Enterprise Integration Using Simulation Based Acquisition

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The Challenge Multi-Sensor Command and Control Constellation Architectures Simulation Based Acquisition Enterprise Integration Case Study Link-16 Analysis and Engineering Joint Synthetic Battlespace
Objectives

- The Challenge
  - Multi-Sensor Command and Control Constellation

- Architectures

- Simulation Based Acquisition

- Enterprise Integration Case Study
  - Link-16 Analysis and Engineering

- Joint Synthetic Battlespace

- Conclusion
The Challenge: System Interoperability & Integration

“Integrated and responsive ISR capabilities operating in a collaborative enterprise assuming delivery of timely, relevant information for the NCA and Joint / Combined forces”

Challenge is Getting there!

Source: Intelligence, Surveillance, and Reconnaissance Integrated Capstone Strategic Plan, ASD(C3I), 3 Nov 00
The Multi-Sensor C2 Constellation Approach

- Simulation Enhanced Acquisition
- Technology Enablers
- Legacy Systems Transition
- Industry Involvement Pivotal
  - System of Systems Integrator
  - Teaming Required

Key Enabler for the Global Strike Task Force Concept
Operational Attributes for MC2A

- Air Force
  - MT3C
  - BMTC (Cobra Judy)
  - DCGS
  - MP-RTIP
  - Other
  - National

- Other Service
  - Army (ACS, FCS)
  - Navy (AEA, MMA)
  - CG (Deep Water)
  - Other
  - Joint
  - Coalition

The challenge is to:
- Define / refine the operational “trade space”
- Deliver a set of “enterprise solutions”
"Building it right"
-- Enterprise Integration Begins at the Architecture View

Operational Architecture—Warfighter View

Node Approach:
• Ops Framework
• Single Manager
• Capability Based

Systems Architecture—C2ISR Architect’s View

Manage the C2 Enterprise through the nodes.
• Each SPO is responsible for managing their node--AWACS, JSTARS, AOC, etc..
• Integrated Command & Control SPO manages node integration for interoperability.
What is SBA?

- A process that enables effective systems integration:
  - Enterprise Management
  - Developmental Planning
  - Capabilities/Effects Based Requirements Development

- An initiative within AFMC to provide with integrated simulations, information technologies and processes to:
  - Place the acquisition activity in the warfighter environment
  - Reduce cost & time developing & sustaining systems
  - Support life cycle product improvement
  - Enable information sharing
  - Enhance product quality

A Better Product to the Warfighter – Faster!
How Should SBA Be Applied?

- Throughout Each System’s Life Cycle
  - Warfighter/Developer Collaboration—Better Requirements
  - Improved Insight to Operational Trades—Supporting CAIV
  - Consistent Environment for Design & Test—Reducing Risk

- Across All Systems
  - Real System Interfaces—Ensuring Interoperability
  - Family of Systems Considerations—Prioritized Upgrades

**ATD/ACTDs**
- Sensor Craft
- UCAV

**A - Concept Development**
- Continuous communication with users
- Early & continuous testing

**B - System Development**

**C - Production/Deployment**

**Support**

- Multi-Theater Targeting & Tracking Capability
- Multi-Sensor C2 Aircraft

**CONOPS/Requirements**
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| System Design/Integration | DT/OT | P3I Upgrades-Sustainment |
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- JSF
- Global Hawk
- JSTARS
- AOC

- F15E
- U2
- AWACS
- RJ
Air Picture on Link 16 -- Today’s Reality

- Erratic tracking
- Dual/multiple track designations
- Misidentifications
- Track ID conflicts
- Frequent track # changes
- Frequent track # swaps
- Reliance on voice deconfliction
- Operator overload
JSF Link 16 M&S Architecture
(Remote Host-to-Terminal Interface)

Physical Network (WAN)

MASC Link 16 Simulation Federate

Host System or Simulation “A” (e.g., TPS-75)
Host System or Simulation “B” (e.g., JSF)
Host System or Simulation “C” (e.g., JSTARS)
Host System or Simulation “D” (e.g., AWACS)

Preserves Link 16 network timing including relays
Permits simultaneous multi-net operations
Allows mix of live, virtual & constructive systems
Enterprise Integration
How to Proceed

Enterprise Acquisition
• Warfighter needs initiated w/CONOPs
• Provide integrated system of systems
• Driven by req’d operational effects
• Requirements refined iteratively
• Non-traditional acquisition strategy
• Flexible DoD 5000 framework
• Incremental capabilities delivery

Iterative Trades

New Systems

Technology

Legacy System Modernization

Supportibility & Training

Performance

Cost

Legacy Sys

Technology

Means
M&S
Mkt Research
Govt / Ind Studies
STA & AoA Products
CRD, ORDs, APB, TEMP, Etc

CRD

CDI

MC2A

Joint

MNS

US Air Force CONOPS

US Air Force

CONOPS / MNS / ORD Development Constellation Concept Development

Warfighter needs initiated w/CONOPs
Provide integrated system of systems
Driven by req’d operational effects
Requirements refined iteratively
Non-traditional acquisition strategy
Flexible DoD 5000 framework
Incremental capabilities delivery
Joint Synthetic Battlespace
A Key Element of SBA

WHY?
*Tactical and Analytical Realism*
- WarFighter/Developer Collaboration
- Real System Interfaces (HWIL/SWIL)
- Improved Insight to Operational Trades
- Demonstrate Large Scale Exercises
- Interoperability Testing
- Family of Systems approach to System Effectiveness
- True Industry/Government Partnership

Levels Playing Field Across the Industry-Government Enterprise
Joint Synthetic Battlespace
Enabling Tool for System Acquisition

- Immerse the Acquirer in the Warfighter’s Environment
  - Quicker Fielding – Avoid Redesign/Mistakes
  - Cost Avoidance – Total Systems Savings
  - Improved Product – Better Design/Operator Interfaces

WARFIGHTER
- Training
- Mission Rehearsal
- Operations Definition

Joint Synthetic Battlespace
- Repeatable
- Variable Resolution/Fidelity
- Verified/Validated/Trusted
- Distributed or Standalone
- “Corporate” Infrastructure

ACQUISITION
- Technology Analysis
- Design Trades
- Systems Engineering
- Integration and Test
- Operational Testing

Government Sites
Contractor Sites

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Conclusion

- The Challenge: Managing A Complex System of Systems and ensuring their Interoperability and Integration

- The Solution: Enterprise Integration using Principles of Simulation Based Acquisition
  - With a firm foundation of the Architectural Perspective grounded in M&S

Enterprise Integration: Achievable Now & Necessary for the Future