

Simulation Based Acquisition

- *The 2nd Year* -

*Presentation to
DMSO Industry Days
June 3, 1999*



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**SBA
Industry
Steering
Group**

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Raytheon**

Vice Chair:

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SAIC**

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**SBA
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(Page 2)

Harold (Hal) Jones	TASC
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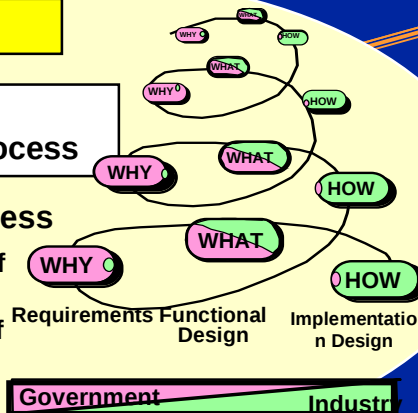
SBA - NOT JUST TECHNOLOGY

Process

Iterative Acquisition Process

• Iterative Spiral Process

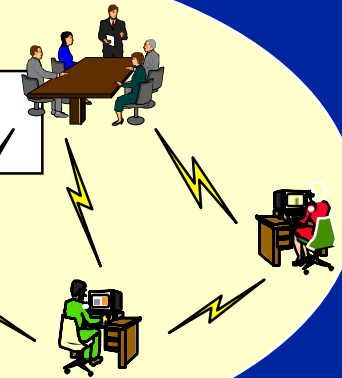
- Electronic Exchange of System Models
- Rapid Evaluation of Multiple Options



Culture

Evolved Acquisition Culture

- Enabled Integrated Process Teams
- Changing Roles and Responsibilities



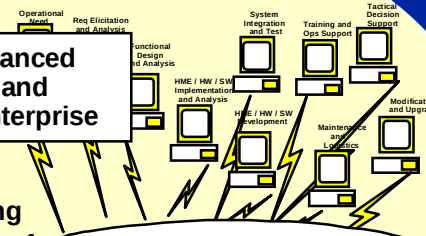
Environment

Integrated Advanced Engineering and Management Enterprise

- Collaborative Distributed Engineering
- Seamless Integration of Engineering Disciplines

Common Project Data Repository
Integrated Product Process Model
Format

- Info Repository
- User Transparent Web Style Access
- Integrated Design Data Schema

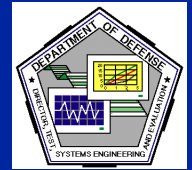


Together, these will facilitate --

An unprecedented quality of enterprise-wide, collaborative decision making across the acquisition life-cycle...



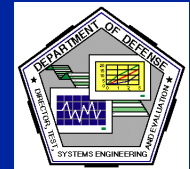
RECAP: WHAT IS SBA?



- **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



IS THERE A SOUND-BITE FOR SBA?



Vision

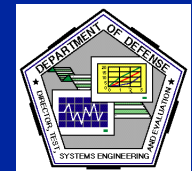
...to have an Acquisition Process in which DoD and Industry are enabled by robust, **collaborative use** of simulation technology that is **integrated across acquisition phases and programs.**

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*...its all about virtual development,
and leveraging M&S reuse!*

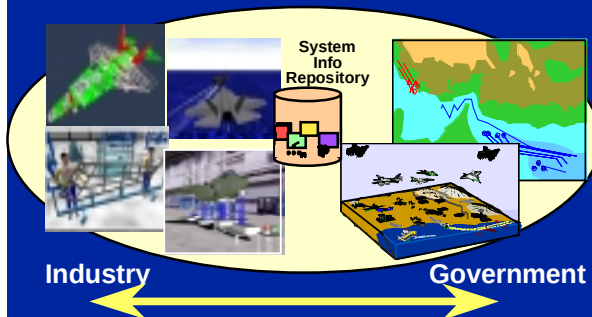
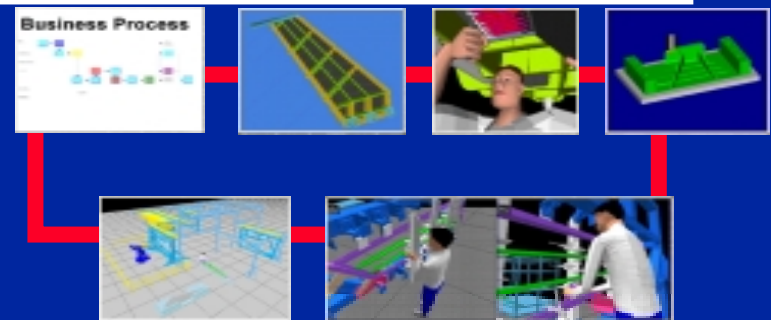


IN SBA, M&S TECHNOLOGY MUST ENABLE



Access Controls

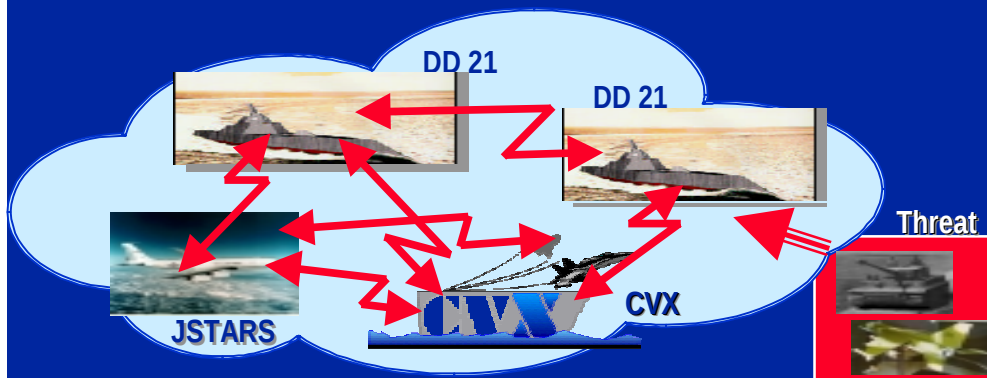
Linking unrelated M&S (cost, engr design, op eval, O&S, manuf, etc)



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

Visualization

Rapid, credible analysis of entire trade space

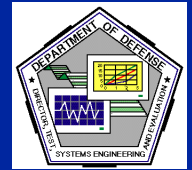


Early assessment in Collaborative Environment of system interfaces



THE MAKING OF SBA

Industry has been an essential player!



Year 1 DMSO Industry Days, June 1997

Year 1

- **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

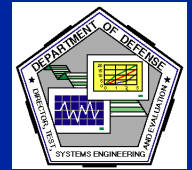
Year 2 DMSO Industry Days, June 1998

Year 2

- **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



- AGREEMENT - SBA KEY ARCHITECTURE PIECES

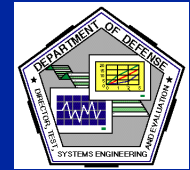


- Distributed Product Description (DPD)
- Distributed/Industry Resource Repository (DIRR)
→ **Key tenet: Partnership with Industry**
- Collaborative Environments (CE)
→ **Key tenet: Share/reuse across program lines**
- Data Interchange Formats (DIF)

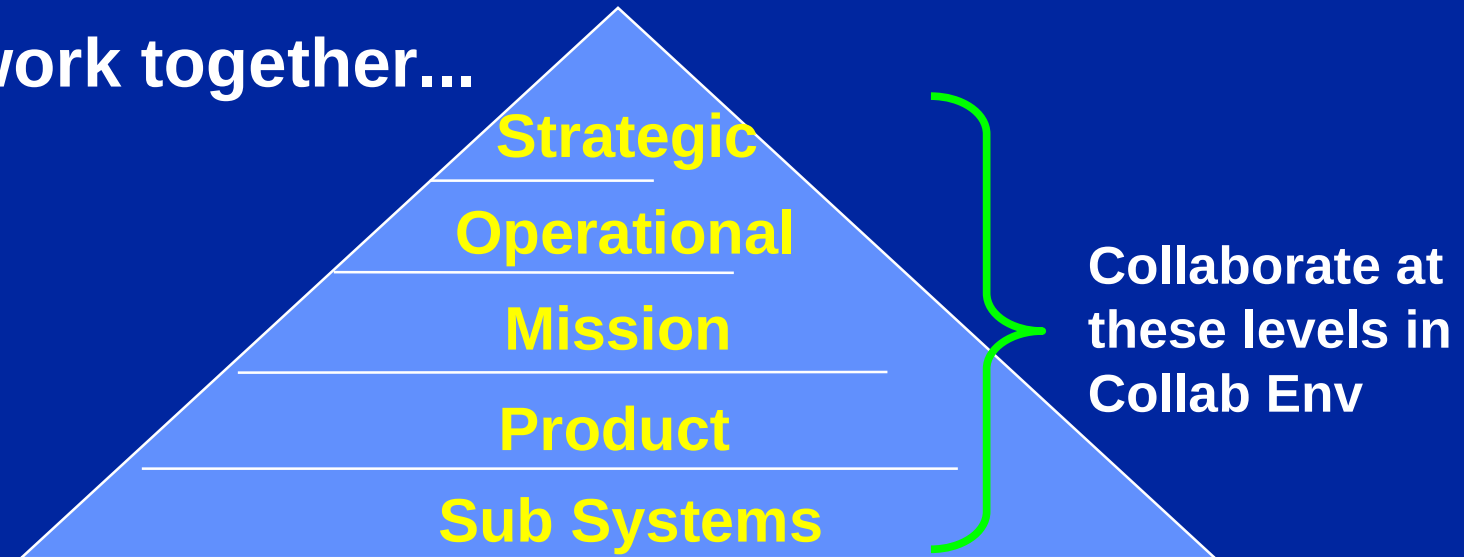
Per: the Roadmap, the DSMC research, the QFD process, and ISG studies



SBA OPERATIONAL ARCHITECTURE



How we work together...



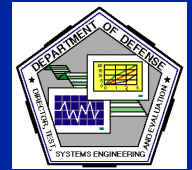
Operational Architecture

Mission
Dependent

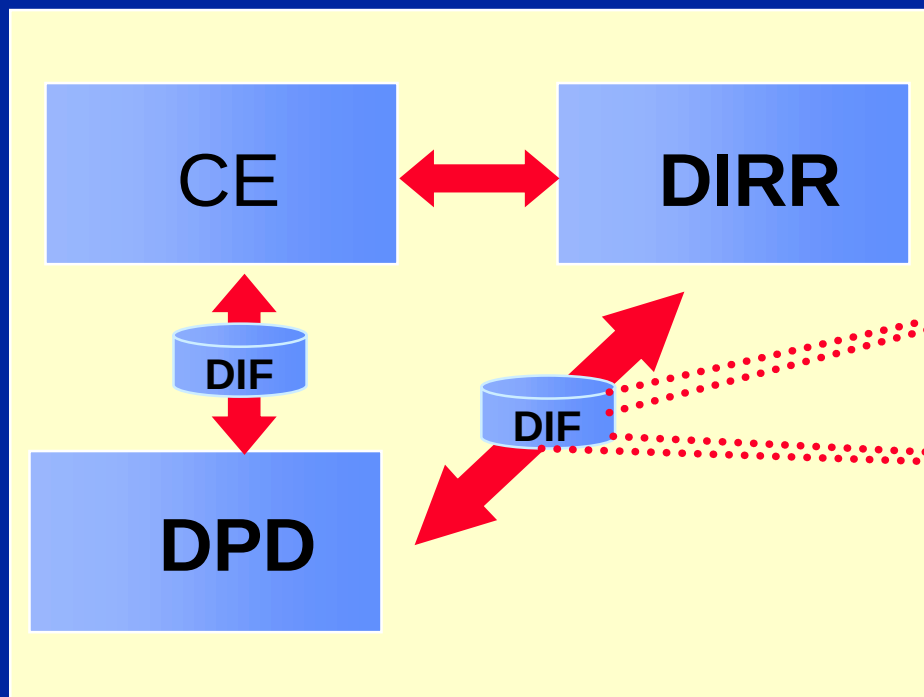
- Who works with whom?
- Who shares/reuses?
(I.e. who *collaborates* with whom?)
- Blind to organizational boundaries
- Functions, information flows, activities



TECHNICAL AND SYSTEMS ARCHITECTURES - HOW KEY PIECES FIT TOGETHER -

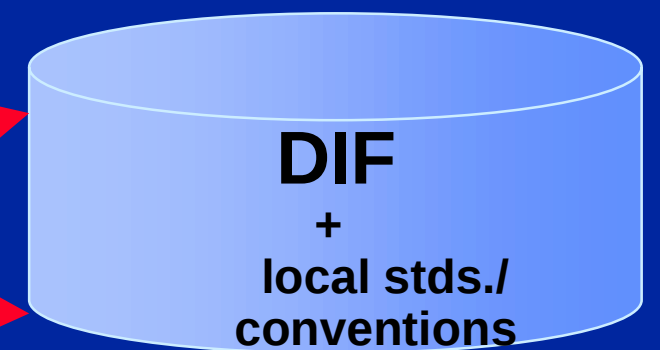


The tools to work together:



Systems Architecture

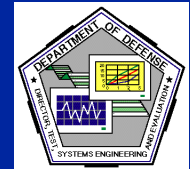
The language to communicate:



Technical 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

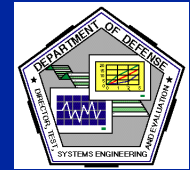
(Other ...)

Manufacturing
Data

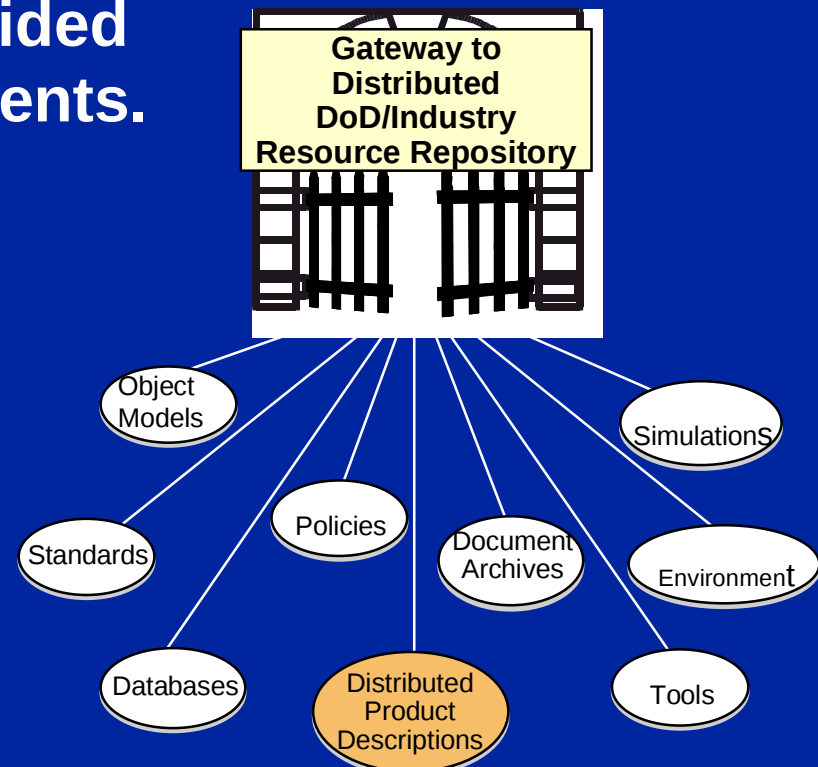
Authoritative
Models



DOD/INDUSTRY RESOURCE REPOSITORY (DIRR)

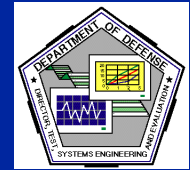


- A collection of pointers constituting a web technology-based distributed repository of tools, information resources, and generic infrastructure components for use within and reuse across acquisition programs
- The union of capabilities provided by all Collaborative Environments.

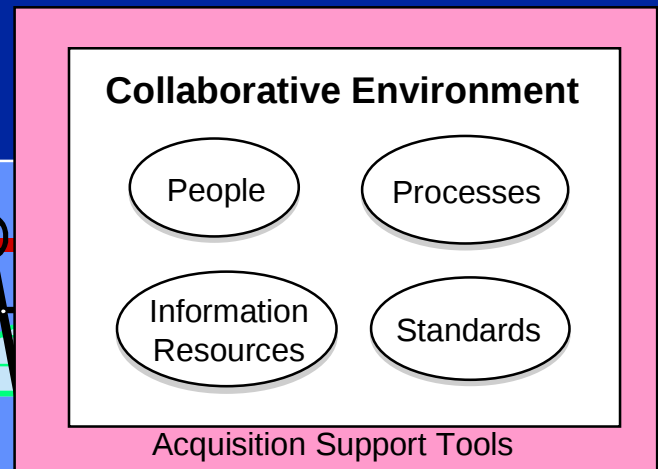
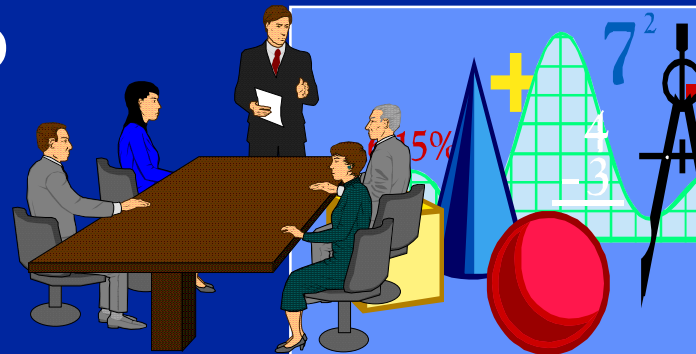




COLLABORATIVE ENVIRONMENTS (CE)

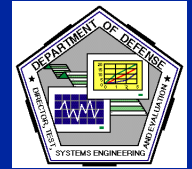


- An enduring collection of resources, people, processes, and tools assembled to attack a given problem
- Cross Program/Phase
- Mission or Product focus
- Enables IPPD



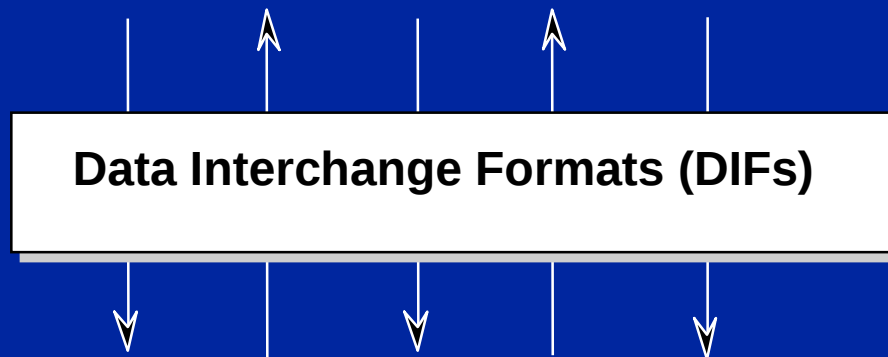


DATA INTERCHANGE FORMAT (DIF)



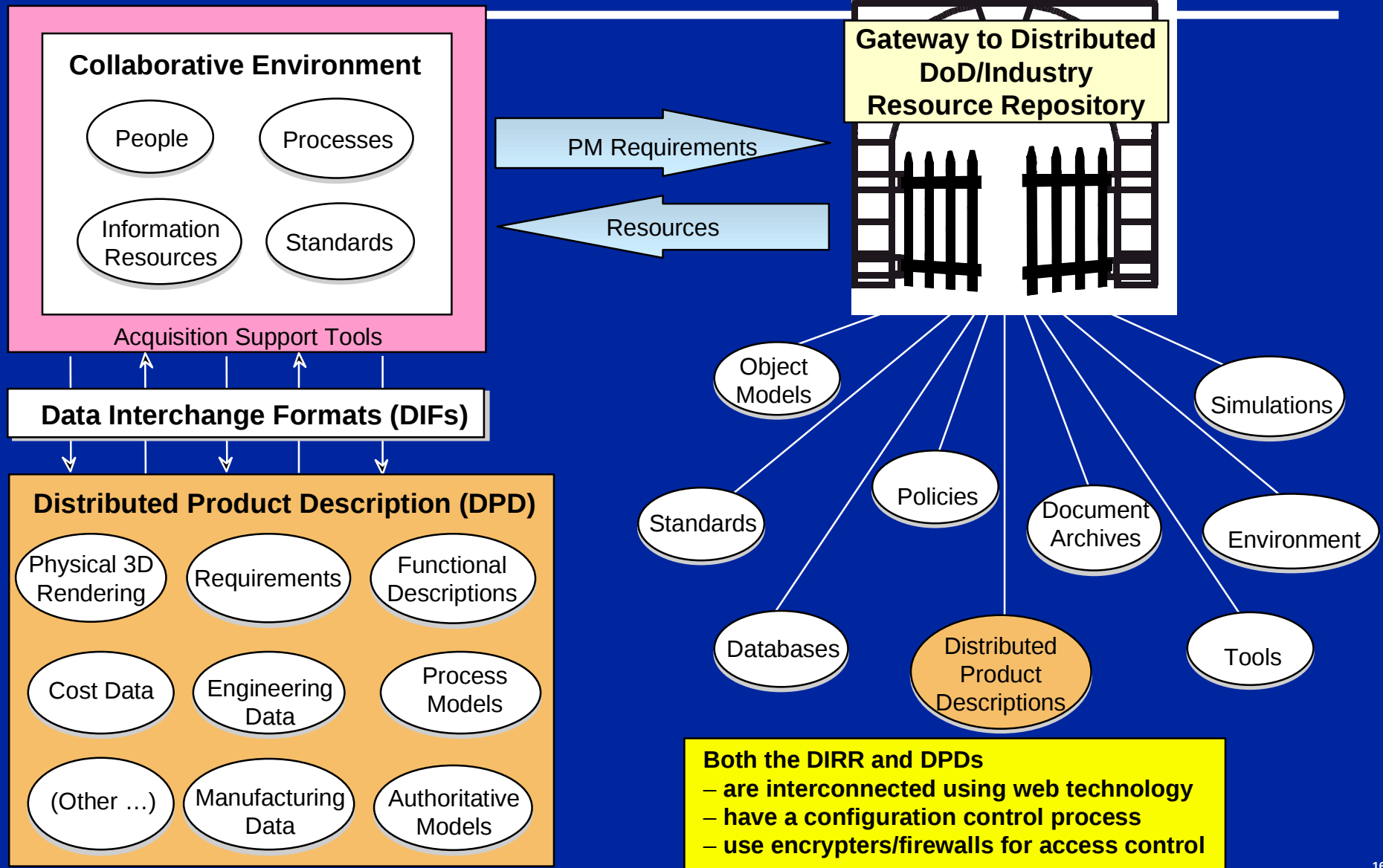
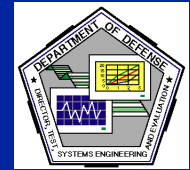
- An extension to existing DIFs where they currently exist, such as SEDRIS
- The “go between” for DPDs and the outside world (DIRR, etc)

...The essence of SBA technical architecture



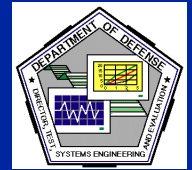


TOP-LEVEL VIEW OF SBA SYSTEMS ARCHITECTURE





POLICY CHANGES



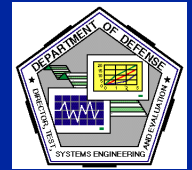
DoD 5000.2-R, Change 4

(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



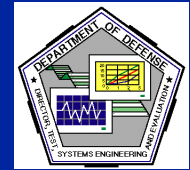
Sharing M&S with Industry

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

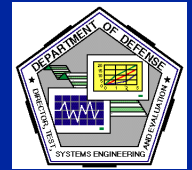


- Example -- Threat Representation M&S
 - Acquisition FWG working with Intel Cmty to establish process to clarify threat M&S development
 - Fosters:
 - Reuse and interoperability in threat representation
 - Early involvement of Intel Community for V&V





GOVERNMENT - INDUSTRY PARTNERSHIP

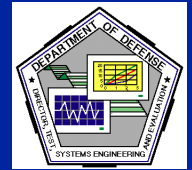


- **Objective:** Establish Government/Industry Architecture Development and Standards Group (ADSG)
- **Purpose:** Integrated Industry and Government participation in SBA technical concepts and recommendations for SBA implementation
- **How:** A number of vehicles/mechanisms exist; which structure evolves will depend on specific needs





OTHER EVENTS

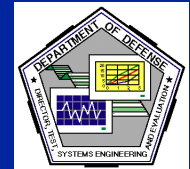


- DSMC Publication: "SBA - A New Approach," 1997-98 Research Fellows
- Acquisition Reform video: "SBA - The Way Ahead"
- Development of "core body of knowledge" for acquisition professional courses
- Navy BAA - Collaborative Engineering Environment
- Army Dual Use S&T BAA - Collaborative technologies, data management, product modeling
- M&S Awards in Acquisition





WHAT'S AHEAD?



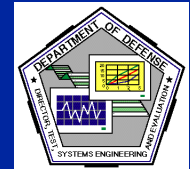
Today DMSO Industry Days, June 1999

Year 3

- 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



SBA KEY CONTACTS



OSD	Robin Frost, OUSD(A&T)	(703) 695-2300
Army	Ellen Purdy , OASA(ALT)	(703) 604-7006
Air Force:	Major Gerry Smithers, SAFXO	(703) 588-7191
Navy	John Bilmanus, Nav Acq Ref	(202) 610-7022
DMSO	Col Ken "Crash" Konwin	(703) 998-0660
Industry	Steve Olson, Raytheon	(703) 876-1942
Steering Group		

SBA Special Interest Area

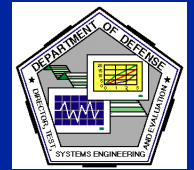
<http://www.msosa.dmsos.mil/sba/>

M&S Effectiveness Study

<http://www.acq.osd.mil/te/pubdocs.html>

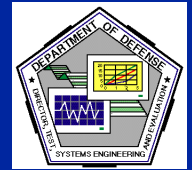


Back Up





3.3 ACQUISITION STRATEGY



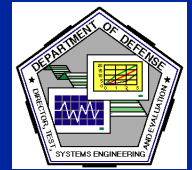
“Each PM shall develop and document an acquisition strategy.... Essential elements ... Include ... **modeling and simulation approach**...”

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



ACQUISITION STRATEGY

3.3.8 MODELING AND SIMULATION (M&S) APPROACH



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

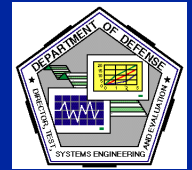
- **integrate M&S within program planning activities;**
- **plan for life-cycle application, support, and reuse of models and simulations;**
- **integrate modeling and simulation across the functional disciplines.**

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



Test and Evaluation Section

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**)*