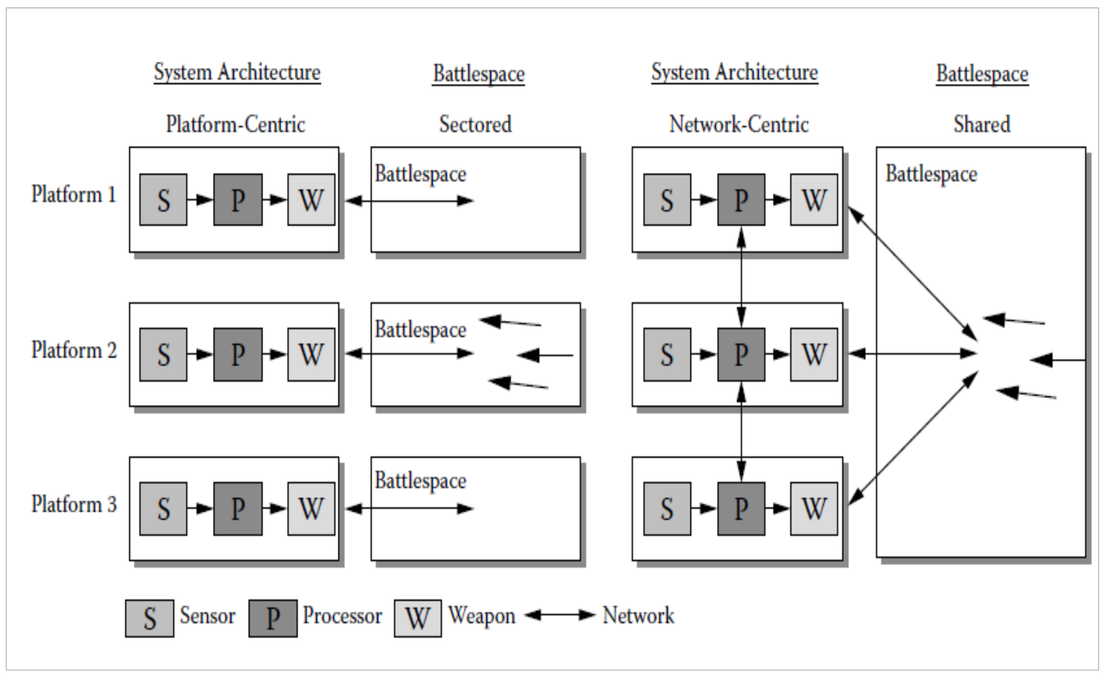
Applying a System-of-Systems Engineering Perspective to Current and Future Army Acquisitions

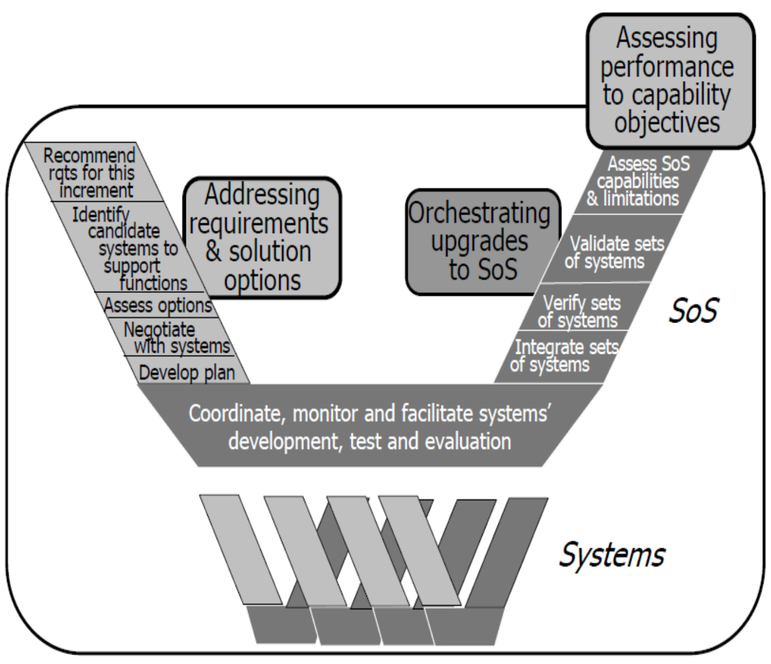
Naval Postgraduate School

Overview

The Army acquires systems to be part of larger system-of-systems (SoS) in which units are networked together to provide additional capabilities and greater flexibility in a dynamic environment. Even though the Army has acquired SoSs, the processes and organizations in the acquisition system are designed around a single system approach. This research explored an SoS engineering approach to all current and future Army acquisitions.



Comparison of Platform Centric Systems Architecture with Network-Centric Systems Architecture (Dickerson 2014)



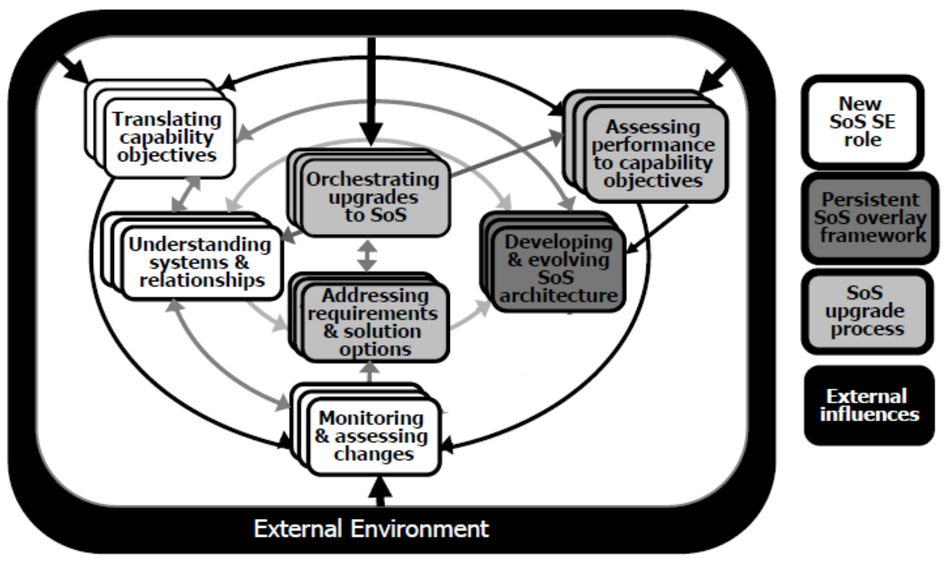
SoS Engineering Processes (OSD 2008)

Research Questions

- What are the lessons learned and best practices that can be gleaned from the Army's past attempts at SoS acquisitions?
- What current processes in the Army acquisition system should change, be created, or be implemented as policy in order to facilitate systems engineering from an SoS perspective?
- What organizational changes in the Army need to take place to facilitate a successful systems engineering process for SoS?

Methods

This research uses the seven core elements of SoS as described in the DoD SE guide for SoS (OSD 2008) as a framework to analyze past Army SoS programs, and to determine what was done successfully as well as areas that could improve. The research examines the Counter Rocket Artillery Mortar system, the Army Battle Command System, and the Future Combat Systems to extract lessons that could be applied using SoS engineering. The report concludes with procedural and organizational recommendations for implementing an SoS engineering approach to current and future Army acquisitions.



SoS Engineering Core Elements and Their Relationships (OSD 2008)

Conclusions

Some of the recommendations include:

- Standardize the integrated architecture
- Initially allocate funding at the SoS level, and divide up funding into constituent systems based on each system's objectives
- Use the SoS wave model as an assessment tool for SoS architectural evolutions and future SoS updates
- Train and designate SoS engineers as mandatory stakeholders in the Joint Capabilities Integration Development System (JCIDS) process
- Assign a Chief Interoperability Officer to all future Army acquisitions early in the process
- Assign capability portfolio managers at the PEO level, and organize future SoS acquisitions based on the capability manager's area of responsibility

Acquisition Research Program
Graduate School of Business & Public Policy

www.acquisitionresearch.net

Chike Robertson, MAJ, Army

Advisors: Dr. Ronald Giachetti
Dr. Kristin Giammarco