Department of the Air Force

I n t e g r i t y - S e r v i c e - E x c e l l e n c e

Department of the Air Force Improving Engineering Practice
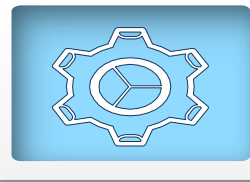
Kristen Baldwin

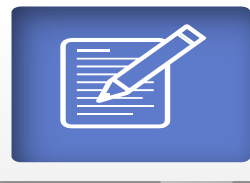**Deputy Assistant Secretary of the Air Force, Science, Technology & Engineering**

SAF/AQR Priorities

Drive Science, Technology, and Innovation Outcomes to meet DAF Priorities

- Oversee transformational S&T and innovation pipelines
- Focus Development Planning to bridge accelerated transition to programs through System of Systems and Mission Engineering
- Oversee and champion large scale technology transition prototyping efforts

Strengthen Cyber Resiliency of Weapons Systems

- Advance program protection and systems security engineering across the lifecycle
- Facilitate design for mission assurance in weapon systems

Ensure Technical Rigor and Risk Management through Digital Transformation

- Lead DAF-wide independent technical review and assessments of acquisition programs
- Transform Digital Engineering and Open Architecture framework to promote the development of innovative applications, standards, tools, and environments

Advance Science and Engineering Talent and Practice

- Oversee S&E workforce development, lead DAF STEM strategy for future talent, and increase diversity
- Champion transition of manufacturing technologies to Organic Industrial Base and Defense Industrial Base

Reoptimizing for Great Power Competition

*"**The Air and Space Forces must change or we could fail to prevent, and might even lose a war**. Not the kinds of war we've fought or been fighting for the last 30 years, but a war between modern great powers with enormous costs and consequences for the US and its partners and for the world. **We cannot let that happen**." – Hon Frank Kendall, SecAF (AFA, Sep 2023)*

GPC Optimization Attributes:

- Strong Organizational Alignment
- Enterprise-Solution Focused
- Values Missions and Outcomes over Process and Functions
- Effective and Persistent Self-Assessment
- Agile and Adaptive
- Effective Communication
- Rapid Execution with Precision
- Deliberate Integration
- Resilient, Survivable and Sustainable
- Aligned and Focused Workforce

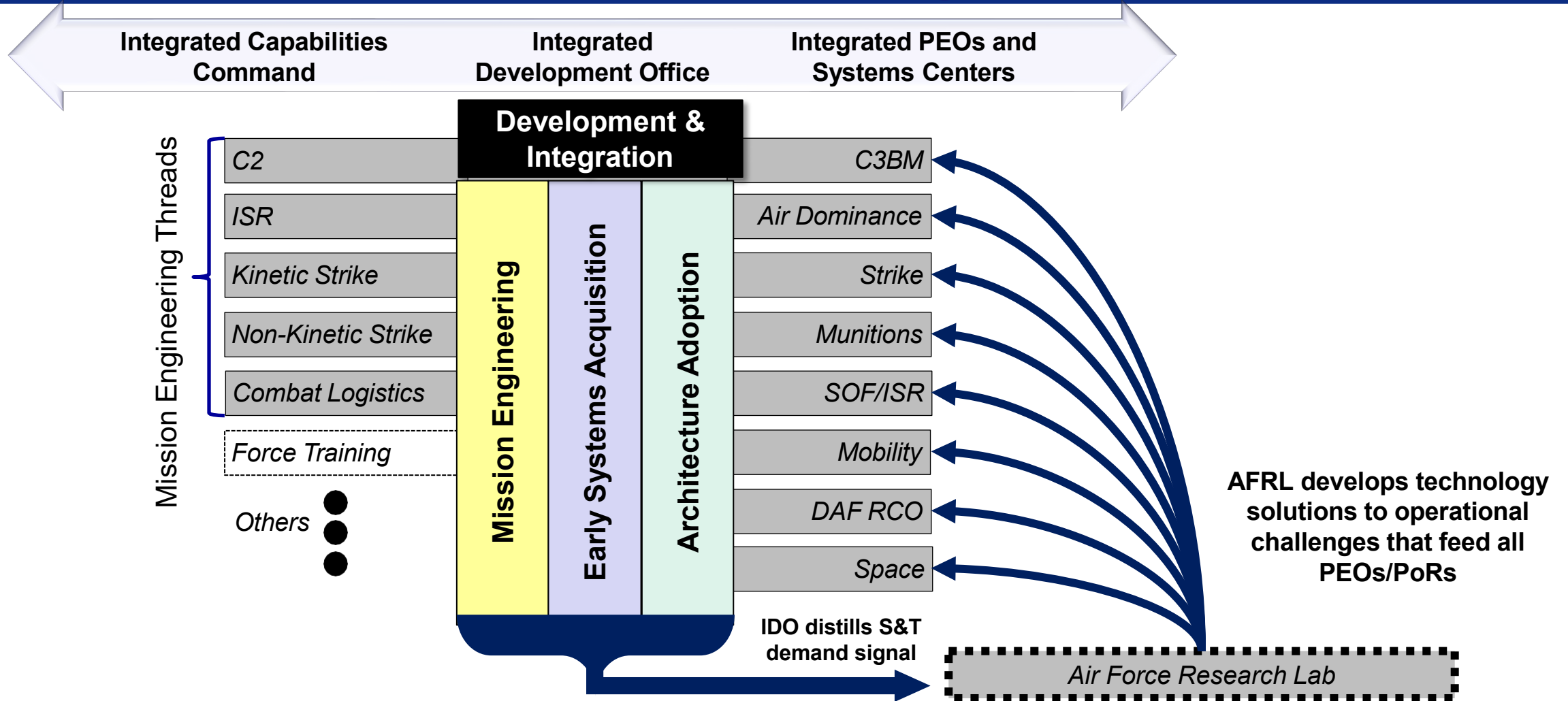## Instituting Organizational Change (subset)

- ❑ Integrated Capabilities Office (ICO)
    - ▪ Identify concepts & facilitate AF-SF collaboration
- ❑ Office of Competitive Activities (OCA)
    - ▪ Identify DAF-wide imperative problems & opportunities over time
- ❑ Program Assessment & Evaluation Office (PAE)
    - ▪ Identify analytically based DAF resourcing priorities
- ❑ Integrated Capabilities Command (ICC)
    - ▪ Balance & prioritize AF modernization plans and develop force design
- ❑ Integrated Development Office (IDO)
    - ▪ Oversee/execute USAF capability development for modernization
- ❑ AFMC Systems Centers/Integrating PEOs
    - ▪ Develop, deliver, continuous support to integrated capabilities

Capability Development Pipeline: Demand Signal to Materiel Solution

Integrated Capabilities Command → Integrated Development Office → Integrated PEOs and Systems Centers

Development & Integration

Mission Engineering Threads:
- C2
- ISR
- Kinetic Strike
- Non-Kinetic Strike
- Combat Logistics
- Force Training
- *Others* • • •

Columns: **Mission Engineering** | **Early Systems Acquisition** | **Architecture Adoption**

PEOs and Systems Centers:
- C3BM
- Air Dominance
- Strike
- Munitions
- SOF/ISR
- Mobility
- DAF RCO
- Space

IDO distills S&T demand signal

Air Force Research Lab

AFRL develops technology solutions to operational challenges that feed all PEOs/PoRs
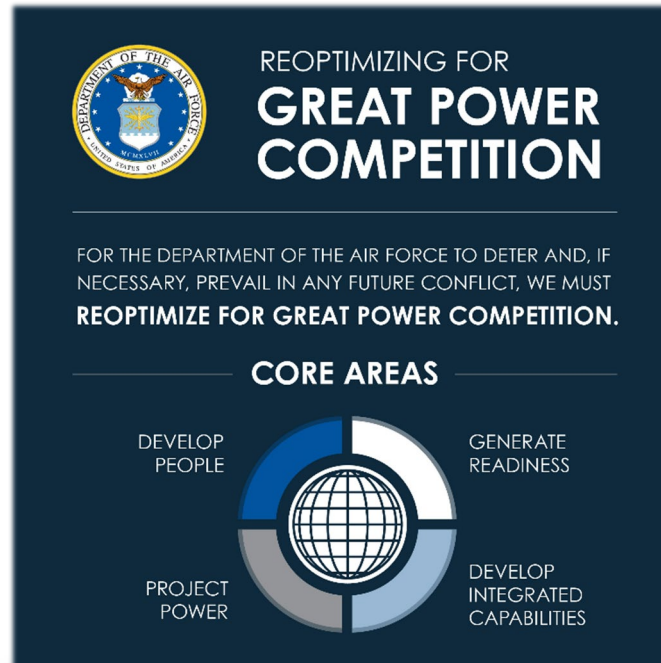
ICC & IDO roles in USAF's re-optimization for Great Power Competition

ICC & IDO will directly support the ability to develop integrated capabilities, a core area to reoptimize for Great Power Competition

ICC

- **Develop competitive operational concepts** and align capability development efforts

- Generate requirements to **outpace the threat** and **integrate across missions**

- **Prioritize modernization plans** and develop programming inputs to **align with force design**

- Provide a **unified demand signal** for science, technology, experimentation, and industry

REOPTIMIZING FOR **GREAT POWER COMPETITION**

FOR THE DEPARTMENT OF THE AIR FORCE TO DETER AND, IF NECESSARY, PREVAIL IN ANY FUTURE CONFLICT, WE MUST **REOPTIMIZE FOR GREAT POWER COMPETITION.**

CORE AREAS

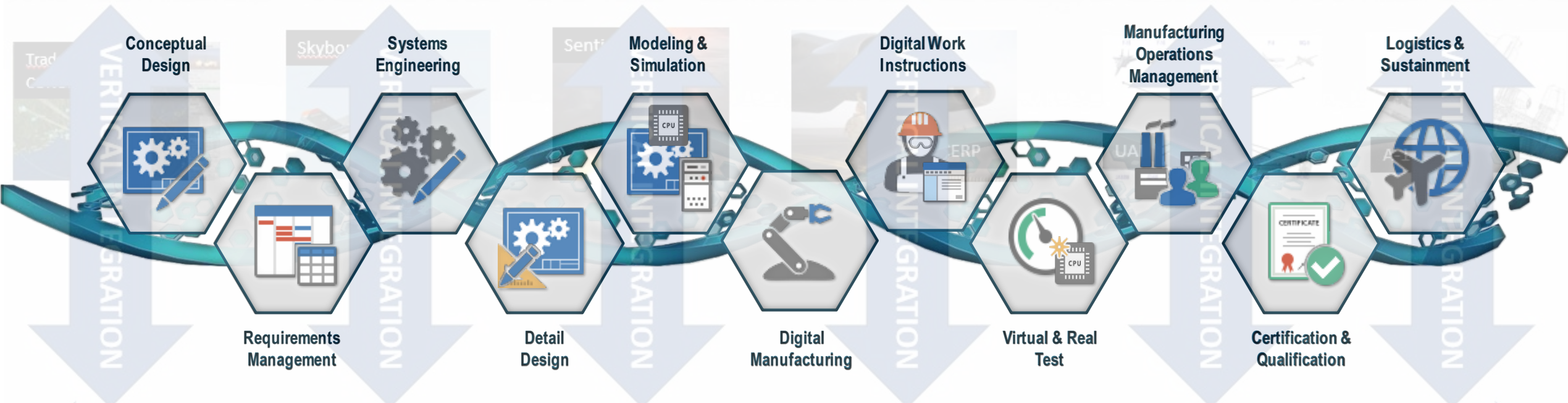DEVELOP PEOPLE · GENERATE READINESS · PROJECT POWER · DEVELOP INTEGRATED CAPABILITIES

IDO

- Execute **capability development** prototyping and experimentation

- Lead **mission engineering** solution tradespace analysis

- Execute enterprise-focused and integrated **early systems engineering** and **acquisition**

- **Apply** and **enforce technical architectures** and **standards** on to those early systems acquisition programs

DMM Across the Lifecycle

Mission Engineering	Research	Develop	Design	Test	Supply	Sustain	Maintain	Modernize

- Conceptual Design
- Requirements Management
- Systems Engineering
- Detail Design
- Modeling & Simulation
- Digital Manufacturing
- Digital Work Instructions
- Virtual & Real Test
- Manufacturing Operations Management
- Certification & Qualification
- Logistics & Sustainment

HORIZONTAL INTEGRATION

Foundational Supporting Capabilities

Digital Materiel Management:
Ensure critical processes employ digital methods across the entire lifecycle – from invention to retirement – for both warfighting capabilities as well as installation and mission support capabilities

DIGITAL MATERIEL MANAGEMENT

Modernize IT Infrastructure

Structure and Secure Our Data

Provide Access to DMM Tools

Develop Digital Strategies

Train Our Digital Workforce

Instill a Digital-First Culture

Enterprise Digital Dominance

DMM: Whitepaper

Video OV-1

Space Force Vision for a Digital Service

- "An <u>interconnected</u>, <u>innovative</u>, <u>digitally dominant</u> force." – *USSF Vision for a Digital Service, 2021*
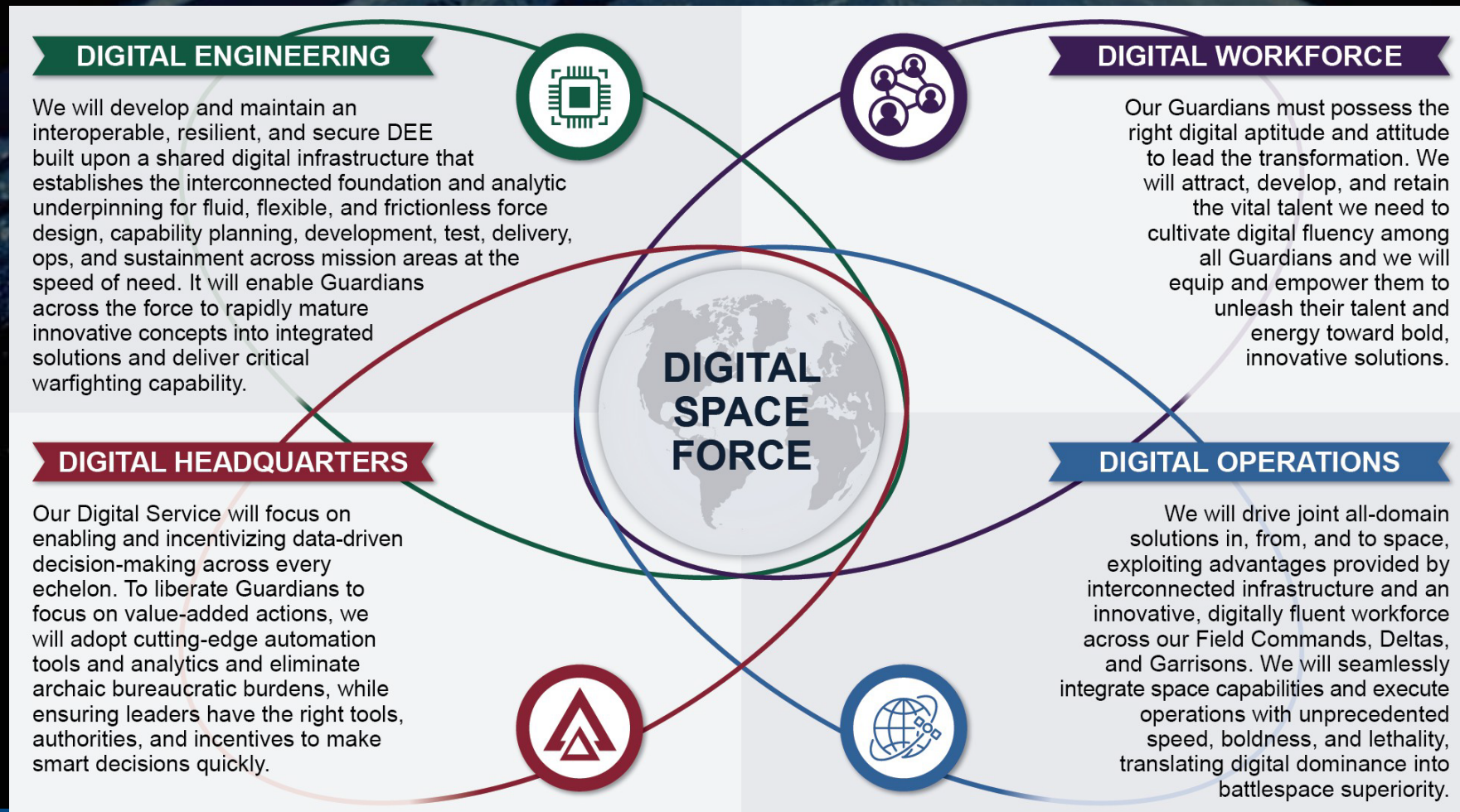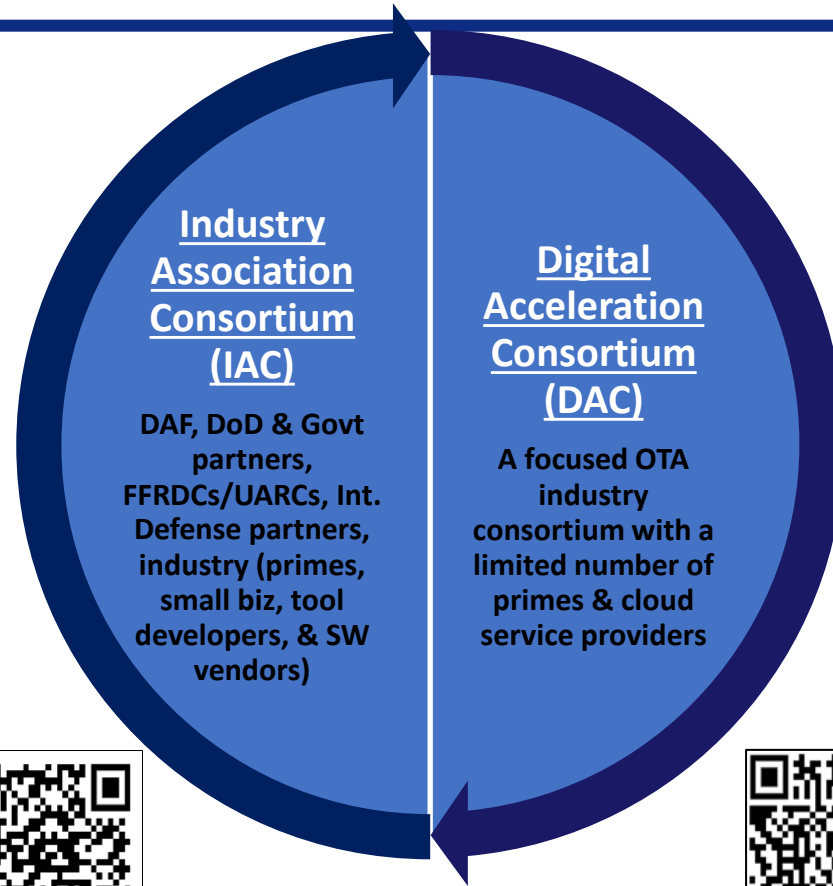
DIGITAL ENGINEERING

We will develop and maintain an interoperable, resilient, and secure DEE built upon a shared digital infrastructure that establishes the interconnected foundation and analytic underpinning for fluid, flexible, and frictionless force design, capability planning, development, test, delivery, ops, and sustainment across mission areas at the speed of need. It will enable Guardians across the force to rapidly mature innovative concepts into integrated solutions and deliver critical warfighting capability.

DIGITAL WORKFORCE

Our Guardians must possess the right digital aptitude and attitude to lead the transformation. We will attract, develop, and retain the vital talent we need to cultivate digital fluency among all Guardians and we will equip and empower them to unleash their talent and energy toward bold, innovative solutions.

DIGITAL SPACE FORCE

DIGITAL HEADQUARTERS

Our Digital Service will focus on enabling and incentivizing data-driven decision-making across every echelon. To liberate Guardians to focus on value-added actions, we will adopt cutting-edge automation tools and analytics and eliminate archaic bureaucratic burdens, while ensuring leaders have the right tools, authorities, and incentives to make smart decisions quickly.

DIGITAL OPERATIONS

We will drive joint all-domain solutions in, from, and to space, exploiting advantages provided by interconnected infrastructure and an innovative, digitally fluent workforce across our Field Commands, Deltas, and Garrisons. We will seamlessly integrate space capabilities and execute operations with unprecedented speed, boldness, and lethality, translating digital dominance into battlespace superiority.

Digital Industry Consortia

Objectives:
- **Provide an open, collaborative opportunity for the defense industrial base to contribute to the identification and articulations of barriers and develop solutions associated with the rapid, full-scale adoption of DMM**

Outputs:
- **Outcomes inform DAC scope and provide best practices**
- **Information dissemination path for DAC products**

Industry Association Consortium (IAC)

DAF, DoD & Govt partners, FFRDCs/UARCs, Int. Defense partners, industry (primes, small biz, tool developers, & SW vendors)

Digital Acceleration Consortium (DAC)

A focused OTA industry consortium with a limited number of primes & cloud service providers

https://dafdto.com/

IAC Sharing site

DAC Description

Objectives:
- **Recommend solutions for modernizing IT infrastructure, compatible Integrated Digital Environments, secure access to data, common data standards & formats, policy & contracting language**

Outputs:
- **Standardized digital deliverables**
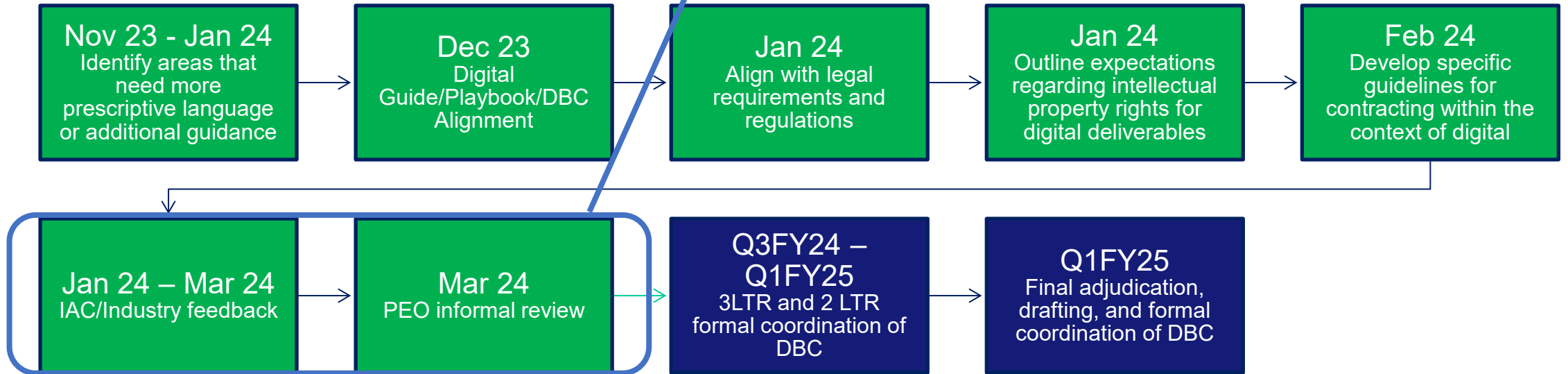- **Standardized IP data tagging / formatting**

Policy and Guidance for DMM: Updated Digital Building Code (DBC)

- **FY24 DBC updates will include refreshed content and prescription for DMM implementation in Acquisition programs; accountability mechanisms will ensure programs are born digital or adopt digital practices:**
  - **Digital Engineering**
  - **Open Systems Architecture**
  - **Agile Software Practices**

Key Updates in the next DBC:

- **Need better explanations of digital twin, digital thread, ASoTs**
- **IP and contract language improvement**
- **Tool agnostic language to remove constraints**
- **Feasibility of models vs paper-based reviews and how to leverage data and models for acquisition**
- **How to leverage MOSA, OSA, GRA**
- **Digitalization of sustainment activities**

Nov 23 - Jan 24 Identify areas that need more prescriptive language or additional guidance	Dec 23 Digital Guide/Playbook/DBC Alignment	Jan 24 Align with legal requirements and regulations	Jan 24 Outline expectations regarding intellectual property rights for digital deliverables	Feb 24 Develop specific guidelines for contracting within the context of digital

Jan 24 – Mar 24 IAC/Industry feedback	Mar 24 PEO informal review	Q3FY24 – Q1FY25 3LTR and 2 LTR formal coordination of DBC	Q1FY25 Final adjudication, drafting, and formal coordination of DBC

Integrity - Service - Excellence

Cross-Cutting Digital Efforts

- **Digital Airworthiness**: The DAF successfully demonstrated a prototype tool that accelerates and streamlines the airworthiness process using a platform with AI/ML

- **Independent Technical Risk Assessments (ITRAs)**: The DAF developed a roadmap to inject digital engineering best practices into ITRAs and, ultimately, drive automation into technical risk assessments

- **Systems Engineering Technical Reviews (SETRs)**: The DAF is exploring how to shift away from traditional SETRs with month long prep times and powerpoint presentations to a model-based process

- **Digital Standards**: Applying new tools to enable the digital analyzation of standards/documents by their contents and relationships

- **USSF**: The USSF is building modeling standards and patterns that will allow cross cutting enterprise integration and are currently being applied across the C3BM realm: Space, Air, and Sea.

Forward Leaning MOSA Strategy

- **Foundational to Digital Acquisition, DMM, and to the National Defense Strategy LoE "Build a More Lethal Force" by enabling us to "modernize key capabilities"**

- **DAF will scale and proliferate select standards and GRAs for legacy and new platforms**

- **Continued collaboration with OSD, our Service partners, and the Industrial Base**

- **The USSF, with IEEE-ISTO established a Space Systems MOSA Interface Standards Alliance to enable standards to keep pace with technology advancements and ensure interoperability across space systems of systems**

- **AFMC's MOSA Guidebook and the DAF Digital Building Code are promoting greater adoption**

- **The Agile Mission Suite (AMS) GRA represents the future implementation strategy for Air Programs**

See the USAF MOSA Presentation this week for more information

Agile Mission Suite (AMS) Government Reference Architecture (GRA)

- **Built on the foundation of previous Open Architecture developments but decomposes previous "black boxes" into software-defined modules**
- **Government-owned Sensor-to-Glass interfaces**
- **Strong isolation between safety/flight-critical and mission-critical components to enable adopting platforms to field rapid software updates**
- **Well-defined, high-speed mission-systems interfaces allowin adopting platforms to leverage best-of-breed capabilities**

Commercial Approach

Militarized Approach
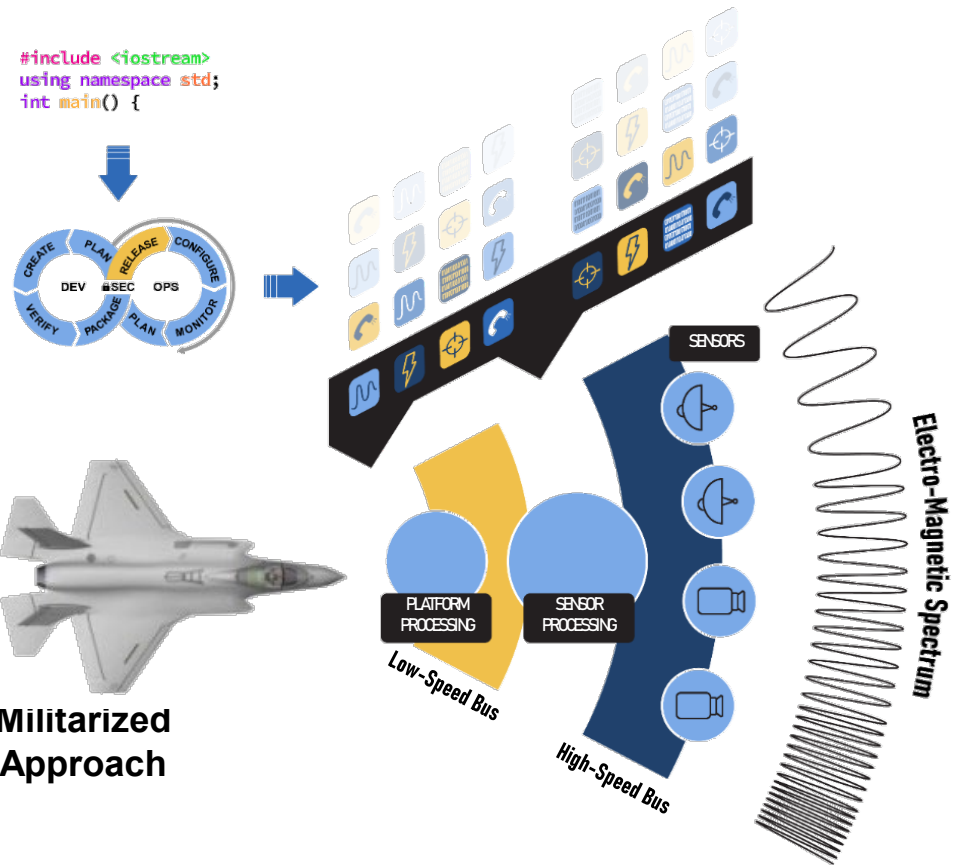
AMS GRA ensures adopting platforms respond to dynamic threat environment at the speed of software (vs. hardware)