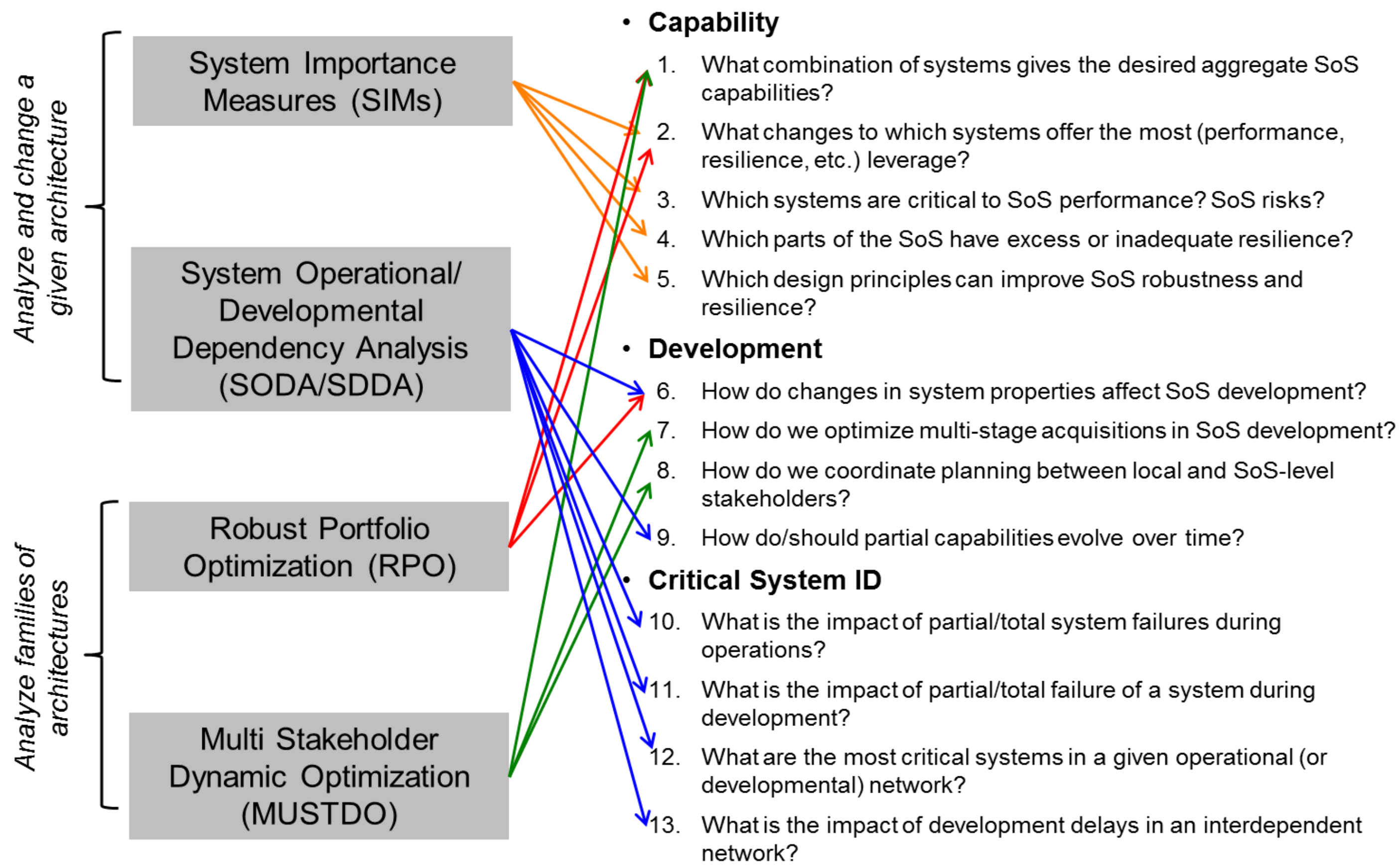


## Overview

OBJECTIVE – Test and validate the SoS analytic workbench (AWB) by addressing the “archetypal questions” in a unified naval warfare scenario

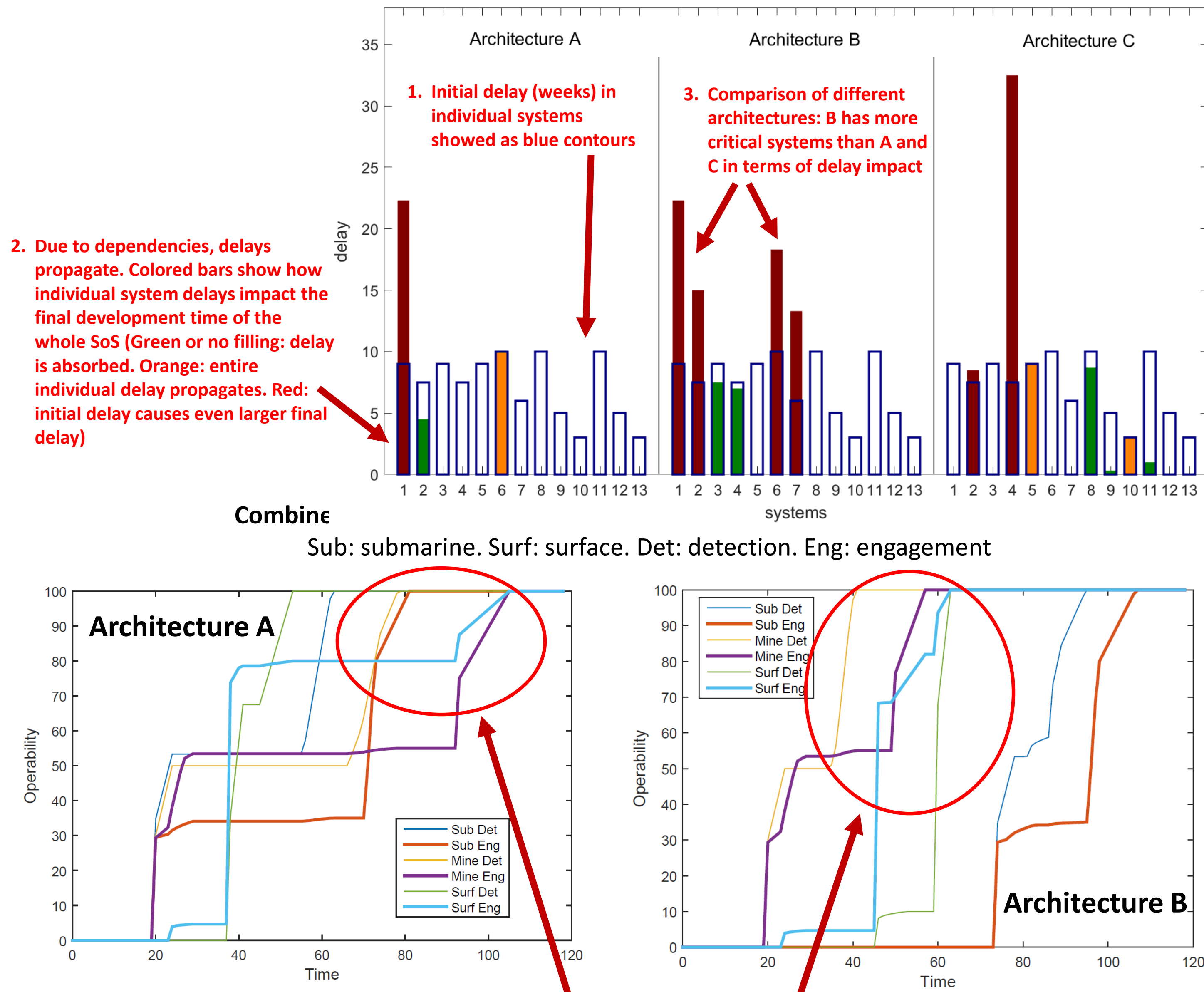


## Computational Methods

### Systems Developmental/Operational Dependency Analysis (SODA/SDDA)

Assessing the impact of developmental schedule and operational dependencies

SDDA shows how development delays in systems propagate in an interdependent network. What systems are critical in three Naval Warfare architectures?

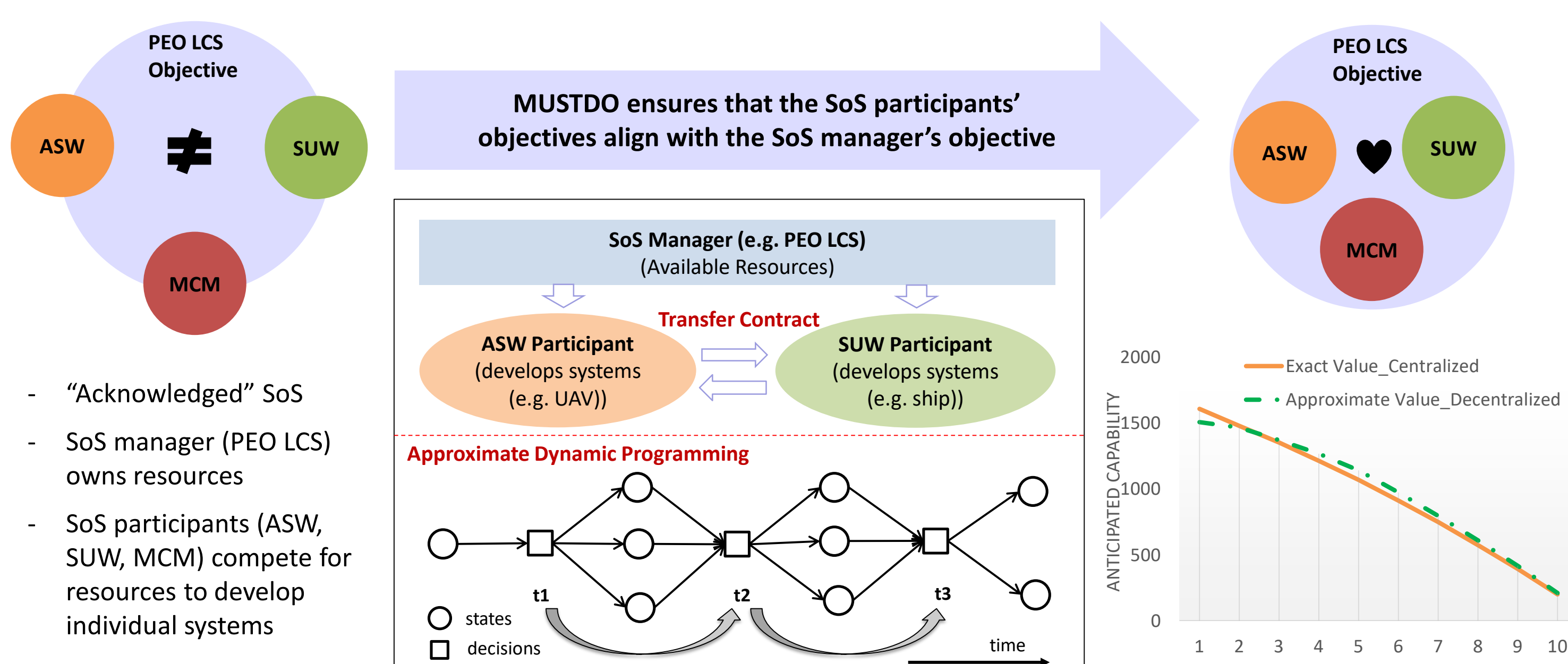


More questions can be addressed by SODA and SDDA, for example:

- Which systems are critical to SoS performance? What are the technical risks in the SoS?
- What is the impact of partial/total system failures during operation?

### Decision Tools: Multi-Stakeholder Dynamic Optimization (MUSTDO)

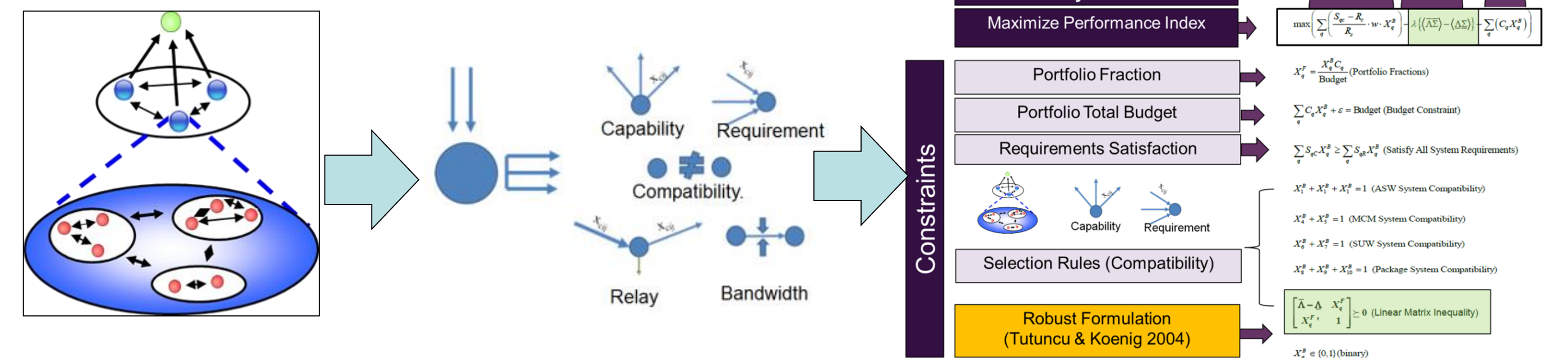
How do we coordinate planning between local and SoS-level stakeholders?



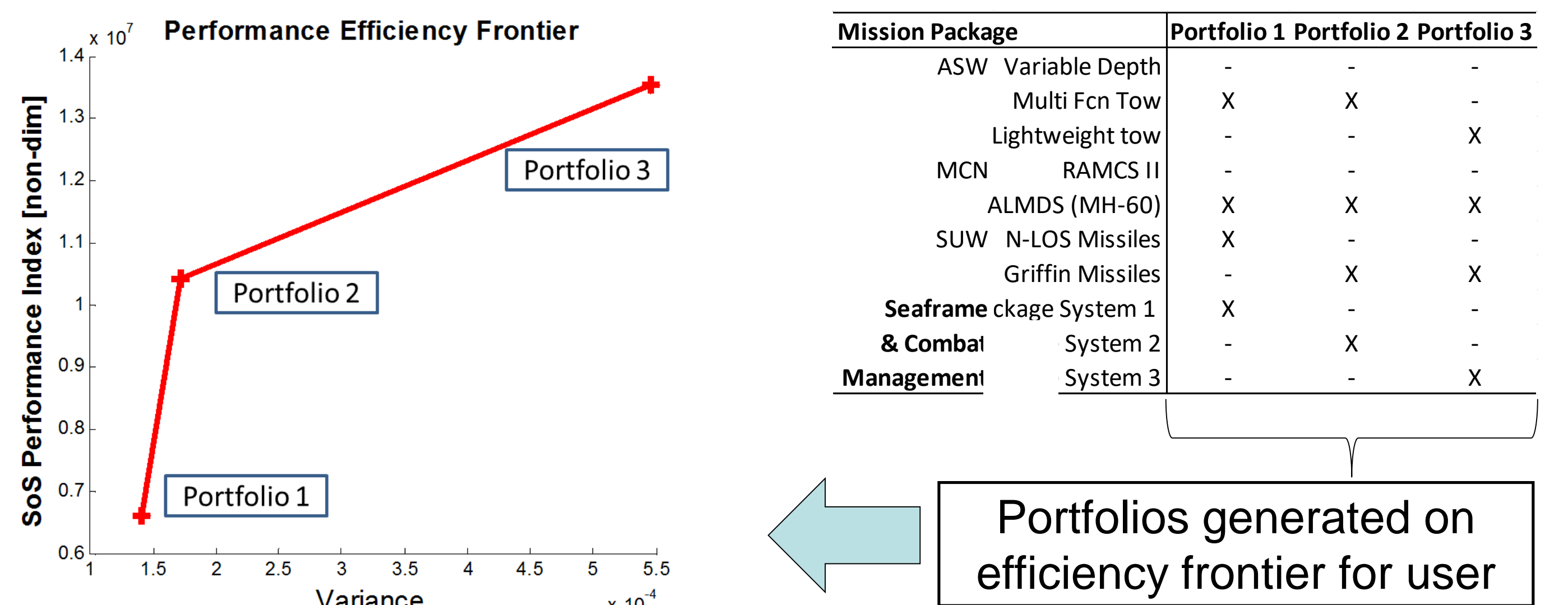
## Computational Methods

### Decision Tools: Robust Portfolio Optimization (RPO)

Decision support approach from operations research to identify portfolios of systems by leveraging performance against risk under various types of uncertainty

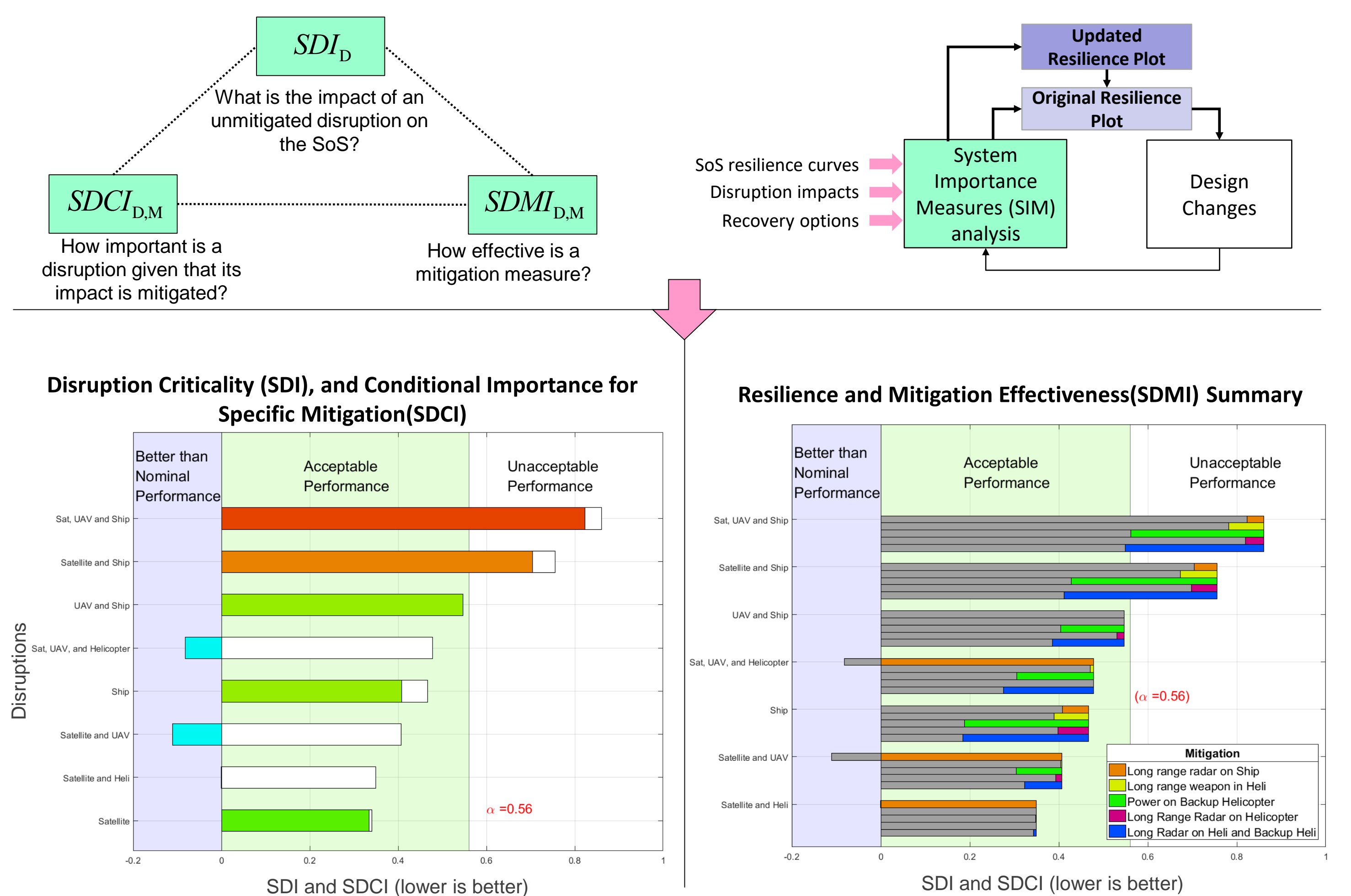


### Performance Efficiency Frontiers for Tradespace Analysis



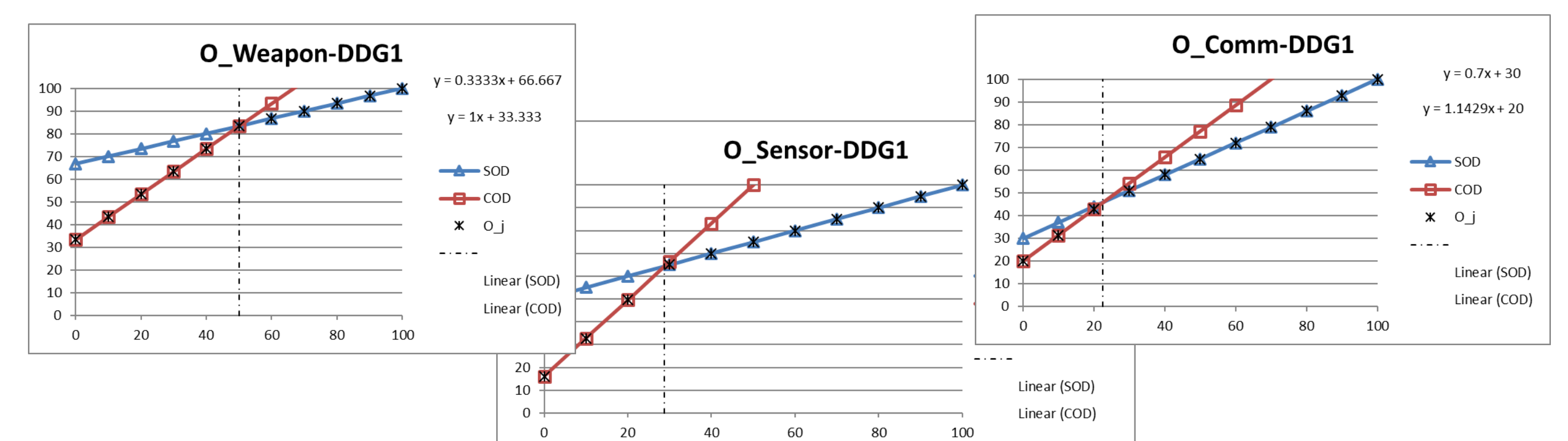
### System Importance Measures (SIMs)

Family of measures that rank systems based on their impact on the overall SoS performance. They help in strategically building resilience into an architecture.



## External Applications

• Transition of AWB software to NSWC Dahlgren Division



• Transition of AWB software to MITRE Corporation

## Contacts/References

Investigators:

Dr. Daniel DeLaurentis

Dr. Karen Marais

Dr. Navindran Davendralingam

Center for Integrated Systems in Aerospace

Purdue University

West Lafayette, IN

Contact E-mail: ddelaure@purdue.edu