Using the 5 Benefits of a Modular Open Systems Approach (MOSA) to Choose Enablers

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19th Annual NDIA Systems Engineering Conference
Springfield, VA | October 26, 2016

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‘Strategic’ Challenges

- **MOSA is not an all or nothing proposition**
  - Must tailor approach to expected MOSA outcomes
  - Permeates all aspects of systems engineering
  - Requires design trades based on near-term and long-term cost benefit
- **MOSA is more than just defining architectures and selecting standards**
  - Technical community
  - Business relationships
- **Governance and leadership matter**
  - Top cover for individual programs to succeed
  - Leadership and engineering where necessary across multiple programs
- **Industry must be an able and willing partner**
  - Design decisions, documentation, specifications, interfaces, tools, etc.

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Advancing MOSA within DoD

Modular Open Systems Working Group

- FY15 NDAA Sec 801
- OSA DR WG
- BBP 3.0 IPT
- TSWG

Advance Current Body-of-Practice

– The DoD MOSA Stakeholder community will collaborate to advance the current body-of-practice, leveraging the talent and dedication of the stakeholders currently working in this broad area

Establish & Execute Future Body-of-Work

– Develop a body-of-work of artifacts necessary to support implementation of M/OSA across system development and acquisition

– Deliver a set of artifacts to result in a compendium of necessary items to enable a comprehensive and cohesive understanding and treatment of M/OSA implementation across all domains related to the realization of systems for the DoD

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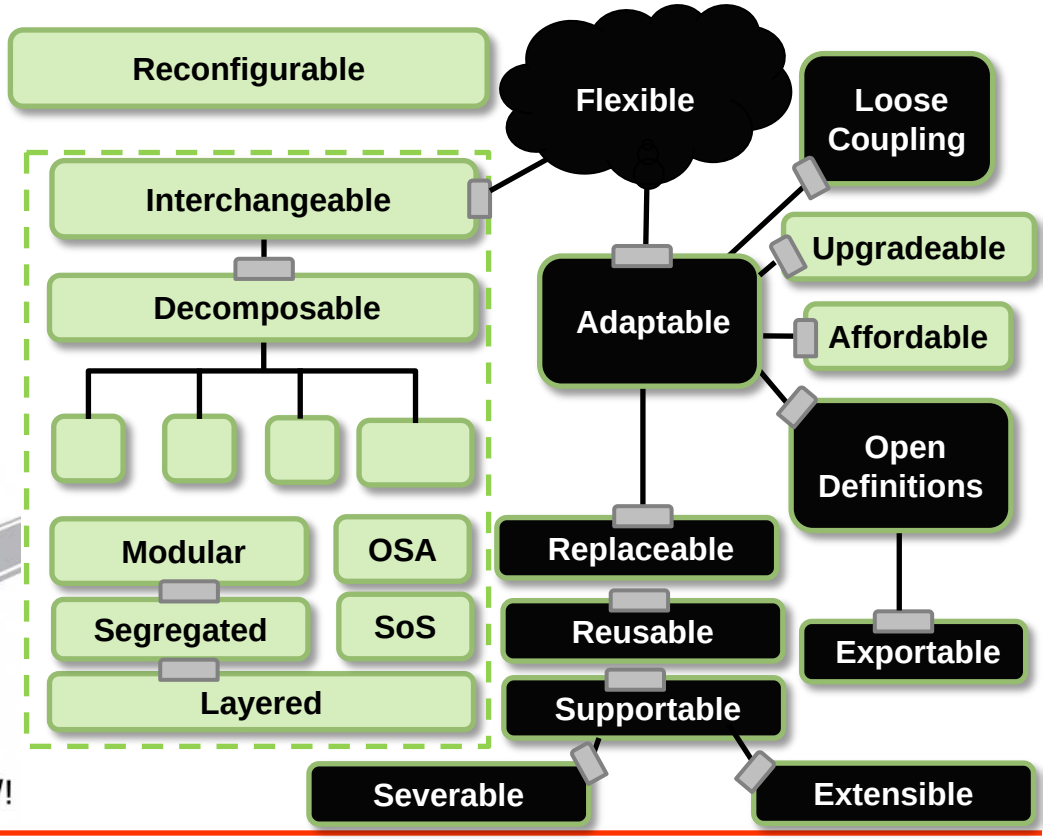
Modular Open Systems Complexity

- **Today's systems are complex in: size, interactions <u>between</u> components and subcomponents, and external interactions**
- **The <u>appropriate</u> <u>use</u> <u>of</u> modular design techniques and open systems standards can achieve the 5 MOSA benefits**
  - Interoperability
  - Technology Refresh
  - Competition
  - Innovation
  - Cost Savings/Cost Avoidance



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Modular Open Systems Approaches

Why → **How** → **What**

5 Benefits

- *Interoperability*
- *Tech Refresh*
- *Competition*
- *Innovation*
- *Cost Savings / Cost Avoidance*

Approaches

- **Modular Design**
- **Defined Interfaces**
- **Standards Process**
- **Accessible Data**
- **Open Interfaces**
- **IP Rights**

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

Supporting the goals for MOSA implementation are methods, processes and tools which underpin the approach

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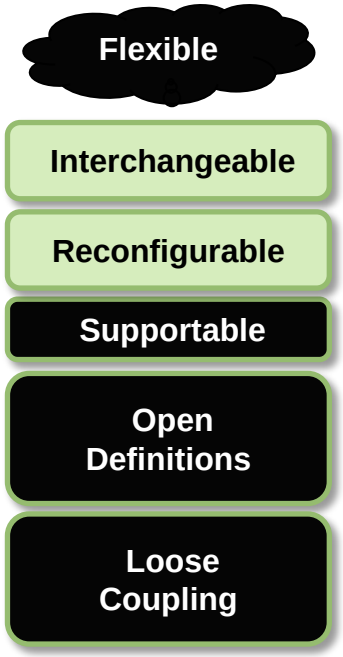
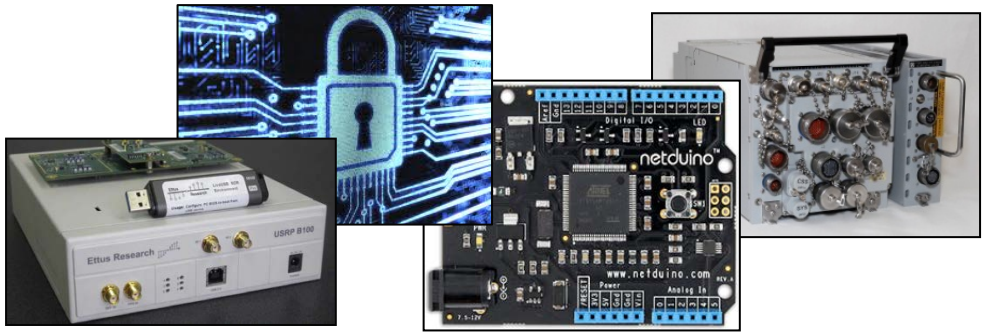
Improve Interoperability

- **Begin with the MOSA End Goal in Mind**
  - Enable systems (and software applications) to access and provide data + services using (open) interface definitions between components
- **Program Objectives**
  - Operational flexibility to support reconfigurable product configurations of existing capabilities to counter threats or enable different missions
  - Share and exchange data consistently between components (and system stakeholders) using defined data models





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Enable Tech Refresh

- **Begin with the MOSA End Goal in Mind**
  - Enable periodic upgrades of technology to assure system supportability
- **Program Objectives**
  - Enable technical flexibility for rapid and effective system upgrades
  - Upgrade technology without changing all components in the entire system

Flexible

Upgradeable

Severable

Replaceable

Adaptable

Loose Coupling

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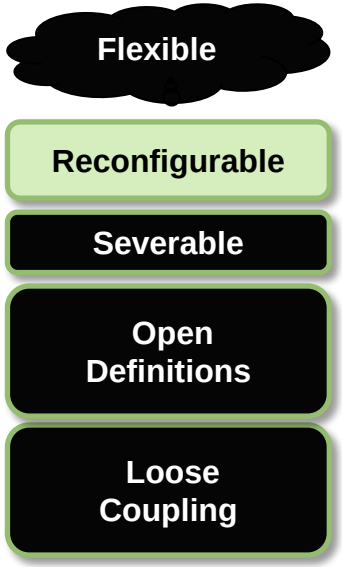
Increase Competition

- **Begin with the MOSA End Goal in Mind**
  - Prevent vendor lock and increase options for replacement/refresh
- **Program Objectives**
  - Platform and vendor independence when hardware (and software) implement open industry standards
  - Ability to openly compete severable modules
  - Compete portable components with open (specifications or standards for interfaces, services, and supporting formats) across a wide range of systems from one or more suppliers



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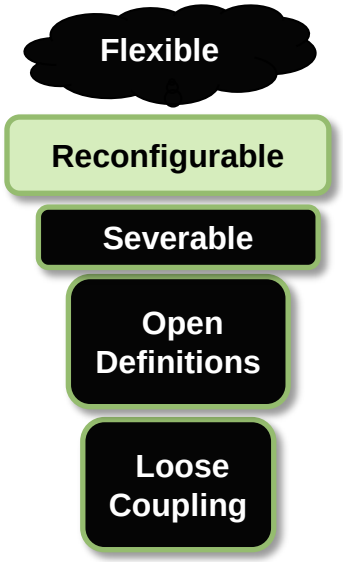
Incorporate Innovation

- **Begin with the MOSA End Goal in Mind**
  - Insert capabilities that provide technological innovation to the warfighter
- **Program Objectives**
  - Take advantage of new advancements in technology
  - Enable technical agility to meet rapidly changing requirements



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Improve Cost Savings/Avoidance

- **Begin with the MOSA End Goal in Mind**
  - Enable reduction in cost & time to decrease total cost of ownership
- **Program Objectives**
  - Achieve less expensive technical modifications
  - Additional capabilities and modifications desired without redesigning non-critical hardware or software
  - Ability to reuse previous investments: technology, modules or components across the acquisition lifecycle

Flexible

Affordable

Adaptable

Severable

Reconfigurable

Replaceable

Reusable

Supportable

Loose Coupling

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What Next?

- Define modularity and openness (technical and programmatic) in an ecosystem
- Address MOSA for component obsolescence and cases where there is a loss of critical suppliers
- Address how to plan for technology insertion and upgrades in tightly coupled, highly integrated systems
- Quantify the costs, benefits, and risks of MOSA across multiple dimensions (e.g. using tradespace exploration)
- Map beneficial elements of MOSA strategies to appropriate acquisition processes that encourage adoption
- Organize what we know, and plan for what needs to be done

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For Additional Information

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