Simulation Based Acquisition
- The 2nd Year -

Presentation to
DMSO Industry Days
June 3, 1999
<table>
<thead>
<tr>
<th>SBA Industry Steering Group</th>
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<tr>
<td><strong>Chair:</strong> Steve Olson, Raytheon</td>
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<td><strong>Vice Chair:</strong> Dave Thomen, SAIC</td>
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<td>Floyd Adagio Pacific Sierra/Veridian</td>
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<td>Jimmy Ajlouny GD- Land Systems</td>
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<td>Jim Augins Innotiv Inc.</td>
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<td>Beau Beauregard Lockheed Martin</td>
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<td>Randy Boys Raytheon</td>
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<td>Carl Byers Original Sim Inc</td>
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<td>Doug Clark A&amp;T Inc</td>
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<td>Frank W. Cooper Concurrent Technologies Corp</td>
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<td>Jack Gaudet Northrop Grumman</td>
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<td>Margaret Herald Lockheed Martin</td>
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Together, these will facilitate --

An unprecedented quality of enterprise-wide, collaborative decision making across the acquisition life-cycle...
RECAP: WHAT IS SBA?

• **SBA is a robust M&S engineering environment** --
  – Starting early, from initial requirement & concept
  – Intensive “wringing-out” in synthetic, collaborative environment of cost, function, performance across system life cycle
  – Reuse of M&S across system life cycle, across programs/services

• **SBA is a revised acquisition process** --
  – Integrating Requirements, Acquisition, Training, Operations, Sustainment, T&E, etc functions using collaborative environment
  – Rapid, multiple assessments of trade space prior to locking requirements
  – Thorough understanding early of total ownership cost implications of performance requirements & design

• **SBA is cultural change** --
  – New educational curriculum
  – Empowered collaborating teams, including industry partners
  – Up-front emphasis & investment on M&S
  – Increasing reliance on M&S to reduce design risk
...to have an Acquisition Process in which DoD and Industry are enabled by robust, collaborative use of simulation technology that is integrated across acquisition phases and programs.

Vision

...its all about virtual development, and leveraging M&S reuse!
IN SBA, M&S TECHNOLOGY MUST ENABLE

Linking unrelated M&S (cost, engr design, op eval, O&S, manuf, etc)

Interoperability & reuse in system design, across programs & services (Govt & Ind)

Rapid, credible analysis of entire trade space

Early assessment in Collaborative Environment of system interfaces
THE MAKING OF SBA
Industry has been an essential player!

Year 1  DMSO Industry Days, June 1997

- Industry Challenge to Government: “If serious about SBA, it must be a partnership with industry.”
- Government & Industry agreed on SBA Vision
- Industry drafted CONOPS, Need Statement, “AS-IS” technical M&S infrastructure assessment
- 1st national SBA Work Shop
- Government formed Joint Task Force to develop Roadmap

Year 2  DMSO Industry Days, June 1998

- Quality Function Deployment exercise ranked needs
- Roadmap published, refined, staffed for coordination
- 2nd national SBA Work Shop
- DSMC publication “SBA: A New Approach”
- Nine “core issues” worked
- 5000 Policy for M&S strengthened
- POM and Implementation plan drafted
• Distributed Product Description (DPD)

• Distributed/Industry Resource Repository (DIRR)
  Key tenet: Partnership with Industry

• Collaborative Environments (CE)
  Key tenet: Share/reuse across program lines

• Data Interchange Formats (DIF)

Per: the Roadmap, the DSMC research, the QFD process, and ISG studies
How we work together...

Operational Architecture

- Who works with whom?
- Who shares/reuses? (I.e. who collaborates with whom?)
- Blind to organizational boundaries
- Functions, information flows, activities

Collaborate at these levels in Collab Env
The tools to work together:

- CE
- DIF
- DPD
- DIF
- DIF
- DIF
- DIF

The language to communicate:

- DIF + local stds./conventions

Technical Architecture

Systems Architecture
DISTRIBUTED PRODUCT DESCRIPTION (DPD)

- In its simplest form, a 3-dimensional representation of a system, along with associated process data
  - Functional information (what does this thing do?)
  - Requirements information (why do we need this?)
  - Manufacturing information (what special tooling do we need to produce it?)
  - Cost information (how much does it cost?)
- Other features like “user selectable views”

Distributed Product Description (DPD)

- Physical 3D Rendering
- Requirements
- Functional Descriptions
- Cost Data
- Engineering Data
- Process Models
- (Other …)
- Manufacturing Data
- Authoritative Models
A collection of pointers constituting a web technology-based distributed repository of tools, information resources, and generic infrastructure components for use within and reuse across acquisition programs.

The union of capabilities provided by all Collaborative Environments.
COLLABORATIVE ENVIRONMENTS (CE)

- An enduring collection of resources, people, processes, and tools assembled to attack a given problem
- Cross Program/Phase
- Mission or Product focus
- Enables IPPD

**Collaborative Environment**
- People
- Processes
- Information Resources
- Standards

**Acquisition Support Tools**

**IPPD**
- CONOPS DEVELOPMENT
- LOGISTICS SIMULATIONS
- TRAINING SIMULATIONS
- VIRTUAL TESTING
- VIRTUAL BUILD
- SYNTHESIZE DESIGN
- INITIAL NEEDS ASSESS
- REFINE REQUIREMENTS

**Operate & Sustain**
- OPERATE
- MAINTAIN
- TRAIN
- TEST
- BUILD
- DESIGN
• An extension to existing DIFs where they currently exist, such as SEDRIS
• The “go between” for DPDs and the outside world (DIRR, etc)

...The essence of SBA technical architecture
Both the DIRR and DPDs
– are interconnected using web technology
– have a configuration control process
– use encrypters/firewalls for access control
DoD 5000.2-R, Change 4  
(released 11 May 1999)

- A modeling and simulation approach is an essential element of an Acquisition Strategy
- Simulation, Test and Evaluation Process is added to the Test and Evaluation Section
FUTURE POLICY CHANGES

Sharing M&S with Industry

A pending change to DoD 5000.2-R addresses models and simulations used in the source selection process to evaluate competitive proposals.

Such M&S would be shared with industry well in advance of the selection process.
COMMON PROCESSES

• Example -- Threat Representation M&S
  – Acquisition FWG working with Intel Cmty to establish process to clarify threat M&S development
  – Fosters:
    • Reuse and interoperability in threat representation
    • Early involvement of Intel Community for V&V
GOVERNMENT - INDUSTRY PARTNERSHIP

- **Objective:** Establish Government/Industry Architecture Development and Standards Group (ADSG)

- **Purpose:** Integrated Industry and Government participation in SBA technical concepts and recommendations for SBA implementation

- **How:** A number of vehicles/mechanisms exist; which structure evolves will depend on specific needs
• DSMC Publication: “SBA - A New Approach,” 1997-98 Research Fellows
• Acquisition Reform video: “SBA - The Way Ahead”
• Development of “core body of knowledge” for acquisition professional courses
• Navy BAA - Collaborative Engineering Environment
• Army Dual Use S&T BAA - Collaborative technologies, data management, product modeling
• M&S Awards in Acquisition
## WHAT’S AHEAD?

### Today  DMSO Industry Days, June 1999

- Roadmap “On The Shelf” (guiding document)
- Industry (NCAT) partnership formalized
- ISG assist JSF to develop first operational SBA DPD
- POM resources
- Implementation plans
- First SBA business game
- Architecture Development & Standards Group
- 3rd national SBA Work Shop
- Military Services’ “pathfinder” projects
  - DIRR - DPD - DIF - CE
- Experiments in planning
- DMSO Workshop for PMOs
- Educational curriculum
- Policy
- Culture, culture, culture

### Year 3

- 3rd national SBA Work Shop
- Military Services’ “pathfinder” projects
  - DIRR - DPD - DIF - CE
- Experiments in planning
- DMSO Workshop for PMOs
- Educational curriculum
- Policy
- Culture, culture, culture
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SBA Special Interest Area

http://www.msosa.dmso.mil/sba/

M&S Effectiveness Study

http://www.acq.osd.mil/te/pubdocs.html
Back Up
“Each PM shall develop and document an acquisition strategy.... Essential elements ... Include ... **modeling and simulation approach**...”

**Reference:** DoD 5000.2R, chg 4, 11 May 1999

*New content in yellow*
M&S shall be applied…

- throughout the system life-cycle …
- to supplement actual T&E, manufacturing, and logistics support.

In collaboration with Industry, PMs shall

- integrate M&S within program planning activities;
- plan for life-cycle application, support, and reuse of models and simulations;
- integrate modeling and simulation across the functional disciplines.

Reference: DoD 5000.2R, chg 4, 11 May 1999
(New content in yellow)
3.4.4 MODELING AND SIMULATION

M&S shall be integral to T&E...

Simulation, Test and Evaluation Process (STEP) ... in the TEMP ... a robust and comprehensive evaluation strategy, using both simulation and test resources.

...program office shall work with the T&E community in developing this evaluation strategy

...identify and fund STEP resources early

Reference: DoD 5000.2R, chg 4, 11 May 1999
(New content in yellow)