Systems Engineering in Army Acquisition

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The effective performance of systems engineering best practices on a development program yields quantifiable improvements in program execution (e.g., improved cost performance, schedule performance, technical performance).

The **Army System Engineering** program and policy approved (13 June 2005)

- Requires a SEP for each program

- Establishes a System Engineer within each program and PEO

- Establishes Army System Engineering Forum (ASEF)

- Establishes peer review at all major technical reviews

- Establishes the PEO as the SEP approval authority

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SAAL-SSI

MEMORANDUM FOR PROGRAM EXECUTIVE OFFICERS
DIRECT REPORTING PROJECT MANAGERS

SUBJECT: Army Systems Engineering Policy

The Under Secretary of Defense for Acquisition, Technology and Logistics issued policy to reinvigorate systems engineering within the Department of Defense. Guidance for implementing systems engineering across Army Acquisition, Logistics and Technology is enclosed.

The Assistant Deputy for Acquisition and Systems Management, Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology, will chair an Army Systems Engineering Forum (ASEF) that is chartered to institutionalize effective systems engineering practices across our workforce and programs, and to promote collaboration across our requirements, acquisition, logistics, and testing communities. Each Program Executive Officer and Direct Reporting Program Manager is to designate a Chief System Engineer to participate on the ASEF. I expect the ASEF to plan, coordinate, manage, and execute initiatives for the resurgence of effective systems engineering, balancing programmatic cost, schedule, and supportability with technical reality. Within two weeks, please provide the name of your Chief System Engineer to Dr. James Linnehan, SAAL-SSI, (703) 604-7430, or e-mail: james.linnehan@saal.army.mil.

Systems engineering excellence can integrate all elements of our U.S. Army community into a process driven disciplined team, producing timely, affordable, high quality products meeting the needs of our warfighters. I look forward to working with you to make this vision a reality and compelling success.

Claude M. Bolton, Jr.
Assistant Secretary of the Army
(Acquisition, Logistics and Technology)

Enclosure

CF:
USD(AT&L)
CG, AMC
CG, TRADOC

System Challenge for the Army

> **Army systems are becoming more interdependent, and required operational capability is not provided by a single system but rather by a combination of systems**

System of Systems (SoS) Systems Engineering (SE) capability at the Enterprise level is necessary to address:

- Stove-pipe product development

- Many interdependencies

- Path from Current to Future Systems

- LandWarNet and Battle Command operations…
  Requirements are done outside of the systems engineering process; we are engaging the Training and Doctrine Command (TRADOC) on Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) and battle command migration, and identifying new processes for system of systems development.

System of Systems (SoS) - A set or arrangement of systems that results when independent and useful systems are integrated into a larger system that delivers unique capabilities

System of Systems Systems Engineering (SoS SE) - Planning, analyzing, organizing, and integrating the capabilities of a mix of existing and new systems into a SoS capability greater than the sum of the capabilities of the constituent parts
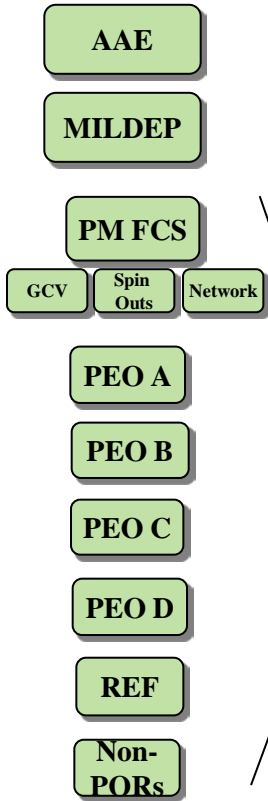
SoS SE Management Structure

TODAY

- AAE
- MILDEP
- PM FCS
  - GCV
  - Spin Outs
  - Network
- PEO A
- PEO B
- PEO C
- PEO D
- REF
- Non-PORs

Solutions Fielded But Not Integrated Across Brigade Formations

FUTURE

Performs Integration Function Across Brigade Formations

- AAE / MILDEP
  - SoS SE
    - PEO A
      - TF WBDE Mod PM
    - PEO B
      - TF XBDE Mod PM
    - PEO Integration
    - PEO C
      - TF YBDE Mod PM
    - PEO D
      - TF ZBDE Mod PM

Formerly PM FCS
- GCV
- Increments
- Network

INTEGRATION Formation Based Task Forces
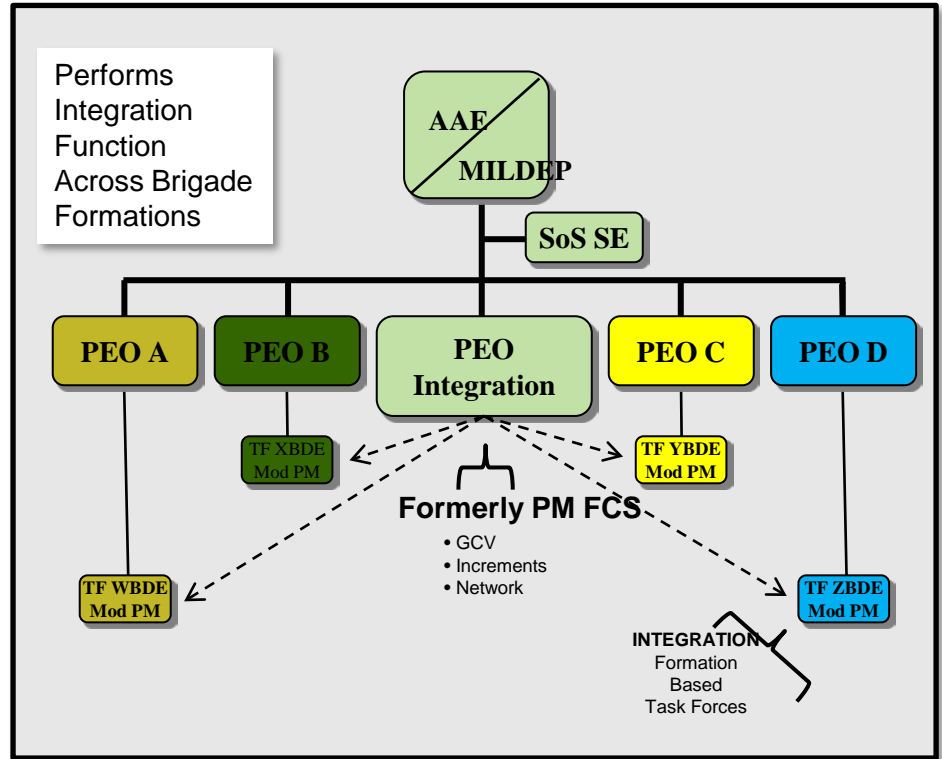
- **Leverages Investment in BCT Modernization**
- **Organized to Integrate and Incrementally Deliver Materiel Solutions Across Brigade Formations**
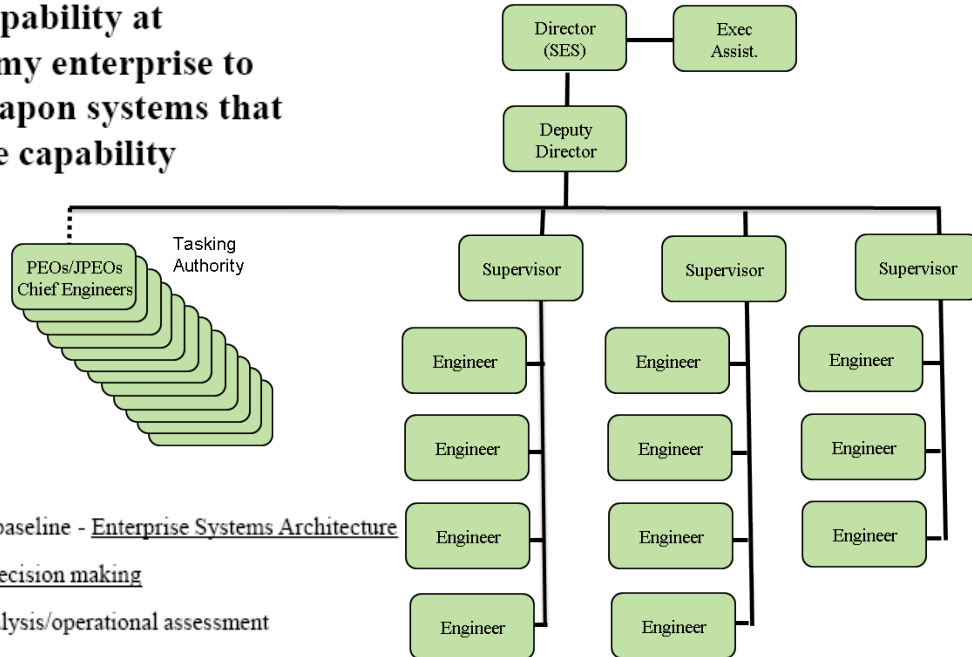
SoS SE Organization

MISSION

Provide Systems Engineering capability at System of Systems level across the Army enterprise to deliver integrated and interoperable weapon systems that provide optimized and affordable capability

Director (SES)

Exec Assist.

Deputy Director

PEOs/JPEOs Chief Engineers — Tasking Authority

Supervisor — Engineer, Engineer, Engineer, Engineer

Supervisor — Engineer, Engineer, Engineer, Engineer

Supervisor — Engineer, Engineer, Engineer

FUNCTIONS

- Develop, evolve, and maintain a detailed, interoperable SoS design baseline - Enterprise Systems Architecture
- Address technical, operational and cost aspects to frame issues for decision making
- Leverage experimentation and M&S tools as part of engineering analysis/operational assessment
- Establish and evolve an SoS vision over time, and translate into capability attributes
- Translate emerging requirements into implied system attributes for technology insertion solutions
- Lead targeted technical assessments to enable cost/capability trades within and across system boundaries
- Maintain visibility into individual system architectures, specifications & performance
- Coordinate technically with SEs in related programs (Army, Joint)

SoS SE Interface

Design, develop and facilitate the delivery of relevant, integrated and affordable capability sets by type of formation over time in support of the Army's modernization strategy, LANDWARNET and Army Force Generation (ARFORGEN) fielding cycles.
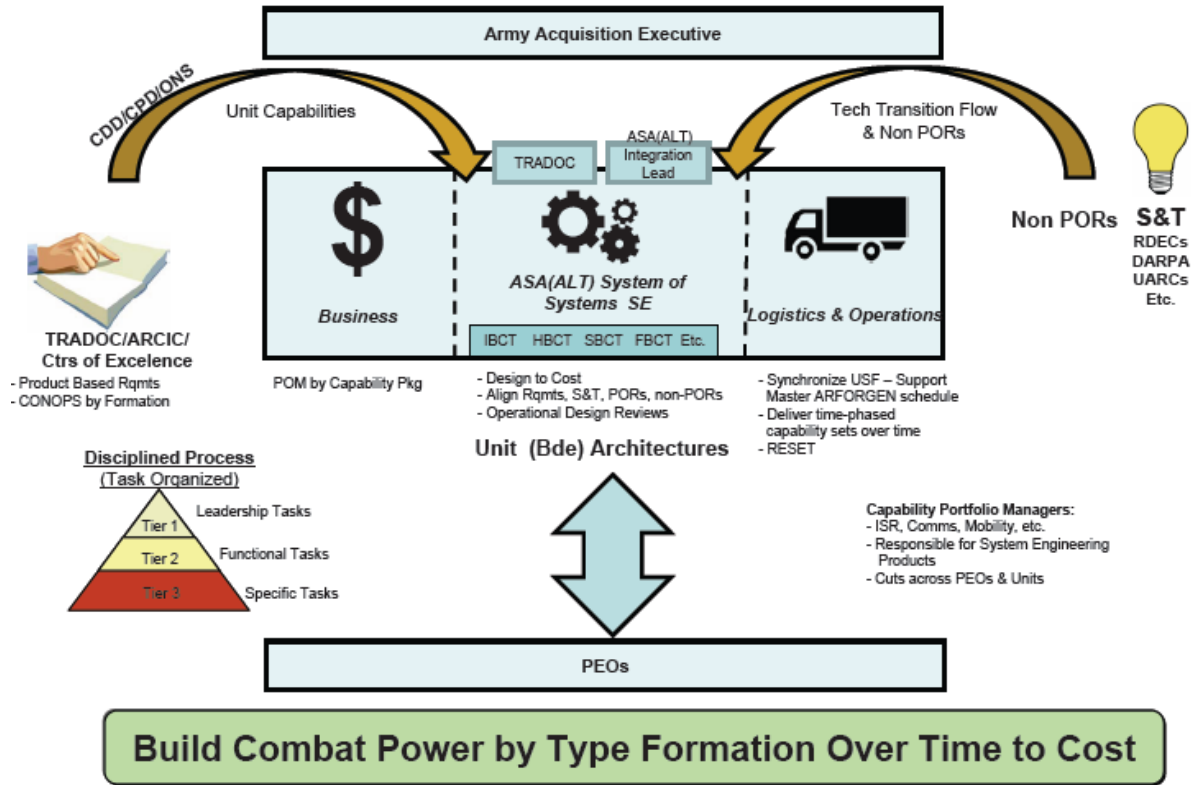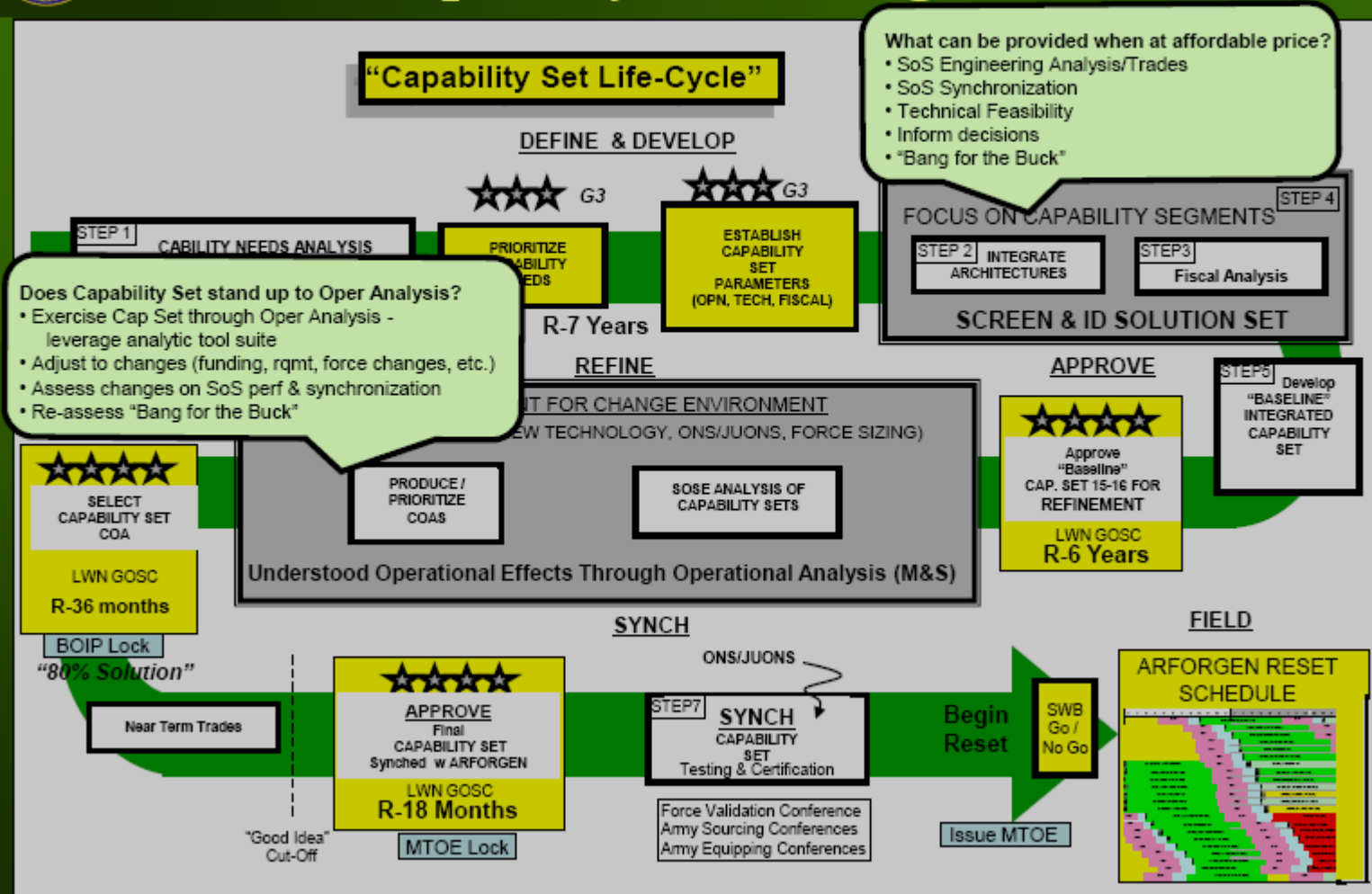

Build Combat Power by Type Formation Over Time to Cost

Summary

System of Systems systems engineering is an enabler in the new Army BCT Modernization strategy.

Systems Engineering is being done in Army programs; we need to ensure that it is consistent, and consistently followed across the PEOs.

Implement efforts to support requirements generation at the System of Systems or Enterprise Level, and help define the trade space.