

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



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Fraunhofer Center Maryland**

**NDIA Systems Engineering Conference
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Objectives

- **Review 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**





The DoD Acquisition Best Practices Clearinghouse

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DoD Acquisition Best Practices Clearinghouse!

Best Practices Clearinghouse
Connecting you to Government and Industry Best Practices

Defense Acquisition University

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DAU Homepage
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— BPC Menu —

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About BPC

Welcome to the Acquisition Best Practices Clearinghouse



The DoD Acquisition Best Practices Clearinghouse (BPC) facilitates the selection and implementation of systems engineering and software acquisition practices appropriate to the needs of individual acquisition programs. The BPC uses an evidence-based approach, linking to existing resources that describe how to implement various best practices. These linked resources also provide descriptions of the practical results (both good and bad) of applying the practices in various contexts, from which users can learn about the results to be expected in their environment. All evidence stored is also contextualized, so that users will be guided to the lessons relevant to their program, type of problem, or specific situation.

Quick Search

Practices that have the most evidence

- Software Formal Inspections
- Pair Programming
- Trade Studies
- Architectural Reviews
- Integrated Project Data Repositories (IPDRs)

Evidences that have the highest trustability scores

- Advances in Software Inspections
- An Analysis of Defect Densities Found During Software Inspections

BPC Learning Guides

Guide Links

- For First-Time Users of BPC
- Contributing Content to BPC
- BPC Tutorials
- Explaining Gold, Silver & Bronze Practice Maturity Levels
- Understanding the BPC Vetting Process

Gold Practices

- Pair Programming
- Software Formal Inspections

Practices that Reduce Schedule

- Include a Requirements Database in the RFP

Practices that Improve Quality

- Pair Programming
- Software Formal Inspections
- Software Walkthroughs

Acquisition KM Systems



Done

start | Internet | 100% | 4:34 PM



What makes BPCh unique?

Contents

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

- 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 Maturity



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



(~~Score~~)



Evidence 1

Source
Context
Results



Evidence 2

Source
Context
Results



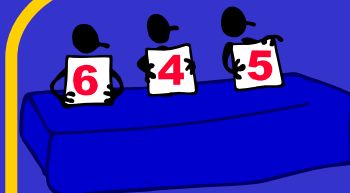
Evidence 3

Source
Context
Results



Evidence 4

Source
Context
Results





Definitions

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- Intro to BPCh
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- A **practice** is:
 - A *documented* activity that is described in an *actionable, repeatable* way;
 - 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

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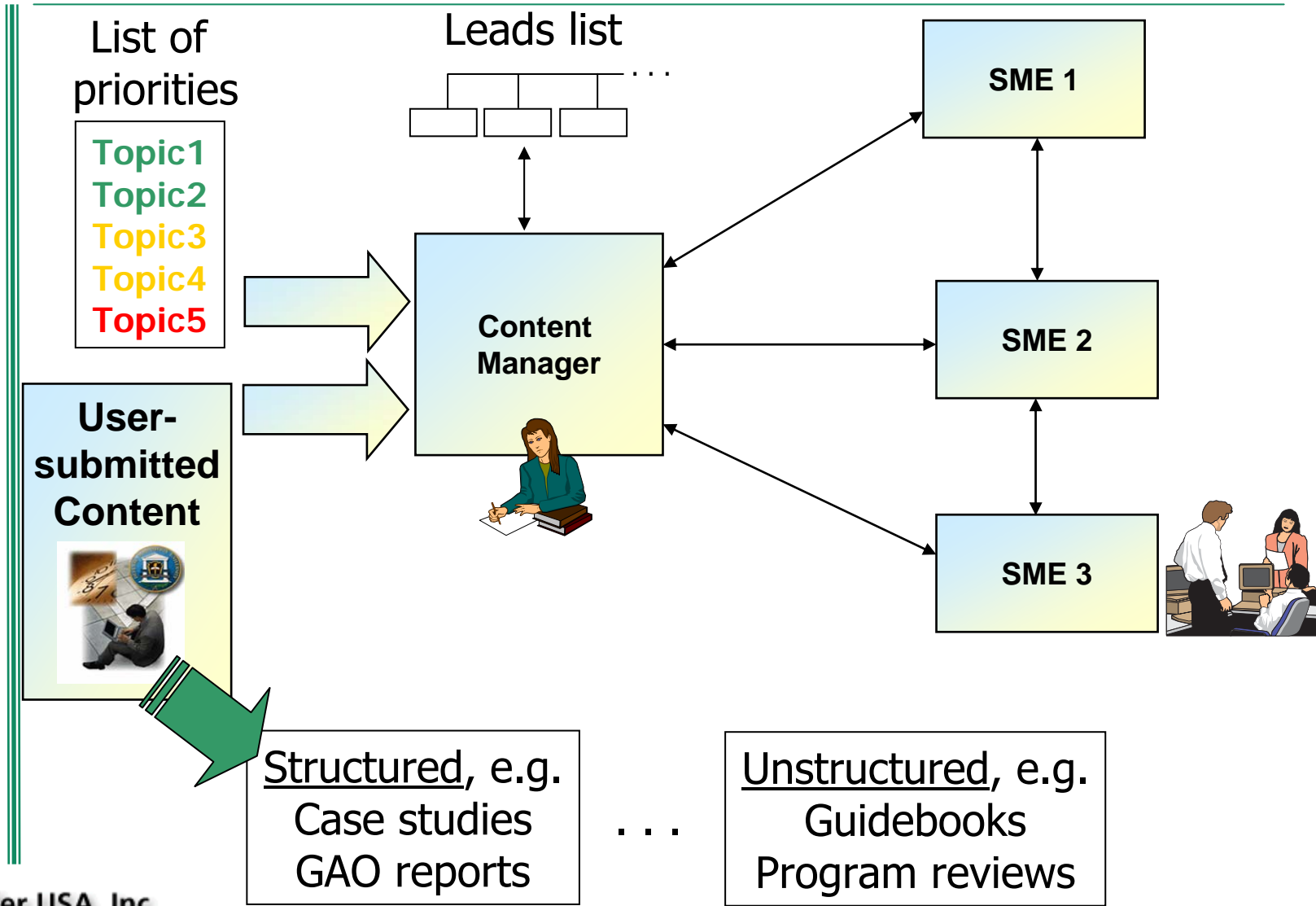
- Any piece of evidence is tagged according to where it was drawn from:
 - **Target role** (acquirer, developer)
 - **Domain** (warfighter, business, intelligence, enterprise integration environment)
 - **Criticality level** (normal, mission, safety, security)
 - **Integration level** (software application, 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)

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- Intro to BPCh
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Current Priorities

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How can I get involved?

- 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

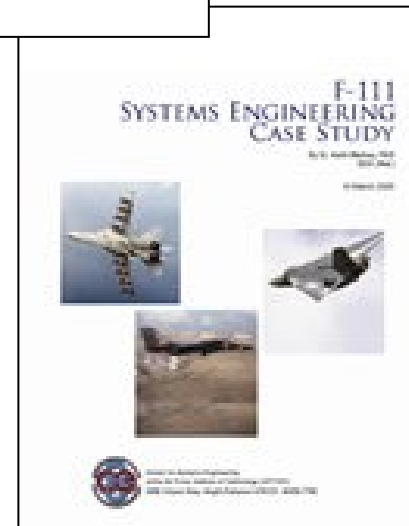
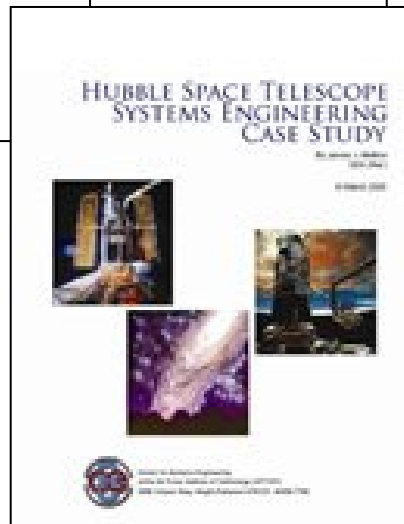
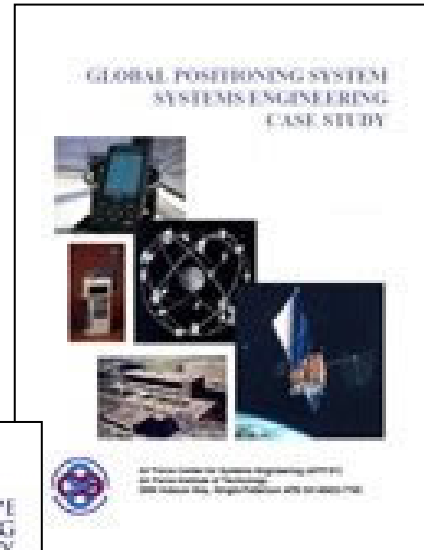
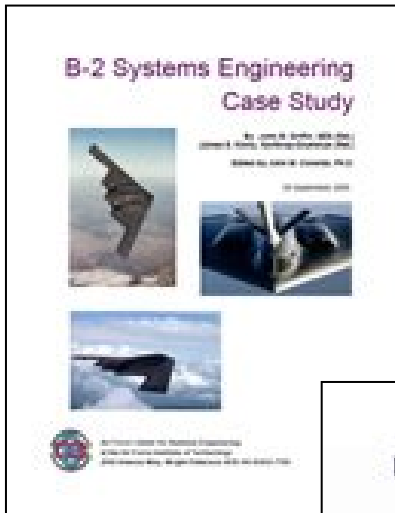
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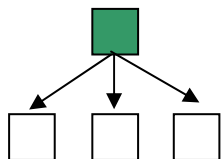
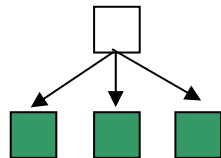
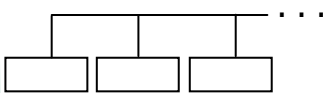




Example: AFIT Case Studies

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- 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

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- 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

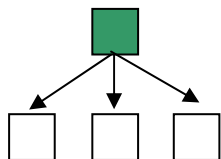
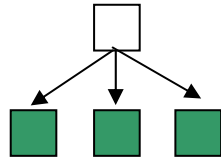
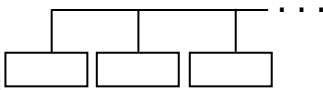
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- Identifying practice leads:
 - Conducted a brainstorming session with technical experts to capture trends, recurring problems
- Creating evidence:
 - Reviewers provided insights from the programs they reviewed, that illustrate the practices they 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

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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

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How can I get involved?

- 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

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How can I get involved?

- 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

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You are here: Home > Systems Engineering Plan > Capabilities, Requirements and Concept(s) of Operation
All practices under "Capabilities, Requirements and Concept(s) of Operation" category

	Maturity ↑		Practice Summary Description ↑
Browse Content Views ▶ Filter Content ▶ Submit Content ▶ Feedback About BPCh	Systems Engineering Plan ▶ CMMI Acquisition Module (CMMI-AM) ▶ Career Field ▶ Software Acquisition Management ▶	Program Requirements ▶ Technical Staffing and Organizational Planning ▶ Technology Maturation and Planning ▶ Technical Review Planning ▶	Capabilities, Requirements and Concept(s) of Operation Other Requirements Linked to the Preferred System Concept Critical Technologies Technology Maturation Cost/ Schedule Constraints Technology Development and Evolving Acquisition Strategy
	Bronze 	Practice Name Integration with Overall Program Management ▶ Practice Summary: Evaluations of the tradeoffs among operational capabilities, functional testing, and support processes; program schedule; and lifecycle cost	
	Bronze 	Practice Name : Utility Curve Methodology Practice Summary: A common methodology used to perform trade-off analysis. It is widely used for cost effectiveness analysis and p	
	Bronze 	Practice Name : Requirements Allocation Sheet	



What the User Sees... An Example Practice

Practice : Software Formal Inspections

Evidence (11) , Resources (2)

Practice Details

Evidence

Resources

Summary

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



Current SMEs

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How can I get involved?

■ Systems Engineering

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- Mike Ucchino michael.ucchino@afit.edu

■ Logistics

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- Jill Garcia jill.garcia@dau.mil

■ Modeling & Simulation (M&S)

- Mike Truelove mike.truelove@syseng-so.com

■ Program Management, System Assurance, Contracting

- None participating

■ Software Acquisition Management

- Larry Baker larry.baker@dau.mil
- Bob Skertic robert.skertic@dau.mil





How can I participate?

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How can I get involved?

- 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
- Fill out our questionnaires...
 - *To suggest other content*
 - *To volunteer as a SME*





Questions?

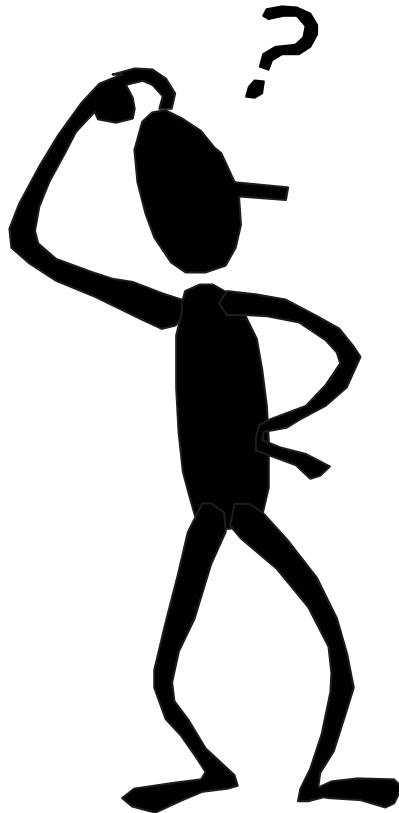
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How can I get involved?



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List of used abbreviations

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Intro to BPCh

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How can I get involved?

- ACC: Acquisition Community Connection
- ACAT: Acquisition CATegory
- AFIT: Air Force Institute of Technology
- BPCh: (Acquisition) Best Practices Clearinghouse
- CoP: Communities of Practice
- COTS: Components Off The Shelf
- DAU: Defense Acquisition University
- DT/OT: Developmental Test / Operational Test
- DoD: U.S. Department of Defense
- IUID: Item Unique Identification
- M&S: Modeling and Simulation
- OSD: Office of the Under Secretary of Defense
- PBL: Performance Based Logistics
- PM: Program/Project Manager
- RFID: Radio Frequency Identification
- SE: Systems Engineering
- SMEs: Subject Matter Experts
- SSR: System Requirements Review
- TEMP: Test Evaluation and Management Plan