RT-163/185: Investigating Approaches to Achieve Modularity Benefits in the Acquisition Ecosystem

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Research Task / Overview

Current DoD acquisition challenges

- to affordably address emerging threats
- component obsolescence
- loss of critical suppliers, and planned technology upgrade for tightly coupled, highly integrated systems

DoD acquisitions strategy : Better Buying Power 3.0 (BBP 3.0)

- Implement best practices to improve productivity, affordability, capabilities, reduce unproductive states across DoD acquisitions
- Includes encouraged use of modularization strategies to achieve desired end benefits…via a Modular Open Systems Approach (MOSA)

CHALLENGE: program managers need strategies and tools to be successful in a MOSA ecosystem

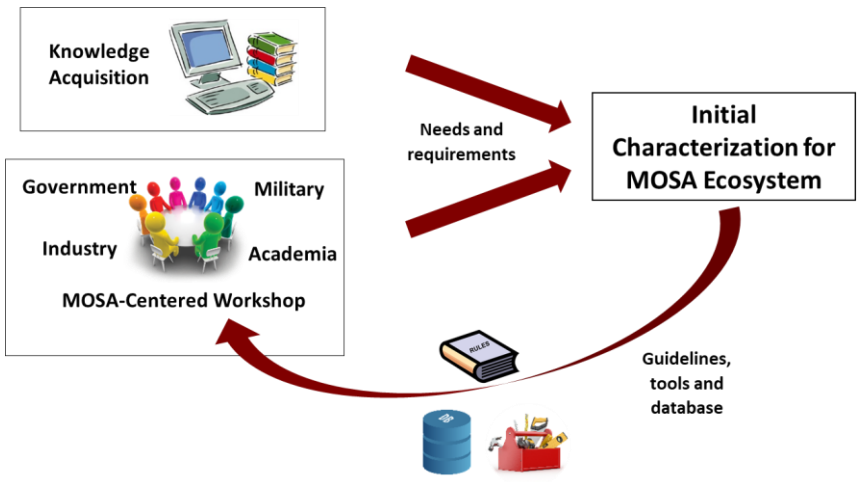
Goals & Objectives

MOSA Research Tasks with SERC have commenced: FY17 RT-163, FY 18 RT-185

- Investigate development of systems to **exploit modularity** to enhance defense acquisitions and military capabilities.
- Explore **concept of an ecosystem** that facilitates adoption of modular solutions to achieve benefits (business + technical ends)
- Investigate how to **encourage modularity** to gain its benefits – conducive modular patterns, decompositions, methods, factors, catalysts etc.
- Provide **guidance and insights** to:
  - aid program managers in decision-making on modularization and achieving the intended benefits
  - Connect desired program outcomes to a MOSA goal

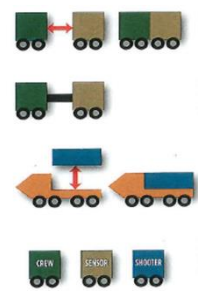
Initial Research Efforts [RT-163]

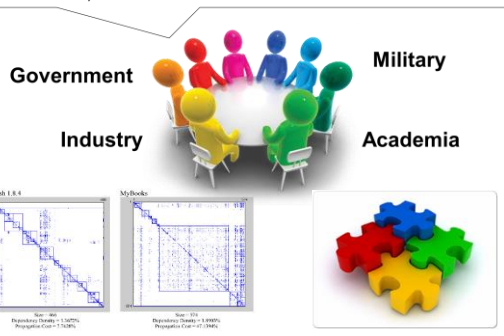
Prior RT-163 Research centered on initial MOSA Ecosystem Characterization



We conducted a MOSA workshop and deep dive knowledge acquisition process

- **Modularity should not be seen as an output** (hard to measure it), **but as means** to achieve functional architectures
  - Be sure to have "feedback" measures to inform choices
- **MOSA is a means to the end we care about, which is the 5 benefits**
  - Care for multiple stakeholders and their needs
- To show **"compliance",** evaluate the degree to which programs show that their **approaches are good in terms of the of the estimated benefits**
- Essentially, **"good modularity" is same as good architecting**
  - In this context **the complex ecosystem in which doing good architecting** (or good modularization) **is harder**
  - Encourage greater intentionality in adequate amount and style of modularity

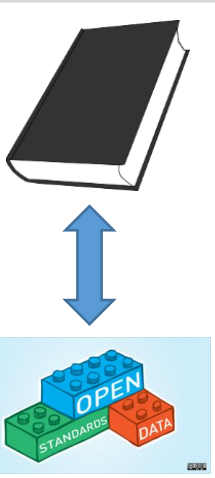




Outcomes of RT-163 included initial **Program Manager Guidance Document**

Program Manager Guidance Document Categories

- *What to Measure and Why*
- *Useful Strategies Exist at Different Acquisition Lifecycle Phases*
- *Caution! Emergent phenomenon in benefits and risks*
- *Ouch! Technical and programmatic pain points*



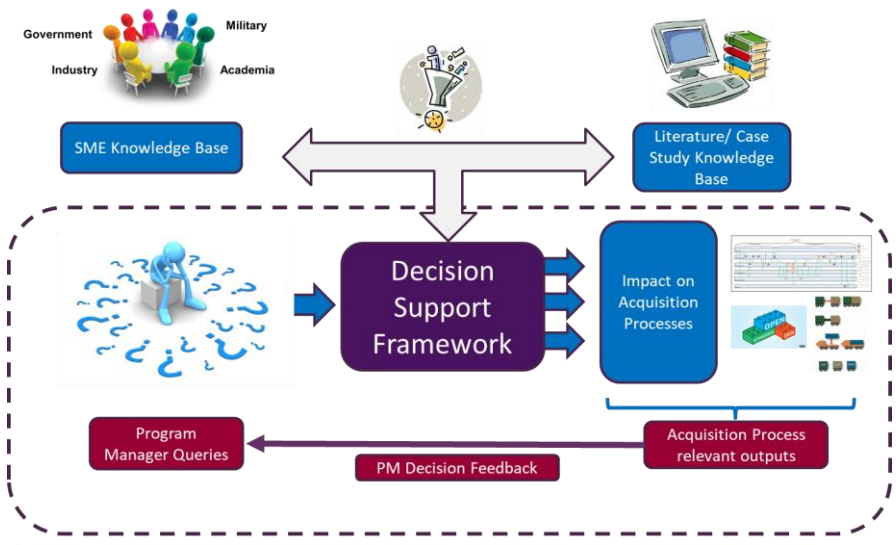
Current Research [RT-185]

Phase I: Extended Needs Identification Knowledge Acquisition

Further PM Guidance Document refinement:

- Further exchanges with key collaborators and contributors from government, industry, academia
- Directed knowledge acquisition and canvassing of case studies based on prior efforts

Developing a Decision-Support Framework



Decision-support framework uses experiential stakeholder community driven knowledge to:

- Provide qualitative insights on impact of stakeholder decisions
- Provide practical and actionable insights on how modular strategies will invoke acquisition processes (e.g. contracting, regulations, standards)
- Qualitative assess tradeoff across modular/open decisions

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