of MOSA
- Maintain Alignment with Army Futures Command (AFC) on Integrated Mission Equipment for Vertical Lift Systems (IME) and Other MOSA-related Efforts
- Ensure Continuity with ASA(ALT) Common Modular Open Architecture (CMOA) Effort



Key Take-Aways



- **PEO Aviation Committed to MOSA Transformation Across the Aviation Domain**
 - Expanding Beyond FVL Platforms
 - Developing Long-term MOSA Roadmap
 - Investing in MOSA-related Activities and Infrastructure
- **Industry Collaboration is Critical to Successful Implementation**
 - Request Quality Responses to RFIs (Industry Opportunity to Influence Future State)
 - Identify Mutually Beneficial Strategies to Make MOSA a Viable Business Case



Questions and Closing Comments

The collage consists of several vertical panels:

- Panel 1 (Left):** Shows a helicopter on the ground with soldiers nearby.
- Panel 2:** Shows a helicopter in flight over a landscape.
- Panel 3:** Shows a soldier in a field with a small aircraft on the ground.
- Panel 4:** Shows several aircraft flying in a cloudy sky.
- Panel 5:** Shows a close-up of a soldier's face wearing a helmet.
- Panel 6:** Shows a helicopter in flight.
- Panel 7 (Center):** A blue background featuring various military equipment, including a radio, a control panel, a vehicle, and a tank.
- Panel 8:** Shows a helicopter on the ground with its door open.
- Panel 9 (Right):** Shows a helicopter on the ground.

Below the collage are several logos:

- CHINOOK (Large Helicopter) Program Office** (Circular logo)
- AMRAD & ANSSE APACHE** (Rectangular logo)
- AVIATION PROGRAM OFFICE** (Circular logo)
- AVIATION PROGRAM OFFICE** (Large circular logo with wings)
- AVIATION PROGRAM OFFICE** (Circular logo)
- FARA** (Rectangular logo)
- LONG RANGE AVIATION** (Rectangular logo)
- AVIATION MISSION SYSTEM ARCHITECTURE** (Rectangular logo)
- AVIATION FLIGHT FACILITY PROJECT OFFICE** (Circular logo)
- AVIATION PROGRAM OFFICE** (Circular logo)

In the center of the blue panel, there are two buttons:

- AMSA** (Upward arrow)
- ATE** (Downward arrow)