

# **Software Engineering Reviews and Audits**

## **Overview**

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**Systems & Software Technology Conference SSTC**  
May 19<sup>th</sup>, 2011

## Report Documentation Page

*Form Approved*  
*OMB No. 0704-0188*

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>19 MAY 2011</b>	2. REPORT TYPE	3. DATES COVERED <b>00-00-2011 to 00-00-2011</b>			
4. TITLE AND SUBTITLE <b>Software Engineering Reviews and Audits Overview</b>		5a. CONTRACT NUMBER			
		5b. GRANT NUMBER			
		5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S)		5d. PROJECT NUMBER			
		5e. TASK NUMBER			
		5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Boeing Company, Boeing Integrated Defense Systems, Seattle, WA, 98101</b>		8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)			
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>Presented at the 23rd Systems and Software Technology Conference (SSTC), 16-19 May 2011, Salt Lake City, UT. Sponsored in part by the USAF. U.S. Government or Federal Rights License</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>33</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

# Software Engineering Reviews and Audits

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- ▶ **Currently working Software Engineering (Quality) - The Boeing Company in Seattle, Washington.**
- ▶ **Program(s):** Missile Systems, B2 Bomber, Advanced Satellite Systems, F-22 Raptor Air Vehicle Systems, 737 Airborne Early Warning and Control (AEW&C) Australia and South Korea programs.
- ▶ CMMI v1.3 Model Upgrade Certification

# Software Engineering Reviews and Audits

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How can internal organizations ensure software engineering programs or projects become successful?

# Software Engineering Reviews and Audits

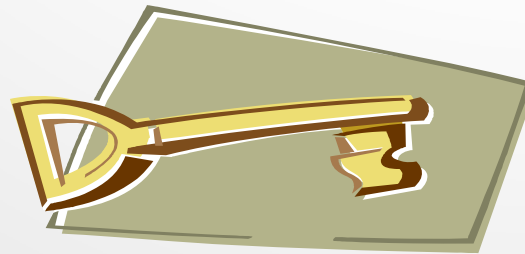
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This presentation will not answer every **Question** about the importance of **Reviews** and **Audits**, but provide ideas and solutions to consider.

# Software Engineering Reviews and Audits

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The emphasis of software disciplines are “**key**” to ensure effective methods are in place for reviews and audit performance.



# Software Engineering Reviews and Audits

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Defined software plans consist of:

- **systems and software development**
- **configuration management**
- **test, integration, and delivery**
- **software quality evaluations**

# Software Engineering Reviews and Audits

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**Capability Maturity  
Model Integration  
(CMMI)**

**Quality Management  
System (QMS)**

**“Software Engineering  
Reviews and Audits”**

**Compliance to Software  
Requirements**

# Software Engineering Reviews and Audits

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## Software Engineering Reviews and Audits

provide a readiness for conducting and performing:

- First Article Inspection (FAI)
- Functional Configuration Audits (FCA)
- Physical Configuration Audit (PCA)

# Software Engineering Reviews and Audits

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Reviews and Audits prepare us to answer questions:

- what are the requirements?
- who needs to participate?
- how do we ensure released baselines are compliant and meet quality objectives?

# Software Engineering Reviews and Audits

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Accurate reviews and audits are essential to the software industry military and aerospace programs to define the framework and specific requirements for “**verification** and **validation**” of software development efforts.

# Software Engineering Reviews and Audits

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**“ software development and the disciplines required  
is a dream - software engineering reviews and audits  
are serious.”**



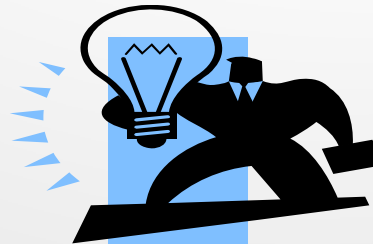
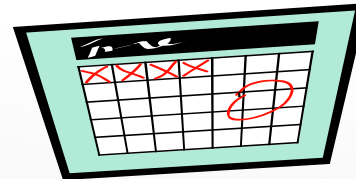
*Boyd L. Summers*

# Software Engineering Reviews and Audits

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Senior Management must have in place:

- allocated budget
- committed schedules
- trained personnel



# Software Engineering Reviews and Audits

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Senior Management will always provide  
when they see:



- effective software development
- team work performance
- customer expectations achievement
- quality improvement

# **Software Engineering Reviews and Audits**

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**“why do our software programs or projects need to  
worry or be concerned?”**

# Software Engineering Reviews and Audits

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**answer:**

**“assurance that software products delivered to customers have been reviewed, audited, verified, and meet required quality requirements.”**

# Software Engineering Reviews and Audits

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## Capability Maturity Model Integration (CMMI)

*Improving processes for developing better products and services*

by adopting **CMMI practices**, I have seen for years software development processes improve.

# Software Engineering Reviews and Audits

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effective software development plans and  
processes are better defined for:

- **planning**
- **design**
- **test**
- **integration**

# Software Engineering Reviews and Audits

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software plans, documented processes and procedures, artifacts, data packages are requirements when it is time to conduct and perform **software engineering reviews and audits.**

# Software Engineering Reviews and Audits

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The scope is to review and confirm information is complete, correct, and configuration changes are sufficiently addressed.

# Software Engineering Reviews and Audits

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The **CMMI** model provides effective methods for systems and software engineering and integration environments.

Let's discuss "**Peer Reviews**"

# Software Engineering Reviews and Audits

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## Definition:

The **Peer Review** is the review of software work products developed by other software designers during development of those work products to identify and fix defects.

# Software Engineering Reviews and Audits

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CMMI for Development v1.3

Process Area:

**Verification**

“**peer reviews** are an important part of ***verification*** and are a proven mechanism for effective defect removal.”

# Software Engineering Reviews and Audits

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Examples of peer review methods include the following:

- Inspections
- Structured walkthroughs
- Deliberate refactoring
- Pair programming

# Software Engineering Reviews and Audits

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## Software and System Integration

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The **quality** enforcer will ensure that the processes such as **peer reviews**, are followed.



# Software Engineering Reviews and Audits

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## < Peer Review Methods >

select appropriate  
peer review

Conduct **Formal**  
peer review with  
applied Software  
Tools

Conduct  
**Informal** peer  
review using  
team inspection

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To ensure you have a successful peer review, select trained reviewers and guidelines are understood from the **start.**



“If the peer review was conducted and performed correctly, you have done it right.”

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## Quality Management System (QMS)

Standards AS9100, SAE AS9110, and ISO 9001

Quality Systems is the model:

- quality requirements,
- design and development
- production
- installation
- service.

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**QMS** is simply:

- defined and documented software processes
- execution of processes
- monitoring or measuring processes
- making continual improvements

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- **Plan** – Processes are documented to deliver results
- **Do** – Implementation is accomplished by a skilled work force.
- **Check** – Compliance to improve performance.
- **Act** – Take actions to continually improve performance.

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In order to have quality management implemented be :

- focused
- process based
- improvement oriented

**“say what you do, do what you say, prove it, and  
improve it”**

# Software Engineering Reviews and Audits

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## Closing Statement:

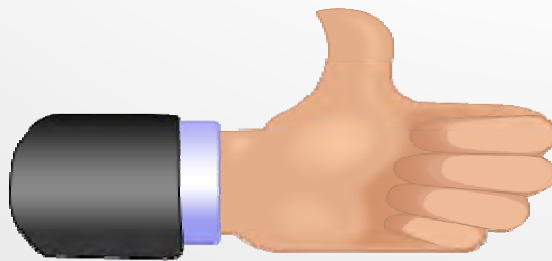
Software Engineering Reviews and Audits



# Software Engineering Reviews and Audits

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“improve individual and team efforts in maintaining a professional setting where software is developed for **profit, cost reduction, and service quality improvement.**”



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<b>AEW&amp;C</b>	Airborne Early Warning & Control
<b>AS</b>	Aerospace
<b>CMMI</b>	Capability Maturity Model Integration
<b>FAI</b>	First Article Inspection
<b>FCA</b>	Functional Configuration Audit
<b>ISO</b>	International Organization for Standardization
<b>PCA</b>	Physical Configuration Audit
<b>QMS</b>	Quality Management System