Best Practices Clearinghouse: 
Making DOD Lessons Learned 
Come Alive and Be Practical

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Software Engineering Collaborator's Information Exchange 
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Objectives

- Provide an overview of the DoD Acquisition Best Practices Clearinghouse (BPCh) approach and tool

- Describe our processes for working with both structured and unstructured content
  - And raise interest in submitting your own content

- Discuss some of the emerging priorities and best practices we are finding
What makes BPCh unique?

- Not all best practices are “best” for everybody
  - Content includes descriptions of past results in context, not just what to do
  - Allows context-sensitive search (show me just the practices that programs like mine have used)
  - Recommendations built on evidence

- Pointers to existing sites, resources, examples
Overview of building content

Name: Practice X

- Practice X has been successfully applied …
- Use it to …
- For more information click on the following links:
  - …

Evidence 1
- Source
- Context
- Results

Evidence 2
- Source
- Context
- Results

Evidence 3
- Source
- Context
- Results

Evidence 4
- Source
- Context
- Results

Practice Maturity
(Bronze)
(Silver)
(Gold)
Definitions

- **A practice:**
  - Is a *documented* activity that is described in an *actionable, repeatable* way
  - Is a description of *how* to do something, not a general goal of *what* to do
  - May be: A process, method, technique, standard...

- **Evidence** about a practice:
  - Is a description of an experience which provides a better understanding of a situation
  - Similar to a *lesson learned*
  - Composed of
    - A practice
    - A context and
    - A discernible result
Representing Context

- Any piece of evidence is tagged according to where it was drawn from:
  - **Target role** (acquirer, developer)
  - **Domain** (warfighter, business, intelligence, enterprise integration environment)
  - **Criticality level** (normal, mission, safety, security)
  - **Integration level** (software application, standalone subsystem, platforms, major system, system of systems)
  - **Environment** (military, other govt., industry, academia)
  - **ACAT level** (I, IA, II, III)
  - **Lifecycle phases** where practice used (Concept refinement, Technology development, System development & demonstration, etc.)
  - **Organizational scope** (individual, project, program, organization, enterprise)
BPCh Content Manager and Subject Matter Experts (SMEs)

Contents

- Intro to BPCh
- Processes and examples
- The users' view
- How can I get involved?

User-submitted Content

List of priorities

- Topic 1
- Topic 2
- Topic 3
- Topic 4
- Topic 5

Structured, e.g.
- Case studies
- GAO reports

Unstructured, e.g.
- Guidebooks
- Program reviews

Leads list

Content Manager

- SME 1
- SME 2
- SME 3
Current Content Priorities

- As determined by Content Advisory Group, input from independent review teams, conference feedback:
  - Logistics
  - Systems Engineering
  - Modeling & Simulation (M&S)
  - Program Management
  - System Assurance
  - Contracting
Example: Air Force Institute of Technology (AFIT) Case Studies
Example: AFIT Case Studies

- Identifying practice leads:
  - AFIT ‘learning principles’ explicitly identified important lessons contributing to success / failure of systems analyzed
    - Mostly SE, PM

- Creating evidence:
  - The case studies provide in-depth examination of a particular program that could be mined for evidence

- Fleshing out practices:
  - Working with AFIT personnel and case study analysts to provide appropriate detail about the practices.
Example: AFIT Case Studies

Example results:

- **New / Modified Practices:**
  - *Invest in* and retain core engineers and staff
  - Integration of requirements and design process
  - Effective validation and verification requires a firm requirements baseline
  - Implement technology development plan when technology spans multiple programs

- **Existing Practices:**
  - Independent Reviews
  - Work Breakdown Structure
  - Distributed Work Allocation
  - Architectural Trade-off Analysis Method (ATAM)
  - Systems Engineering Plan (SEP) Preparation Guide
Example: Program Support Reviews

- **Identifying practice leads:**
  - Conducted a brainstorming session with technical experts to capture trends, recurring problems

- **Creating evidence:**
  - Reviewers provided insights from the programs they reviewed, that illustrate the practices they discussed

- **Fleshing out practices:**
  - Plan to conduct follow-up meetings with the programs themselves to get more detail about *how* practices were implemented
Example: Program Support Reviews

Example practices:

- Include requirements database in Request for Proposal (RFP) process
- Get potential bidders to comment on SRR before RFP
- Develop system engineering plan prior to RFP release and include RFP
- Independent cost & schedule estimate
- Independent reviews
- Establish a battle rhythm for reports
- Integrated Developmental Test / Operational Test (DT/OT)
Other Emerging Practices: Logistics

- Performance-Based Logistics (PBL)
  - Business Case Analysis
  - Award Contract
  - Supply Chain Management
  - Performance-based agreements
  - Resource: DAU Acquisition Community Connection (ACC) PBL toolkit

- Sustainment
  - Technology Insertion
  - Software Sustainment
  - Item Unique Identification (IUID) / Radio Frequency Identification (RFID)
  - Independent Logistics Assessments
  - Prognostics & Health Management and Enhanced Diagnostics
Other Emerging Practices: M&S

- Involve Operational Test Authority in M&S planning to support DT/OT objectives
- Develop M&S plans and integrate with Test Evaluation and Management Plan (TEMP)
- M&S reuse
  - Based on: domain info, conceptual model, algorithms, software components, input data sets…
- Include M&S in contractual provisions
  - Addressing: representation requirements, data rights, M&S planning and documentation, ownership of resources…
What the User Sees… An Example Practice

### Best Practices Clearinghouse

- **Connecting you to Government and Industry Best Practices**

#### BPCh Menu

- DAU Homepage
- I Need Training
- Continuous Learning
- Knowledge Sharing
- Performance Support

#### BPCh Content Views

- Browse Content Views
- Filter Content
- Submit Content
- Feedback
- About BPCh

#### Practice Summary Description

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Practice Name</th>
<th>Practice Summary:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronze</td>
<td>Integration with Overall Program Management</td>
<td>Evaluations of the tradeoffs among operational capabilities, functional testing, and support processes; program schedule; and lifecycle costs.</td>
</tr>
<tr>
<td>Bronze</td>
<td>Utility Curve Methodology</td>
<td>A common methodology used to perform trade-off analysis. It is widely used for cost effectiveness analysis and program decision-making.</td>
</tr>
<tr>
<td>Bronze</td>
<td>Requirements Allocation Sheet</td>
<td></td>
</tr>
</tbody>
</table>

#### Systems Engineering Plan

- Program Requirements
- Technical Staffing and Organizational Planning
- Technology Maturation and Planning
- Technical Review Planning

#### CMMI Acquisition Module (CMMI-AM)

- Other Requirements Linked to the Preferred System Concept

#### Career Field

- Critical Technologies

#### Software Acquisition Management

- Technology Maturation Cost/ Schedule Constraints
- Technology Development and Evolving Acquisition Strategy
## Practice: Software Formal Inspections

**Evidence (11), Resources (2)**

<table>
<thead>
<tr>
<th>Evidence Name</th>
<th>Rating</th>
<th>Overall Perception</th>
<th>Quality Experience Report</th>
<th>Criticality</th>
<th>Primary Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>What We Have Learned about Fighting Defects</td>
<td>8</td>
<td></td>
<td>Via interview</td>
<td></td>
<td>Improved Quality</td>
</tr>
<tr>
<td>Applying Program Comprehension Techniques to Improve Software Inspections</td>
<td>12</td>
<td></td>
<td>Workshop publication</td>
<td></td>
<td>Reduced Cost</td>
</tr>
<tr>
<td>Report on the Loss of the Mars Climate Orbiter Mission</td>
<td>9</td>
<td></td>
<td>Technical report (within an organization or university)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Empirical Investigation of Perspective-Based Reading</td>
<td>13</td>
<td></td>
<td>Archival journal publication (e.g. IEEE Transactions on Software Engineering)</td>
<td>Normal</td>
<td>Improved Quality</td>
</tr>
<tr>
<td>Comparing the Effectiveness of Software Testing Strategies</td>
<td>14</td>
<td></td>
<td>Archival journal publication (e.g. IEEE Transactions on Software Engineering)</td>
<td></td>
<td>Improved Quality</td>
</tr>
<tr>
<td>Space Shuttle Primary Onboard Software Development: Process Control and Defect Cause Analysis</td>
<td>12</td>
<td></td>
<td>Technical report (within an organization or university)</td>
<td>Safety critical</td>
<td>Improved Quality</td>
</tr>
<tr>
<td>Key Lessons in Achieving Widespread Inspection Use</td>
<td>17</td>
<td></td>
<td>Trade journal publication (e.g. CrossTalk)</td>
<td>Don't know</td>
<td>Reduced Cost</td>
</tr>
<tr>
<td>Experience with Inspection in Ultralarge-Scale Developments</td>
<td>18</td>
<td></td>
<td>Conference publication or 2nd-tier publication (EMSE, IEEE Software, CACM)</td>
<td>Don't know</td>
<td>Reduced Cost</td>
</tr>
<tr>
<td>An Analysis of Defect Densities Found During Software Inspections</td>
<td>19</td>
<td></td>
<td>Archival journal publication (e.g. IEEE Transactions on Software Engineering)</td>
<td></td>
<td>Improved Quality</td>
</tr>
</tbody>
</table>

**What the User Sees… An Example Practice**
Program Status

- 20 SMEs covering our priority practice areas
  - Drawn from: DAU, OSD, AFIT, Lockheed Martin
- SME training modules online & being rolled out
- Content Advisory Group (CAG)
- Content processing and maintenance is ongoing
- Tool improvements (working toward v1.6)
Engaging New Participants

- Leveraging booth presence at NDIA-SE this month:
  - Sending an interview team to capture multimedia experiences from conference attendees
  - Integrating with track chairs and workshop on mentoring
  - Benefits to contributors:
    - First 100 interviewees get a DAU backpack
    - Recognition on the BPCh webpage as a content contributor
    - FCMD donates $5/interviewee to Toys for Tots
Engaging New Participants

- Recognition of important contributors
  - Outstanding Content Contributor award: Best content addition to the BPCh in the fiscal year
    - Frequency, quality, and significance of content
  - Outstanding Subject Matter Expert award: Individual providing the best subject-area support
    - Amount and quality of content processed, degree of connections to other resources
Engaging New Participants

- Visit: https://bpch.dau.mil
- Built-in feedback forms in the application
  - …To give us a lead
  - …To suggest a practice we should have
  - …To tell us your experience with a practice
  - …To give us a detailed experience report
- Ability to integrate BPCh with in-house best practice / lessons learned systems

- Contact me…
  - To suggest other content
  - To volunteer as a SME
Questions?

Feel free to contact:

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