ASA(ALT)
Office of the Chief Systems Engineer (OCSE)

Info Brief
Integrated SoS Architecture

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Systems Architecture Development Across the Acquisition Community

Integrated SoS Architecture Challenges

• Architecture capability is focused on program specific support
• Program specific efforts don’t link to a comprehensive SoS view
• Products need to support broader Army processes and decision forums

Systems Architecture / Analysis Vision

As the Army’s Systems Architect….

Establish the capability to develop & deliver the architecture products that enable analysis & trades and provide timely relevant information for decisions
Systems Architecture Relevancy

Organize, visualize, analyze, and communicate stakeholder concerns through various viewpoints

Cost View
Capability View
SE View
Acquisition etc.

“Fit for Purpose”

View
Federated Architectures

Core Processes

Relevancy

• Resourcing
• Capabilities Approval
• Integrated Cap Dev
• Materiel Development
• Reference / Imp Arch
• Fielding

Transport
Platforms
Apps & Services
Sensors

PPBE/PfM
JCIDS
DOTLMPF
Acquisition
Systems Eng
ARFORGEN

E – Enterprise
M – Mission Area
C – DoD Component
P – Program

✓ Conceptual
✓ Enterprise
✓ Capability
ASA(ALT) Ref/Integrated Architecture Goals

- Establish reference architectures for all Army formations, across time, that form the basis for representing and communicating the Army’s programmed plan.
- The data is organized in order to support views and analysis across organizational and budgeting bins.
- Enable trades and analyses that use these architecture data to support informed systems acquisition decisions across the life cycle.

Unprecedented integration of data and concepts!
Levels of Architecture
“A System-of-Systems Architecture View”

Components of “The Big Picture”

- Entire Global Network (GIG)
- Army Enterprise Network / GNEC
- Army Generating Force Network
- Army Tactical Network
- Post/Camp/Station/FOBs
- Across all Phases of Military Ops

The Pieces

- Network Arch by Formation / Echelon
- Common Operating Environment (COE) Reference Architecture
- Transport/NetOps Reference Arch
- Platform Reference Architectures

Solutions

- System Architectures
  - Platforms (Air, Gnd, Sldr)
  - Mission Command (CP CE)
  - Radios (GMR, RR, 117G,..)
  - Sensors (Imaging, Radar, ..)
  - Network (NIR/NIE, 4ID, ..)
### Systems Architecture Efforts

ASA(ALT) systems architecture/analysis has made significant progress, and our products have been used in various forums to support Army/Joint decision making (some examples):

<table>
<thead>
<tr>
<th>Product</th>
<th>Status</th>
<th>Supported Process</th>
<th>Result(s)/Anticipated Result(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Army Network Design Trade</td>
<td>Complete</td>
<td>PPBE, CPR, Acquisition</td>
<td>Army network Strategy; CS13-14; RMD12</td>
</tr>
<tr>
<td>Network BOI Feeder Data</td>
<td>Complete</td>
<td>PPBE, CPR, Acquisition</td>
<td>CS13,14, &amp; NIE network design, RMD12, Radio DRs, GMR N-M, HMS MS C</td>
</tr>
<tr>
<td>Living Organizationally Based Architecture Pilot</td>
<td>Complete</td>
<td>DOTMLPF, Systems Engineering</td>
<td>Linkages between systems arch, operational arch, and M&amp;S (TRADOC &amp; ASA(ALT))</td>
</tr>
<tr>
<td>Platform Integration SWaP Study</td>
<td>Working (30%)</td>
<td>PPBE, Acquisition, ARFORGEN</td>
<td>Army decision on CS-13 &amp; 14 platform mods, RMD13, Unit selection in FY14</td>
</tr>
<tr>
<td>Network Operations IPT</td>
<td>Working (50%)</td>
<td>PPBE, Acquisition, DOTMLPF</td>
<td>NIE NetOps efforts, reduced operational complexity and reduced troop to task ratios, potential re-programming</td>
</tr>
<tr>
<td>Transport Convergence Trade Study</td>
<td>Working (70%)</td>
<td>PPBE, Acquisition</td>
<td>Realignment of satellite acquisition programs and assets</td>
</tr>
<tr>
<td>Integrated Base Defense</td>
<td>Working (80%)</td>
<td>PPBE, Systems Engineering, JCIDS</td>
<td>IBD Design and reference architectures, FY14-18 POM process input, requirements adjudication</td>
</tr>
<tr>
<td>Aerial Tier Analysis</td>
<td>Working (20%)</td>
<td>DOTMLPF, Acquisition, PPBE</td>
<td>Adjustments to the BOIP, NIE participation, reference architecture design, POM15-19 input</td>
</tr>
<tr>
<td>COE Governance</td>
<td>Working (75%)</td>
<td>SoS Systems Engineering - ALL</td>
<td>Advanced and integrated systems trades, over time, relative to integrated requirements</td>
</tr>
<tr>
<td>Reference Architectures (VICTORY, FACE, SPIE)</td>
<td>Working (90,20,20)</td>
<td>SoS Engineering</td>
<td>Direct impact to Army platforms and sensor integration</td>
</tr>
<tr>
<td>Infrastructure development - Portfolio Management</td>
<td>Working (30%)</td>
<td>SoS Systems Engineering - ALL</td>
<td>Advanced and integrated systems trades, over time, relative to integrated requirements and across portfolios</td>
</tr>
</tbody>
</table>

Advancements necessary to address increased complexity

**Focused Trades and Analyses**

- COE Governance
- Reference Architectures (VICTORY, FACE, SPIE)
- Infrastructure development - Portfolio Management
What we need to do next: Linking Business Areas to Establish an Integrated Architecture

Integrated Architecture

Program Management

Army Decisions

Brigade Design

13-14 COA Development

What we need to do next:
Linking Business Areas to Establish an Integrated Architecture
Discussion
Architectures of value are “fit for purpose”, but in general support the description of Formations, Systems, and their interactions.

Architectures combined with operational scenarios and CoAs enable modeling and simulation, and analysis.

Recent additions to the DoDAF also enable descriptions of Capabilities, Services, and Programmatic, but our tools have yet to maturing.

Tools and processes enable a continuum of activities that support the life cycle.
Annual Programmed Plan Refinement Process
(Supported by Integrated Architectures)

13-14 COA Development

- Force Structure
- TRADOC 13-14 Requirements & Objectives
- POR, COTS, and GOTS Solution Schedules
- COAs

Proposed Changes to the Planned Program

Architecture Updates
- PEOs/PMs
- WSRs

Army Decisions

The Programmed Plan (FY 11-17)

PoR 1
PoR 2
PoR 3
PoR Z

The Revised Programmed Plan (FY 11-17)

PoR 1
PoR 2
PoR 3
PoR Z

Repeat
Examples of Architecture is adding value now

(1 of 2)

An example:

Trades & Analysis by “Formation Type”

- VCSA RPR
- TF 120
- R-Series TOE

BOI FD WG

RMD 12
POM 13-17
DRs
BOIP Updates
JTRS Decision (NM, HMS MSC)

NSWG I

Objective Network

Bridging Strategy

NSWG II

Repeat

PLAN

(Actual Code & HW, Routing Arch, Technology Trades)

Final Design by “Patch” (Init Files, Detailed BoM, Schedule)

Lab Testing (117G)

ANW2 Network

Entire Routing Design (Unicast, Multicast, Voice)

NIR/NIE

Aug MTOE + TPE

Agile Process

Detailed Routing Arch/Data

“Fielding” the 2/1 AD

Lab Developed Routing Arch

BCTIE JUL 2010

Engr Level Trades Detailed Design

Executive

R-Series Conference
Examples of Architecture is adding value now

(2 of 2)

- **Trades & Analysis by “Formation Type”**
- **Bridging Strategy**
- **Objective Network**
- **Radio Lab Testing (117G)**
- **ANW2 Network**
- **Entire Routing Design (Unicast, Multicast, Voice)**
- **Final Design by “Patch” (Init Files, Detailed BoM, Schedule)**
- **Aug MTOE + TPF**
- **Agile Process**
- **Detailed Routing Arch/Data**

**“Fielding” the 2/1 AD**