Systems Engineering in Army Acquisition

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Army Systems Engineering Policy

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).

- 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
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

PEO Integration

- PEO A
- PEO B
- PEO C
- PEO D

Formerly PM FCS

- TF WBDE Mod PM
- TF XBDE Mod PM
- TF YBDE Mod PM
- TF ZBDE Mod PM

INTEGRATION

- Formation Based Task Forces

- GCV
- Increments
- Network

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

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)
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.
ASA (AL&T) LWN/BC Capability Set Management Process

“Capability Set Life-Cycle”

DEFINE & DEVELOP

- G3

FOCUS ON CAPABILITY SEGMENTS

- STEP 2 INTEGRATE ARCHITECTURES
- STEP 3 Fiscal Analysis

SCREEN & ID SOLUTION SET

- STEP 4

APPROVE

- Develop “Baseline” Cap. Set 15-16 for Refinement
- LWN GOSC R-6 Years

FIELD

- ARFORGEN RESET SCHEDULE

DESIGN • DEVELOP • DELIVER • DOMINATE
We Make Soldiers Strong

Does Capability Set stand up to Opér Analysis?
- Exercise Cap Set through Opér Analysis - leverage analytic tool suite
- Adjust to changes (funding, rqmt, force changes, etc.)
- Assess changes on SoS perf & synchronizaton
- Re-assess “Bang for the Buck”

Understood Operational Effects Through Operational Analysis (M&S)

- Final CAPABILITY SET Synched w ARFORGEN
- LWN GOSC R-18 Months

“Good Idea” Cut-Off
- MTOE Lock

Begin Reset
- SWB Go / No Go

ISSUE MTOE

Near Term Trades
- BOIP Lock
- “86% Solution”
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.