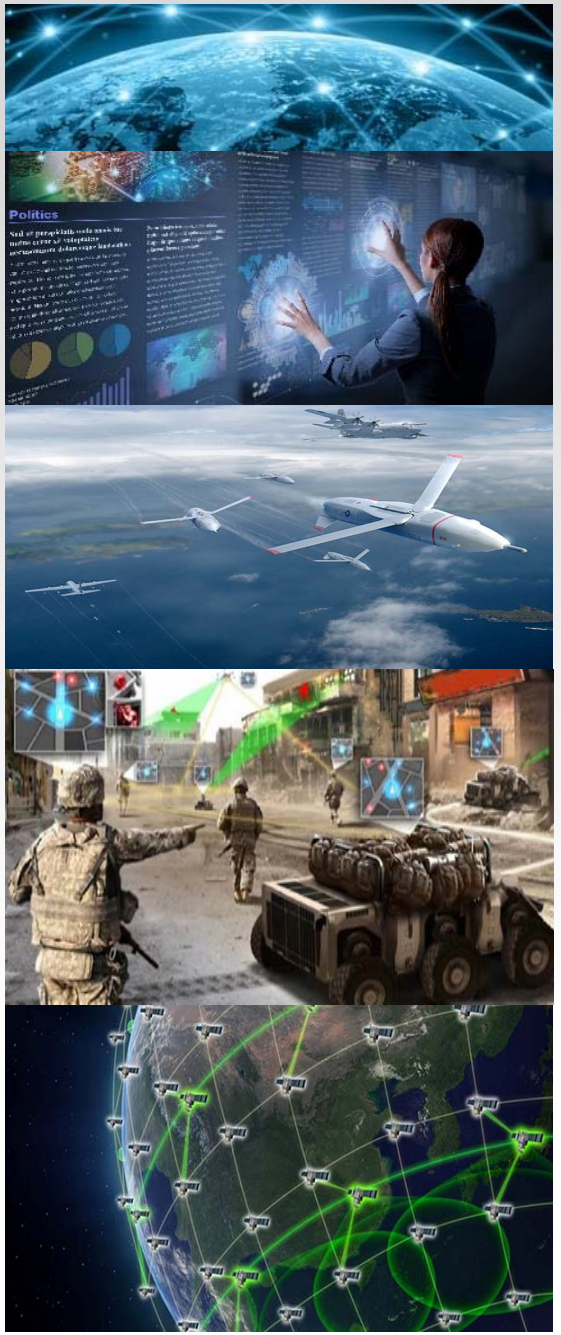

DoD Tri-Service MOSA Initiative for Standardization

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22nd Annual Systems and Mission Engineering Conference
Tampa, FL | 23 October 2019

Contents

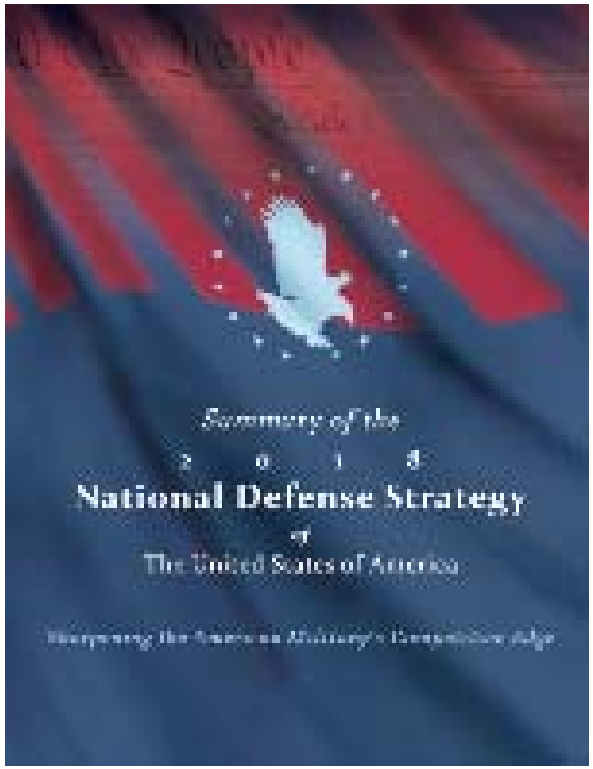
USD(R&E) Modernization Priorities

"We cannot expect success fighting tomorrow's conflicts with yesterday's weapons or equipment."
– National Defense Strategy

- Hypersonics
- Fully Networked Command, Control, and Communication
- Directed Energy
- Cyber
- Space
- Quantum Science
- Machine Learning / Artificial Intelligence
- Microelectronics
- Autonomy
- Biotechnology
- 5G

For each modernization priority, a designated Portfolio Manager (Assistant Director) is responsible for establishing the DoD-wide, mission-focused strategy and execution plan

National Defense Strategy and Modular Open Systems Approach



Remarks by Secretary of Defense
James N. Mattis
on the National Defense Strategy
January 19, 2018

"It is incumbent upon us to field a more lethal force if our Nation is to retain the ability to defend ourselves and what we stand for."

"We will modernize key capabilities, recognizing we cannot expect success fighting tomorrow's conflicts with yesterday's weapons or equipment. Investments in space and cyberspace, nuclear deterrent forces, missile defense, advanced autonomous systems, and resilient and agile logistics will provide our high-quality troops what they need to win."

"To keep pace with our times, the department will transition to a culture of performance and affordability that operates at the speed of relevance. Success does not go to the country that develops a new technology first, but rather, to the one that better integrates it and more swiftly adapts its way of fighting. Our current bureaucratic processes are insufficiently responsive to the department's needs for new equipment. We will prioritize speed of delivery, continuous adaptation, and frequent modular upgrades."

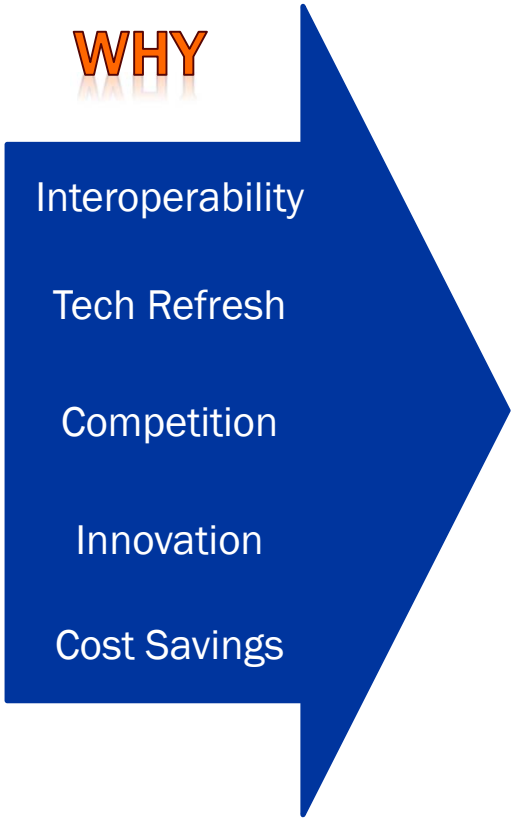
MOSA Goals in Standardization

The use of standard interface specifications enables a modular and open system approach.
- Defense Acquisition Guidebook Ch. 3–4.1.8 Interface Management Process

- **Enable system components and platforms to be separated, competed, and independently developed throughout the lifecycle**
  - Support using common, reusable hardware and software components that can be more readily adapted and refreshed, allowing DoD to deploy and support the latest technologies.
  - Provide the ability for competition of replacement elements, when properly supported by appropriate data rights/intellectual property access
  - Modular, open systems with standardized interfaces facilitate innovation and competition in future technology insertion and refresh efforts - *Defense Acquisition Guide Ch. 3–4.1.8 Interface Management Process*

MOSA Benefits and Approaches

- There is no single, magic bullet for implementing MOSA
- Determine expected outcomes up front



HOW

- Modular Design
- Defined Interface
- Standards Process
- Accessible Data
- Open Interfaces
- Intellectual Property (IP) Rights

WHAT

Modular Technical Design Approaches

- Design severable modules
- Define interfaces between modules
- Publish consensus-based standards
- Define, standardize & describe data models

Open System Business Approaches

- Use standards & specs for interfaces
- Recognize the relevant technical community
- Acquire necessary data & IP rights

Tri-Service MOSA Initiative

Memorandum for Service Acquisition Executives and Program Executive Officers dated January 7, 2019

SUBJECT:

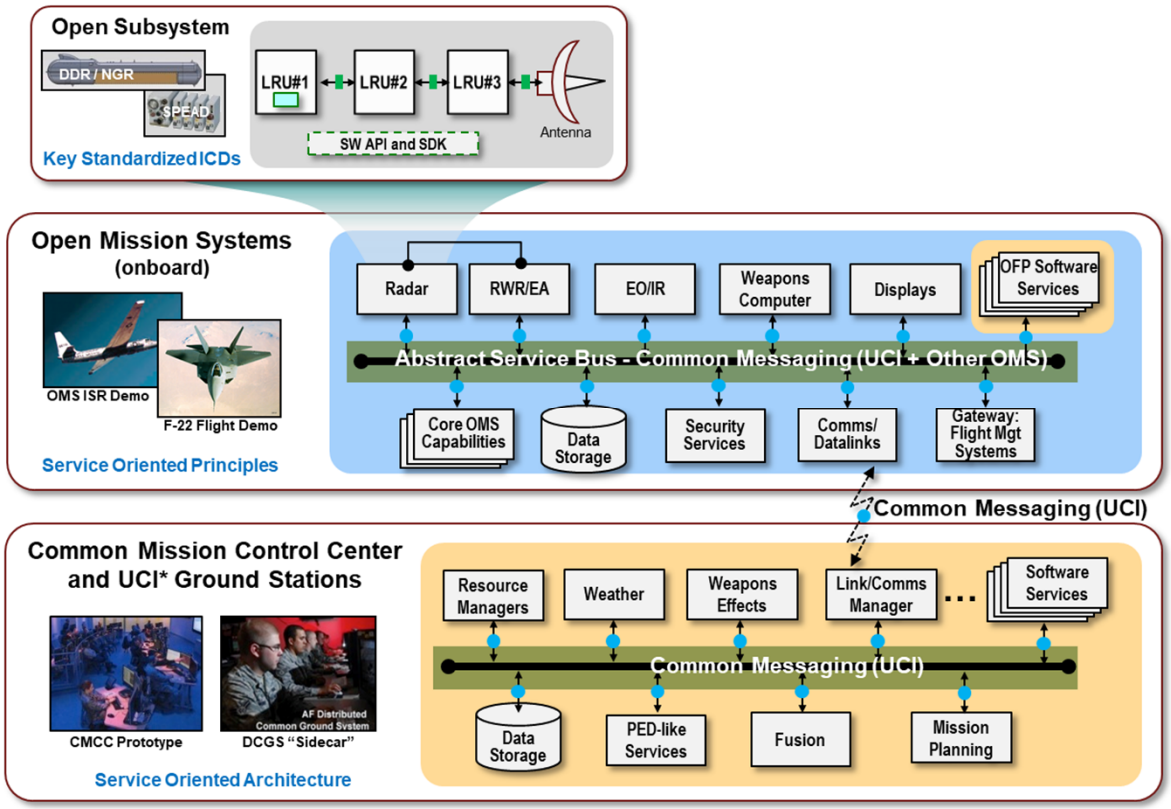
- Driven by the concerns of the Secretary of the Air Force, Army, and Navy on a lack of interoperability across the Department's systems
- The Service Secretaries signed this memorandum highlighting MOSA as a key enabler of interoperability and a critical warfighting imperative
- Highlights standardization efforts across the Services; (1) Air Force OMS/UCI initiative, (2) Army and Navy sponsored FACE™ implementations, and (3) Army VICTORY standards office
- Memo acknowledges there still exists a need to rapidly share information across domain
- "…Standardization Executives should continue standards development efforts where we have gaps."

MOSA is a warfighting imperative for weapon systems

AF Open Mission Systems (OMS)

OMS

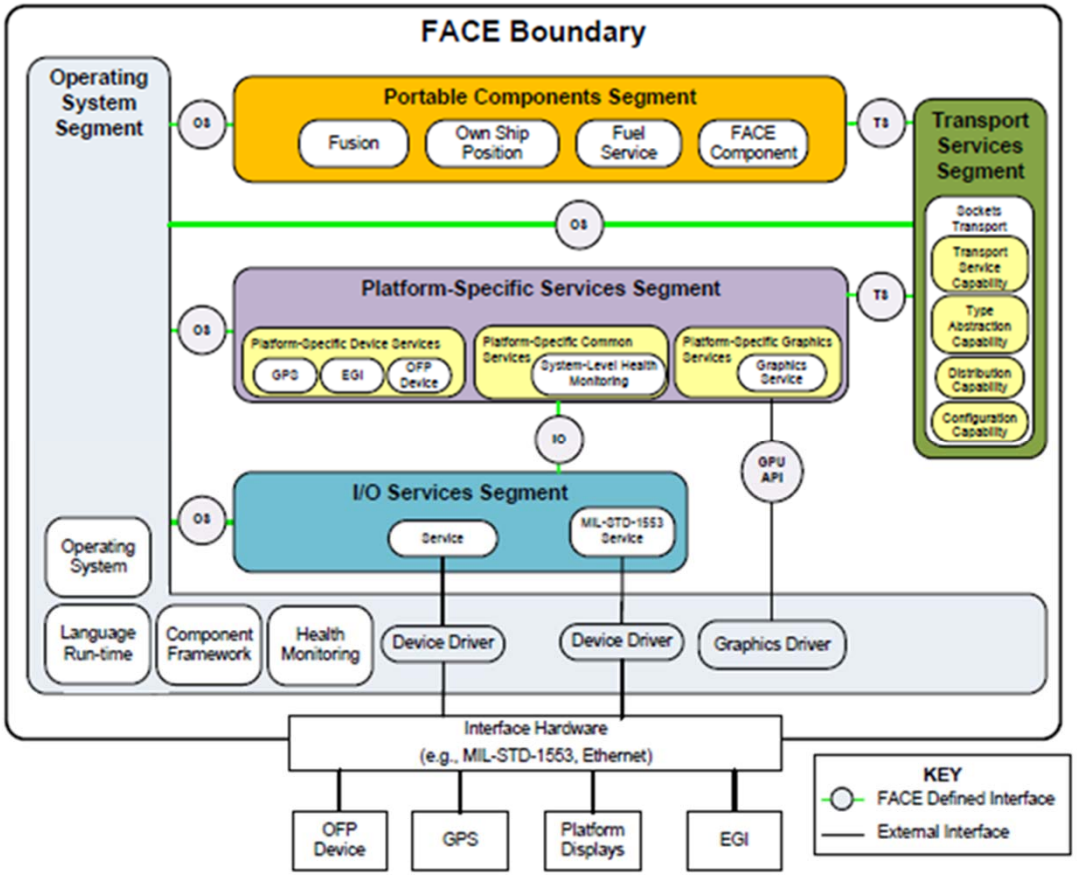
- **What Is OMS?**
  - Is an AF program to develop and sustain an industry consensus, non-proprietary architectural standard for mission systems – open key-interfaces, modularity, composition rules
  - The OMS reference architecture defines a set of architecture elements, or building blocks, that are used to document the key interfaces required of OMS elements
    - These architecture elements may exist within or otherwise impact one or more OMS defined architecture elements



Future Airborne Capability Environment (FACE™)

FACE™

- **What is FACE™ ?**
  - The Future Airborne Capability Environment provides a comprehensive business and technical framework for the FACE open architecture initiative as an implementation of the Modular Open Systems Approach (MOSA)
  - Key objectives are to reduce development, integration costs, and time to field avionics capabilities



Vehicular Integration for C4ISR/EW Interoperability (VICTORY)

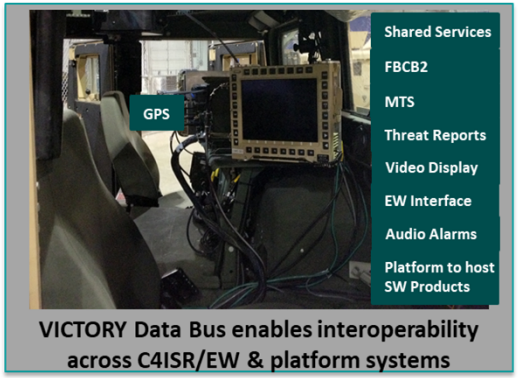
VICTORY

- **What is VICTORY?**
  - Vehicular Integration for C4ISR/EW Interoperability (VICTORY) focuses on adopting/adapting/authoring, validating, and managing a single authoritative framework and standards for vehicular integration

Because it's the <u>RIGHT THING TO DO</u>

Good Systems Engineering Approach to Integrating Electronics on Ground Platforms (C4ISR/EW/Other electronics) – Saves $$$ in the Long Run!

Vehicle programs adopt VICTORY to reduce / eliminate integration cost for new equipment



VICTORY Data Bus enables interoperability across C4ISR/EW & platform systems

"New Capabilities"

Mission equipment (especially high density) adopt VICTORY to share resources and data

VICTORY implementation is ongoing and will be arriving in fielded systems starting in 2020 for specific capabilities

Sample DoD Standardization Efforts for MOSA

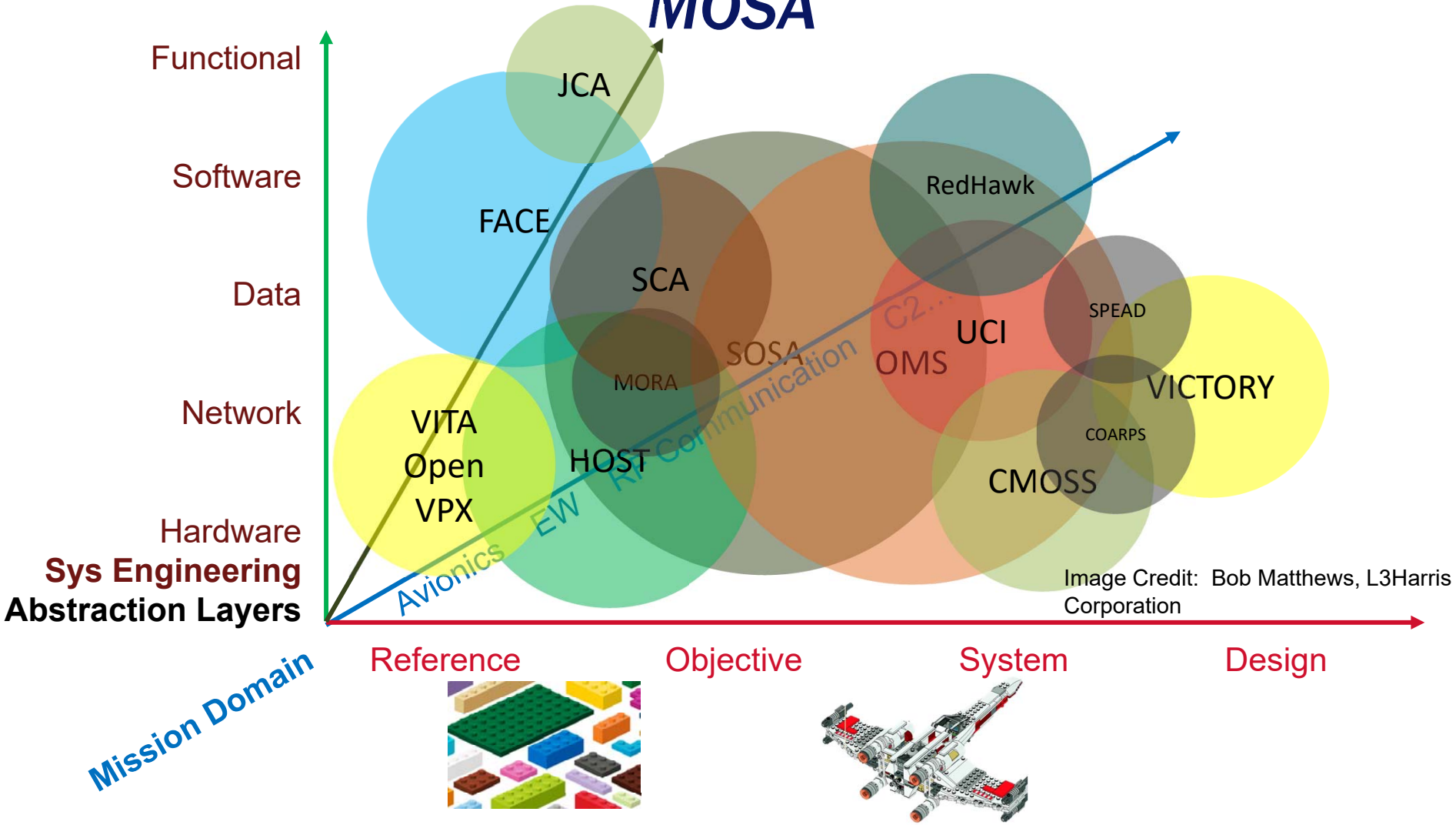


Image Credit: Bob Matthews, L3Harris Corporation

Picking the right standards is key!

Defense Standardization Program Office (DSPO)

TOOLS	TRAINING AND EDUCATION	JOINT AND SERVICE SPECIFIC EFFORTS	COALITION EFFORTS	STANDARDS DEVELOPMENT ORGANIZATIONS

• Acquisition Streamlining and Standardization Information System (ASSIST)
• Government Industry Data Exchange Program (GIDEP)
• Diminishing Manufacturing Sources and Material Shortages (DMSMS) Knowledge Sharing's Portal
• Guide Books
• Weapon System Information Tool (WSIT)
	• Defense Standardization Annual Conference
	• DAU Led Courses
	• Continuous Learning Modules
	• Defense Standardization Program Journal
	• DSPO Led Courses
	• Case Studies
	• Industry Conferences
	  ◦ AIA
	  ◦ Aging Aircraft
	  ◦ DMSMS
		• Defense Standardization Council
		• Joint Standardization Boards
		• Annual Defense Standardization Program Awards
		• Parts Managements & Qualification
			• **NATO** – operational, materiel, and administrative standards
			• **ABCA** - Australia, Britain, Canada, America – mostly land based standards
			• **AUSCANZUKUS** - Australia, Canada, New Zealand, United Kingdom, USA – mostly naval standards
			• **ASIC** - Air and Space Interoperability Council
			• **CCEB** - Combined Communication Electronics Board
				• **ANSI** - American National Standards Institute
				• **ISO** – International Standards Organization
				• **IEC** – International Electrotechnical Commission
				• **ASTM International**
				• **SAE** - Society of Automotive Engineers
				• **AIA** – Aerospace Industries Association
				• **AIAA** – American Institute of Aeronautics and Astronautics
				• **IEEE** – Institute for Electrical and Electronic Engineering

Championing standardization throughout the DoD to reduce costs and improve operational effectiveness

Modular Open Standards and Specifications (MOSS)

Phase I: Populate the MOSS with MOSA enabling standards stated in the Tri-Service memo.

Phase II: Further populate the MOSS with suitable MOSA enabling standards from the Standards Tiger Team.

Phase III: Continue to populate the MOSS with suitable MOSA enabling standards not yet identified.

Ongoing: Publish and maintain a list of efforts that enable MOSA but are not suitable for the MOSS.

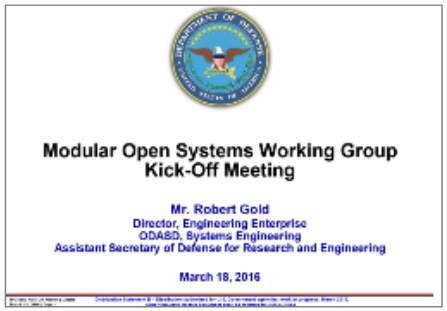
MOSA-Enabling Standards Identification to Date

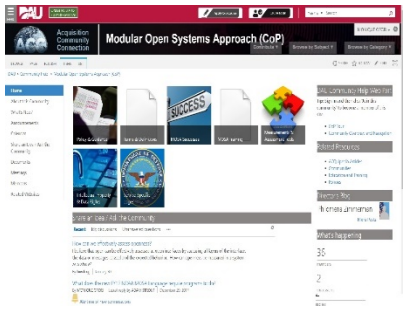
- **Army MOSA-Enabling Standards Data Call**
  - The Office of the Chief Systems Engineer (OCSE) Standards and Interoperability (S&I) Directorate issued a coordinated response to identify MOSA-enabling standards across the Army.
  - In response to the survey, a multitude of Assistant Secretary of the Army (Acquisition, Logistics and Technology) Program Executive Offices and organizations identified more than 226 standards, modeling languages, specifications, and architectures that could support MOSA.
- **Air Force Pick List**
  - The Air Force created an automated pick list that can be tailored by acquisition programs.
  - The Air Force Engineering Enterprise Executive Council developed a management Plan for Air Force Portfolio of Specifications and Standards. The goal was to develop/implement internal Air Force policy and practices for verifying the need for and guiding use of specifications and standards.
- **Navy**
  - The Navy Deputy Standardization Officer presented a list of MOSA-enabling standards to the Standards Tiger Team to include Acquisition Category I/II programs.

Future Collaboration and Way Ahead for MOSA and Standardization

MOSS and MOSA Community of Practice (CoP) leverage work completed to date, the talent and dedication of MOSA stakeholders

- **Modular Open Standards and Specifications (MOSS)**
  - Populate the MOSS area to provide a single source for access to MOSA-enabling standards to increase the Department's ability to rapidly share information across domains
    - https://assist.dla.mil
- **Continue Modular Open Systems Working Group (MOSWG)**
  - Provides an integrated approach to answering MOSA inquiries, addressing MOSA challenges, and identifying MOSA opportunities
- **Advance MOSA CoP**
  - https://www.dau.edu/cop/mosa/





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Acronyms

- CMOSS – C4ISR/EW Modular Open Suite of Standards
- COARPS – Common Open Architecture Radar Specification
- FACE™ – Future Airborne Capability Environment
- HOST – Hardware Open Systems Technology
- JCA – Joint Common Architecture
- MORA – Modular Open Radio Frequency
- OMS – Open Mission Standards
- SCA – Software Communications Architecture
- SOSA™ – Sensor Open Systems Architecture
- SPEAD – Scalable Payload for Electronic Attack Development
- UCI – Universal Command and Control Interface
- VICTORY – Vehicular Integration for C4ISR/EW Interoperability
- VITA Open VPX – VMEbus International Trace Association Open Virtual Path Cross-connect

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