

FAA National Software Conference, June 2001

Guidelines for the Software Review Process

Notice 8110.90: Guidelines for the Software Review Process



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Presentation Overview

- Purpose and History
- DO-178B, Notice 8110.90, and the FAA Software Job Aid
- Outline of Notice 8110.90
- Highlights of Notice 8110.90
- Summary

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Purpose

- Provide guidelines to certification authorities and designees for performing software reviews
- Clarify the software review process discussed in DO-178B
- Standardize the review approach, which is detailed in FAA Job Aid “Conducting Software Reviews Prior to Certification”



History

- Began Notice - 1995/96
- Completed FAA Software Job Aid and training - June/July 1998
- Finalized Notice 8110.81 - March 1999
- Notice 8110.81 automatically cancelled after one year
- Reinstated as Notice 8110.90 - January 2001

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DO-178B, Notice 8110.90, and the FAA Software Job Aid

- Per DO-178B sections 9.2 and 10.3 the certification authority may review the software life cycle processes and their outputs
- Notice 8110.90 is “WHAT” document, Job Aid is “HOW” document
- Notice 8110.90 is policy, Job Aid is a training tool

Notice 8110.90 Outline

- Sections 1-3: Purpose, Distribution, Related Publications
- Section 4: Definitions
- Section 5: Scope
- Section 6: Objectives of the Software Review Process
- Section 7: Interaction between the Software Review Process and Software Life Cycle
- Section 8: Additional Considerations for the Software Review Process
- Section 9: Preparing, Conducting, and Documenting the Software Review
- Section 10: Conclusion

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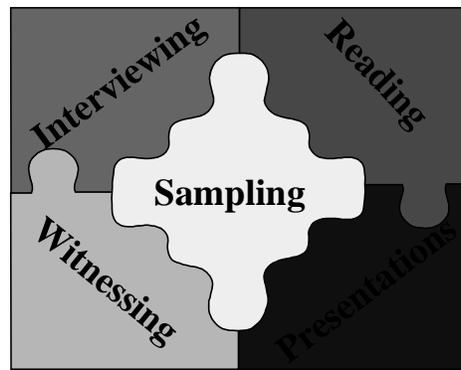
Def: Review (Section 4) - 1/2



- Process of examining software life cycle data, project records, and other evidence to determine if DO-178B objectives are satisfied

Def: Review (Section 4) - 2/2

Typical Review Activities



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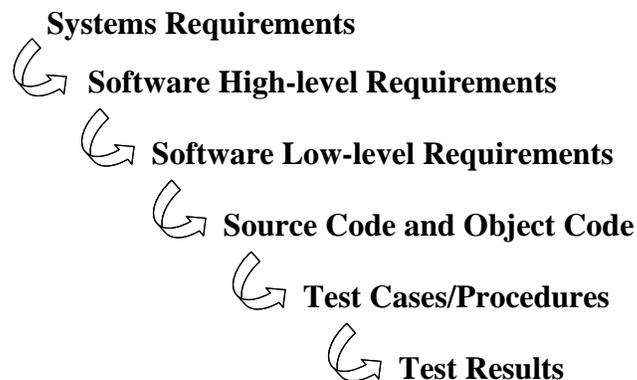
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Def: Sampling (Section 4)

- Technique used in software review
- Select representative software life cycle data to analyze compliance to DO-178B objectives

Examples of Sampling - 1/2

- Traceability examination:



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Examples of Sampling - 2/2

- Review safety assessment tie to software level
- Examine structural coverage analysis
- Examine software quality assurance and configuration management records

Def: Presentation (Section 4)



- Applicant's overview of the software program
- Use sparingly during the software review process
- May not give full picture of actual life cycle activities

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Def: Findings and Observations (Section 4)

- FINDING = Identification of a failure to meet DO-178B objective(s)
- OBSERVATION = Identification of potential software life cycle improvement

Scope (Section 5)

- DO-178B discusses Certification Liaison Process (Section 9)
- DO-178B addresses software reviews by certification authorities (Section 9.2 and 10.3)

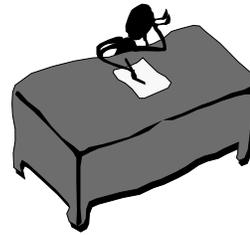
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Scope (Section 5) Two Review Techniques



On-site



Desk

Scope (Section 5b) Making Arrangements

- Determine type of review (i.e., Planning, Development, Verification, or Final)
- Determine dates, locations, personnel
- Determine designee involvement
- Specify data to be reviewed

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Purpose of Software Review (Section 6a)

- Address technical issues in a timely manner
- Physically examine compliance data
- Verify adherence to plans and procedures
- Monitor designees

Determine Level of FAA Involvement (LOFI) (Section 6b)

- Determine LOFI early in the project
- Determine how many and what type of reviews the FAA will perform
- LOFI criteria is documented in Notice 8110.87
- LOFI should be documented for each software project

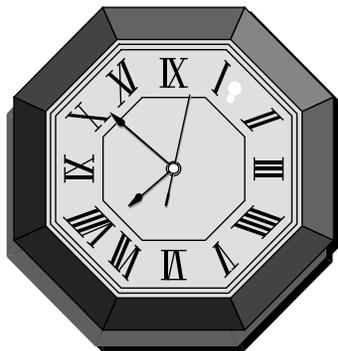
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Examples of Levels of FAA Involvement (Section 6b)

- High: Level A system, little designee support, little experience with DO-178B (3 - 4 reviews)
- Medium: Level A system, experienced designees, experience with DO-178B (2 - 3 reviews)
- Low: Level C or D system, experienced designees, experience with DO-178B (0 - 1 review)

Review Process & Life Cycles (Section 7)



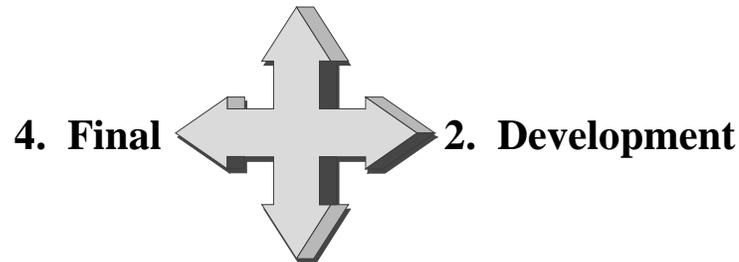
- Reviews should begin early in the software life cycle

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Four Types of Software Reviews (Section 7)

1. Planning

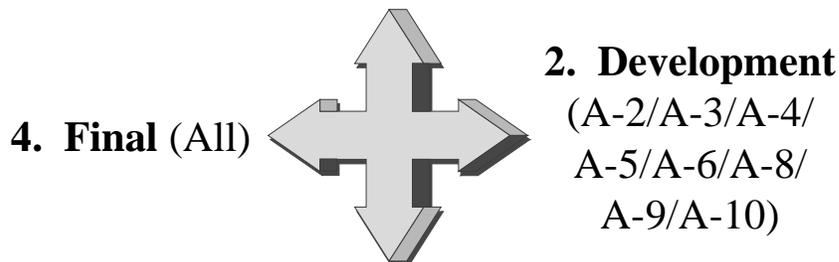


3. Verification

Note: In Job Aid these were called
Stages of Involvement # 1, 2, 3, 4

Four Types of Reviews & Relationship to DO-178B Annex A (Section 7)

1. Planning (A-1/A-8/A-9/A-10)



3. Verification (A-7/A-8/A-9/A-10)

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1. Software Planning Review (Section 7) - 1/2

- Called “Stage of Involvement # 1” in Job Aid
- Occurs when applicant has completed planning process:
 - Plans and standards are complete and under configuration control
 - Plans and standards have been reviewed by SQA

1. Software Planning Review (Section 7) - 2/2

- Data to review - See Table 1 in N8110.90
- Review data to assess compliance to the following DO-178B objectives:
 - Table A-1: All Objectives
 - Table A-8: Objectives 1-4
 - Table A-9: Objective 1
 - Table A-10: Objectives 1-2



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2. Software Development Review (Section 7) - 1/3

- Called “Stage of Involvement # 2” in Job Aid
- Occurs when applicant is well into software development process:
 - Most of the development data are complete and have been reviewed
 - Some test cases may already be started

2. Software Development Review (Section 7) - 2/3

- Criteria to determine whether the Project is ready for Development Review:
 - High-level Requirements are complete and trace to Systems Requirements
 - Software Architecture is complete
 - Low-level Requirements are complete and Trace to High-level Requirements
 - Source Code is complete and traces to Low-Level Requirements

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2. Software Development Review (Section 7) - 3/3

- Data to review - See Table 2 in N8110.90
- Review data to assess compliance to DO-178B objectives:
 - Table A-2: Objectives 1-6
 - Table A-3 & A-4: All Objectives
 - Table A-5: Objectives 1-6
 - Table A-8: Objectives 1-4, 6
 - Table A-9: Objectives 1-2
 - Table A-10: Objective 3

3. Software Verification Review (Section 7) - 1/3

- Called “Stage of Involvement # 3” in Job Aid
- Occurs when applicant is well into verification/test process

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3. Software Verification Review (Section 7) - 2/3

- Criteria to determine whether the Project is ready for Verification Review :
 - Development data is complete and under configuration control
 - Test cases and procedures are complete, reviewed, and under configuration control
 - Testing environment is documented and controlled
 - Testing is complete or well under way
 - Test results are documented

3. Software Verification Review (Section 7) - 3/3

- Data to review - See Table 3 in N8110.90
- Review data to assess compliance to DO-178B objectives:
 - Table A-1: Objective 3
 - Table A-5: Objectives 7
 - Tables A-6, A-7, A-8: All Objectives
 - Table A-9: Objectives 1-2
 - Table A-10: Objective 3

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4. Final Certification Software Review (Section 7) - 1/3

- Called “Stage of Involvement # 4” in Job Aid
- Occurs when product is ready for certification

4. Final Certification Software Review (Section 7) - 2/3

- Criteria to determine whether the Project is ready for Final Certification Review:
 - Software Conformity Review has been conducted
 - Software Accomplishment Summary and Configuration Index are complete
 - All other Software Life Cycle Data are complete and under Configuration Control
 - All Problem Reports, Action Items, and Certification Issues have been addressed

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4. Final Certification Software Review (Section 7) - 3/3

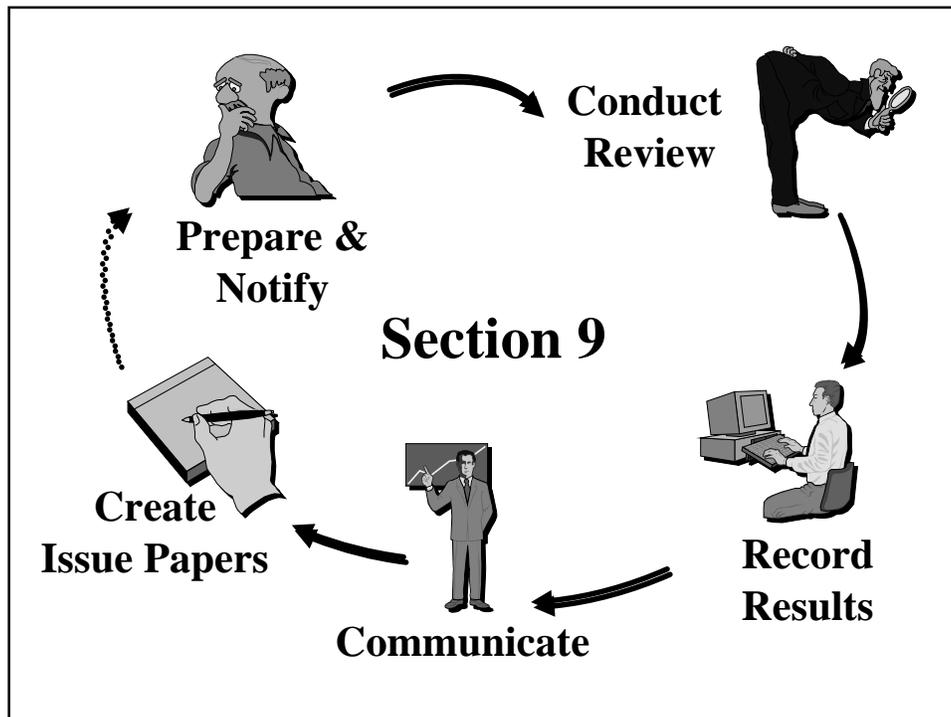
- Data to review - All life cycle data should be available. See Table 4 in N8110.90 for data specific to Final Certification Review.
- Review data to assess compliance to all DO-178B objectives

Additional Considerations (Section 8)

- Number, type, and depth of reviews will vary depending on:
 - Software Level
 - Product attributes (e.g. size, complexity)
 - New technology or novel design
 - Experience with DO-178B
 - Experience with Certification
 - Designee Support
 - Other special considerations

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For Additional Information on Software Reviews

- Reference the FAA Software Job Aid - "Conducting Software Reviews Prior to Certification"
- View the Video Training on using the FAA Software Job Aid
- Go to the FAA Software Web-site:
<http://av-info.faa.gov/software/>

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Guidelines for the Software Review Process

Summary

- Provides guidelines for preparing, conducting, and documenting software reviews
- Outlines four types of reviews:
 - Planning
 - Development
 - Verification
 - Final
- References FAA Software Job Aid for detailed information about conducting software reviews