50 Years of Acquisition Reform: What have we learned? Where do we go?

Otto Jons, Advanced Marine Center
How Are We Doing?

1. The weapons acquisition process, which is slow, inefficient, .....has become a burden on the defense industry ...

2. The nation can ill afford the perpetuation of a defense acquisition process so widely considered to be dysfunctional.

3. The defense acquisition system has basic problems that must be corrected. These problems have developed over several decades from an increasingly bureaucratic and overregulated process.

4. There is a growing and deep concern about the DOD acquisition processes. Restructuring acquisition is critical and essential!

5. The existing acquisition system is not capable of responding to customer needs .... The world has changed beyond the limits of the system’s ability to adjust or evolve.

We Aren’t There Yet!

1. 2001 - U.S. Commission on National Security/ 21st Century
5. 1994 - Secretary of Defense William Perry
Outline

I. 50 Years of Acquisition Reform: A Brief History

II. The Acquisition System Today

III. Important Concepts – Largely Ignored

IV. Proposed Solutions
Acquisition Reform Studies

1. The 1986 Packard Commission
3. The 1993 Report of the Acquisition Law Advisory Panel
4. The 2004/5 CSIS Beyond Goldwater-Nichols Studies
5. The 2006 Defense Acquisition Performance Assessment
6. The 2007 Expeditionary Contracting Study
7. The 2008 CSIS Beyond Goldwater-Nichols Phase 4 Study: Invigorating Defense Governance

A Comment (Prof. H. Sapolsky, MIT):

“Let's just skip the acquisition reform charade…

“Another blue-ribbon study, more legislation and a new slogan will not make it happen at last....”
Acquisition System Evolution

1962-1965
- Conceptual Phase (Based upon Operational Requirement)
- Project Definition Phase
- Program Requirements Baseline

1965-1970
- Concept Formulation Phase (Including Exploratory and Advanced Development Based upon Operational Requirements)
- Contract Definition Phase
- Engineering Development Phase
- Production Phase
- Operational Phase
- Program Decision
- Ratification Decision

1971-1976
- Conceptual Phase (Based upon Mission Operational Requirement and Intelligence Analysis)
- Program Initiation Phase
- Full-Scale Development Phase
- Production and Deployment Phase
- Milestone II (Commitment to Limited Production)

1977-1979
- Program Initiation Phase
- Demonstration and Validation Phase
- Full-Scale Engineering Development Phase
- Production and Deployment Phase
- Milestone I
- Milestone II (Commitment to Limited Production)
- Milestone III

1980-2000
- Concept Exploration Phase
- Demonstration and Validation Phase
- Full-Scale Deployment Phase
- Production and Deployment Phase
- Milestone I
- Milestone II (Commitment to Limited Production and Intention to Deploy)
- Milestone III

2000-2002
- Concept & Technology Development
- Sys. Dev. & Demonst.
- Full Rate Production & Deployment
- Operation 7 Support

CSC Proprietary 5
Initiatives in the Nineties

Acquisition Reform Initiatives 1995

- IPPD / IPT
- CAIV
- Electronic Solicitation
- Performance Specifications
- Open Systems Architecture
- Industry Teaming
- Best Value
- Commercial Specification (COTS / NDI)

Better
- Lessening Demand on the Acquisition Workforce

Smarter
- Managing Knowledge and Streamlining Standards

Faster
- Shortening Weapon Systems Schedules

Cheaper
- Controlling Weapon Systems Costs
The 5000 Model: Old vs. New

Old Process

Determination of Mission Need

- Concept Exploration
- Program Definition & Risk Reduction
- Engineering & Manufacturing Development
- Production, Fielding, Deployment, & Operational Support
- Demilitarization & Disposal

New Process (2001+)

Technology Opportunities & User Needs

- Concept & Technology Development
- System Development & Demonstration
- Production & Deployment
- Support
- Demilitarization & Disposal
Defense Acquisition Management Framework - 2003

A. Concept Refinement
   - Concept Decision

B. Technology Development

C. System Development & Demonstration
   - Design Readiness Review

Defence Acquisition Management System - 2008

A. Materiel Solution Analysis
   - Materiel Development Decision

B. Technology Development
   - PDR

C. Engineering and Manufacturing Development
   - Post-PDR Assessment
   - Post-CDR Assessment

IOC

FOC

Focus of major changes

User Needs

Technology Opportunities & Resources

DoDD 5000 - A Brief History

**DAPA Study (2005) Highlights:**
- **The problems are deeply imbedded; we therefore need a radical approach to improvements**
- **Our recommended improvements represent a significant transformation of the Acquisition System.**

*(DepSecDef G. England)*

**SECNAV Dr. Donald Winter – 2007:**

<table>
<thead>
<tr>
<th>Problems</th>
<th>Actions</th>
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<tbody>
<tr>
<td>1. A steady erosion in the Navy’s domain knowledge.</td>
<td>1. Re-assert the Navy’s control over the entire process.</td>
</tr>
<tr>
<td>2. Limited understanding of how business operates,</td>
<td>2. Use DD&amp;C contracts with mature specifications</td>
</tr>
<tr>
<td>3. Little competition.</td>
<td>3. Provide knowledgeable program oversight</td>
</tr>
<tr>
<td>4. Few/no commercial solutions</td>
<td>4. Hire top quality people experienced with large shipbuilding programs</td>
</tr>
<tr>
<td>5. Fear of recognizing the true expected costs upfront</td>
<td></td>
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</tbody>
</table>
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Today's System

DON Requirements

 Acquisition

Two-Pass/Six-Gate Process
MEMORANDUM FOR ASSISTANT TO THE PRESIDENT FOR NATIONAL SECURITY AFFAIRS

SUBJECT: Acquisition and Requirements Reform

Per your February 13 tasking from the President's Tank Session with the Joint Chiefs of Staff, attached is the Department's plan for reforming acquisition and requirements processes. The document addresses the initiatives we have successfully institutionalized, as well as future opportunities for reform.

Attachment

As stated

cc:

Chairman of the Joint Chiefs of Staff

Under Secretary of Defense for Acquisition, Technology and Logistics
I. Managing Programs with a Robust, Qualified, Agile and Ethical Workforce

1. Smartly Grow the Acquisition Workforce.
3. Target Training and Human Capital Plng
4. Reinvigorate and Raise Certification Stdts.
5. Formalize Reqts Manager Certification.

II. Establishing a Firm Foundation for More Predictable Outcomes

1. Start Programs Right:
2. Targeting Sol’s Def’ by the Joint Warfighter.
3. Identifying the Critical Needs of the Warfighter
4. Emphasizing Cost Realism.
5. Integrating Test and Evaluation (T&E)
10. Conducting More Frequent Program Reviews to Assess Progress.
11. Using Information to Manage Programs Effectively.
13. Establishing Flexible & Rapid Response Teams
14. Improving Acquisition of Services Mgt.
15. Delivering Timely Solutions.

III. Managing Risks and Opportunities ~ Strategy, Budget, and Governance

1. Align Investment Priorities to Strategic Priorities.
2. Balance Existing and Future Investments to Provide the Right Mix Capabilities at the Right Time.
4. Establish a Fixed/Stable Investment Budget.
5. Create Integrated and Effective Governance.
“Today’s requirements process is a highly formalized pursuit - driven by the perceived needs of war fighters and - accommodated by engineers in which - the suppliers of financial resources are not consulted.

“The nation can ill afford the perpetuation of a defense acquisition process so widely considered to be dysfunctional.”
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I. 50 Years of Acquisition Reform: A Brief History

II. The Acquisition System Today & Discussion

Proposed Solutions

1. C3F (Continuous Collaborative Concept Formulation)
2. Solution-Based Acquisition

Supporting Concepts:

- Human Resource Readiness
- The “Ways and Means” Trade-Space
- Complexity & CAS (Complex Adaptive Systems)
US Navy operators are rigorously selected, put in positions suitable for their talents, taught doctrine based on past experience, and undergo constant practice at sea as a team.

Yet, too often it is assumed that one just has to issue a contract and a team capable of performing one of the most complex endeavors in the world (designing a ship), will instantly come out of nowhere.
People retain their qualification, i.e., their knowledge, only by continuing practice of their trade;

There cannot be effective workforce development or readiness without continuing practice!

Similarly: Tools – even if Validated - still Require People Trained in Using Them!

Continuous Concept Formulation
BENS Recommendation for REQUIREMENTS DETERMINATION:

• “As requirements are developed, they need to be measured against:
  – whether they fit a defined national strategy,
  – whether technology is available, and
  – whether requirements fit a "fiscal reality".

• “It needs to become a **collaborative** process involving
  – war fighters who understand the nature of combat,
  – engineers who understand the limits of technology, and
  – financial experts who can accurately estimate costs and assess consequences for future budget scenarios.

Next: From Collaborative Requirement Determination to Collaborative Concept Formulation
- An Excellent Illustration of Collaborative Concept Formulation.

(1967)
Why Collaborative ConForm

Purpose: Exploring the “Ways & Means” Trade-Space

> **Means** = Material – (Ships, Weapons) & Human – (Personnel, Training)  
  plus Will => Total System Performance

> **Ways** = Strategies, Tactics, Doctrine, Concepts of Operation  
  => The Ways in which the Means are used

➢ **Capability** = The ability to achieve a desired effect through combinations of Means, Ways and Will.

➢ **Capability in Warfare:**

**The Objective:**  
Optimizing our capability against ‘their’ capability in the environment where the contact takes place
Next: The “Ways and Means” Tradespace for Warfare Systems
Naval Systems – A Special Case

Transportation Systems

Navy Missions

Warfare Systems

System of Systems in Natural Environments

Naval Ships: Hybrid Engineered Systems

Complexity & Adaptation: Complex Adaptive Systems (CAS)

Mission - / Warfare Systems

Hull/Platform: A Transportation System

Effectiveness Parameters vary greatly between

- **Transportation Systems**, i.e. Traditional Engineered Systems (TES) and
- **Warfare Systems**, i.e., Complex Adaptive Systems (CAS)
System Categories

Complex Adaptive Systems (CAS)

Dynamic Feedback Systems (DFS)

Engineered Systems

Social Systems

Unpredictable!

Natural Systems

Physical Systems

CAS and DFS are Unpredictable because of:

> Extreme Sensitivity to Initial Condition
> Extreme Sensitivity to Minor Perturbations (“Butterfly Effect”)
> Also: They tend to be Open, Interconnected / Networked
> They Generally Self-Organize (How? – Still a Mystery)

CAS Change Their Behavior and/or Themselves (May lead to new systems/behavior, “Emergence”)
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Supporting Concepts:
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- Complexity & CAS (Complex Adaptive Systems)
Systems Acquisition Process

Part I: Deciding
What System to Acquire

Part II: Acquiring the System
John Young, USD-ATL, to SECDEF (in Response to GAO Report):

The Major Cause of Past Problems: A **Poor Foundation @ MS B**

1. Requirements not Fully Settled
2. Overly Optimistic Cost & Schedule Projections
3. Immature Technology

**We add:** “Requirements not Fully Settled”, see above, *because*

- The “**Ways & Means**“ Trade-Space *has not been (fully) explored*
- **There was a Lack of Human Resource Readiness**

**The Objective:** Building a **Solid Foundation**, i.e., a Mature “Means” Solution,

**Solution Based Acquisition**
Solution-Based Acquisition

I. Continuous Collaborative Concept Formulation (C3F):

II. Concept to Contract

III. Contract to Commissioning

The Key:

Developing Optimal Pairs of:

- System Concepts (Means) and
- Operational Concepts (Ways of Using the Means)

Goal: A Solid Foundation @ MS B:

1. A Mature, Stable System Design based on Collaboration and Sound Engineering to Enable
2. Cost & Schedule Projections based on Past Experience
Final Comments

Some **Underlying Problems** with Past Reform Efforts:

- **Failure to Remember** Lessons Learned.
- **Failure to Create a** Firm Foundation for Acquisition.
- A **Mismatch between** Acquisition Strategy and **Marketplace Reality**
- Ignoring that Ship Systems are “Special” and that Competition is very limited.
- Assuming **Competency and Readiness** on the Part of the **Human Resources/Manpower** Available.
- **Unintended Consequences** of Reform Efforts
- *(Pervasive:) Preoccupation with Process, rather than Outcome*

“More messes have been created in defense procurement over the years by the ideologically fervent, trumpeting one or another universal reform and thus overcorrecting for the mistakes of their predecessors, than by any other members of the military-industrial-congressional menage.”

Questions
SSGXXIV Report:

• “The Navy needs to move beyond the
  Culture of Linear Thinking that causes
  leaders to look for simple cause and
  effect chains.

• “The Navy needs to adopt more
  sophisticated views of the environment,
  warfare, command and control.

• “Adopt the ACI Concept:
  Awareness, Capacity, Influence”

• “Think about the Entire Range of Conflict”:
  “The Total Fleet” and The Free Form Force:
  “If It Floats, Flies, Submerges, Operates in the
  Maritime Commons, it Should Be Connected!”

A Giant Step Forward from “Ordnance on Target!”
Top-Level Changes Required


2. A “National Security” Strategy (from the White House) [The Director of National Intelligence’s, Adm. Dennis Blair’s, recent statements indicate a growing focus]

3. Then, a fiscally-constrained DoD long-term Budget and force structure/weapons to match the strategy [The Secretary of Defense, Bob Gates, has initiated]

4. A major thrust for “Acquisition Reform”

*Source: Managing the Future of DoD Acquisitions
The Honorable Jacques S. Gansler*
Professor and Roger C. Lipitz Chair UoMd
Formerly Under Secretary of Defense (AT&L)
(2009)
Other Views

• **Cato Institute POLICY FORUM (March 13, 2009):**
  "Can the Pentagon Be Fixed?" (Maybe not…)
  • Winslow Wheeler, Center for Defense Information;
  • Colonel Douglas Macgregor, U.S. Army (Retired),
  • Thomas Ricks, Senior Fellow, Ctr for a New American Security,
  • Benjamin Friedman, Cato Institute.

• **B. Friedman Blog:**
  • “At best this (Levin/McCain) bill will create some marginal improvements in defense acquisition.
  • More likely it will simply add hassle….”

• **Prof. H. Sapolsky, MIT:**
  • “Let's just skip the acquisition reform charade…
    “Another blue-ribbon study, more legislation and a new slogan will not make it happen at last….”
C3F Summary

I. Requirement Generation / System Design

- Hydrodynamics
- Stability
- Survivability
- Ship concepts
- Signatures
- Structural integrity
- Auxiliary systems
- Power systems
- Platform systems
- Integrated topside design

II. Human Resource Development / Competency

- Tools, Processes, Information
- Knowledge/Readiness
- People

Proposed Solution:

Continuing Collaborative Concept Formulation (C3F)

Enabling Concepts:

- Capability ("Ways & Means") Trade Space
- Human Resource Readiness
The New Plan:
Acquisition and Requirements Reform

I. Managing Programs with a Robust, Qualified, Agile and Ethical Workforce
1. Smartly Grow the Acquisition Workforce.
3. Target Training and Human Capital Plng.
4. Reinvigorate and Raise Certification Stds.
5. Formalize Reqts Manager Certification.

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3. Managing Risks and Opportunities ~ Strategy, Budget, and Governance
1. Align Investment Priorities to Strategic Priorities.
2. Balance Existing and Future Investments to Provide the Right Mix Capabilities at the Right Time.
4. Establish a Fixed/Stable Investment Budget.
5. Create Integrated and Effective Governance.

Disciplining Systems Engineering. Engineering is vital to effective planning and program success. DoD policy requires a Systems Engineering Plan to guide each phase of the development process. The plans are independently reviewed at the executive level and incorporate event-driven technical reviews to ensure that program progress is carefully monitored consistent with sound engineering business practice. Plans must reflect a Modular Open Systems Approach to facilitate affordable change and enable evolutionary acquisition.

5. Create Integrated and Effective Governance.
15. Delivering Timely Solutions.
Why Solution-Basing for CAS

• The link between System **Performance (Our “Means”)** and **Effectiveness in CAS** is greatly weakened by
  • How and where we use Systems (“Our Ways”) and
  • Their “Ways” and Their “Means”

Therefore:
• Requirements must **float**
  until we find **Solutions**, both for **Our “Ways”** and **Our “Means”**

• The “Solution” is found in the “Ways” & “Means” Trade-Space
• The Parameters: **Effectiveness** (“Ways”, “Means” & Environment), **Cost and Risk**
A Brief Summary:

(1) Continuing **System Concept Formulation** will result in
- Design Teams continually practicing their trade, i.e.
  = in a constant state of (Design) **Readiness** and
  = achieving a high degree of **Proficiency** to develop
- Capable, mature System Concepts **ready** for Refinement and Acquisition.

(2) Continuing **Capability Concept Development**:
- Allows effective Exploitation of the “Ways-” and “Means” Trade-Space,
- Gives Operators continuing Feedback on
  = the Impact of Requirements on both Capability and Cost, and
  = Evolving Opportunities of Advancing Technology
- Gives the Designer continuing Feedback on the Impact of Performance on Capability
From Systems to Effectiveness

Hull/Platform: A Transportation System

Effectiveness

Effectiveness in Transportation

Shuttle Ship:

\[ E = \frac{P \times D}{T_L + D / V + T_U} \]

Where:
- Payload (P)
- Distance (D)
- Time (T) to Load / Unload
- Time to Transit (= D/V)

Effectiveness: A Function of System Performance, i.e., = f (Means Performance)

Effectiveness in Warfare

Warfighting Environment*

Ways Will Means

(Their -)

Our -

Effectiveness

The Key in Warfare:
A Favorable W/M/W Imbalance in the Environment@ the Point-of-Contact

Important: The Nature and Speed of Adaptation

Optimizing Effectiveness in Warfare Mandates Exploration of the “Ways & Means“ Trade-Space
The Traditional Acquisition Process:

1. Identify a Need/Threat (or: “Capability Gap”) and Operational Concepts (“Ways”) to Defeat It
2. Explore Systems (“Means” Solutions) & Develop System Performance Requirements
3. Develop a System Meeting those Requirements

Requirements are finalized before fully defining the System Concept

Without System Definition, i.e., a “Means” Solution:

- No Valid Cost Estimate for New, Advanced Systems,
  i.e., No Assessment of Affordability
- No True Cost vs. Performance Trade-Off,
  No “Quality – Quantity” Trade-Off
- No True “Ways” & “Means” Trade-Off to Maximize Effectiveness
The Acquisition System Process

**Part I: Deciding**
What System to Acquire

Today’s Process:
1. **Identify a Need/Threat** (or: “Capability Gap”) and the Operational Concepts (“Ways”) to Defeat It
2. **Explore Systems** (“Means” Solutions) & Develop System Performance Requirements
3. **Develop a System** Meeting those Requirements

**Part II: Acquiring the System**
People retain their qualification, i.e., their knowledge, only by continuing practice of their trade; = especially important in Complex Naval Ship Design involving extensive knowledge sharing.

There cannot be effective workforce development or readiness without continuing practice!

Similarly: Tools – even if Validated - still Require People Trained in Using Them!