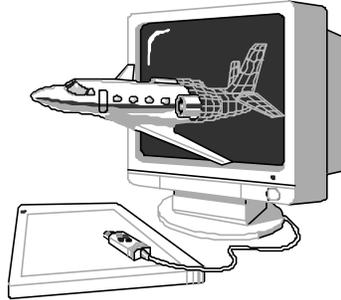




**Guidelines for Software Conformity
Inspection and Software Conformity Review
Notice 8110.86**



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Background

- **Terminology**
- **Who performs what, when**
- **Standardization**

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Objectives

- **Explain relationship of Notice 8110.86 to FAA Order 8110.4B & RTCA DO-178B**
- **Differentiate between software conformity inspection and software conformity review**
 - Characteristics
 - Responsibilities
 - Documentation

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Based in Rule

- **14 CFR Part 21, Section 21.33 Inspection and Tests (b):**
 - *“(2) That materials and products conform to the specifications in the type design; (3) That parts of the products conform to the drawing in the type design; and (4) That the manufacturing processes, construction and assembly conform to those specified in the type design.”*

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Amplified in FAA Order (1/2)

- **FAA Order 8110.4B, Paragraph 2-11f:
Conformity & witnessing of tests**
 - *“The conformity of the test article, test setup, test procedures used, and the validity of the test results must be established for each test conducted to show compliance with a type certification requirement . . .”*

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Amplified in FAA Order (2/2)

- **FAA Order 8110.4B, Paragraph 2-11g:
Conformity Inspections**
 - *“A conformity inspection is required to ensure that the product being certificated complies with the type design. . . . An FAA conformity inspection should be successfully conducted before any official FAA tests (ground or flight) are conducted. . . .”*

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Responsibilities (1/2)

- **FAA Engineering Personnel**
 - **Requests required for conformity inspections are documented**
 - **FAA Form 8120-10, Request for conformity**
 - **FAA Form 8110-1, Type Inspection Authorization**
 - **Memorandum**

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Responsibilities (2/2)

- **FAA Manufacturing Personnel**
 - **Determines that product conforms with drawing specifications and special processes**
 - **Assures software part number and version number is identifiable, under configuration control, reproducible, and documented**
 - **Documents a FAA Form 8100-1, Conformity Inspection Record**

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Order 8110.4B & RTCA DO-178B

- **Order 8110.4B**
 - “... establishes procedures for accomplishing the evaluation and approval of aircraft type design data ...”
- **RTCA DO-178B**
 - “... provide guidelines for the production of software for airborne systems and equipment that performs its intended function with a level of confidence in safety ...”

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Official FAA Tests (Order 8110.4B)

- “... *An FAA conformity inspection should be successfully conducted before any official FAA tests (ground or flight) are conducted. . . .*”
- **In other words, any test in which certification credit is taken**

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Baseline: An important prerequisite to testing for credit

- **RTCA DO-178B**
 - “The approved, recorded configuration of one or more configuration items, that thereafter serves as the basis for further development, and that is changed only through a change control process.”

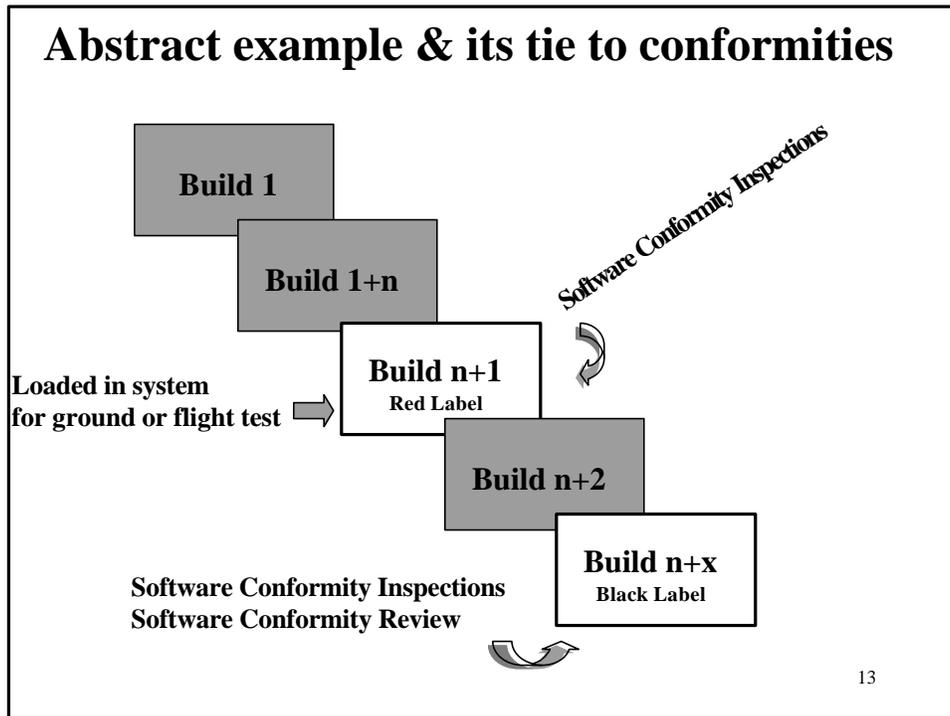
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Understanding types of baselines

- **Black Label**
 - Final baseline
- **Red Label**
 - Any baseline that precedes final baseline

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Notice 8110.86

- GUIDELINES FOR SOFTWARE CONFORMITY INSPECTION AND SOFTWARE CONFORMITY REVIEW
 1. Purpose
 2. Distribution
 3. Related Publications
 4. Background
 5. *Discussion and Procedures*
 6. Conclusion

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Section 5 Discussion & Procedures

- 1 Design Assurance Software Conformity Inspection**
- 2 Software Installation Conformity Inspection**
- 3 Software Conformity Review**

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1. Design Assurance Software Conformity Inspection (1/7)

- To ensure that the test configuration of the software complies with its test baseline before a test for credit is executed**
 - Aircraft**
 - Test Laboratory**
 - Development Workstation**

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Further Guidance (Design Assurance) (2/7)

- **8110.4B**
 - **Conformity and witnessing of tests**
 - **Paragraph 2-11f(4)**
 - **Areas of consideration pertaining to software**
 - **Paragraph 5-2d(9)**
 - **Witnessing of official tests**
 - **Paragraph 5-5**

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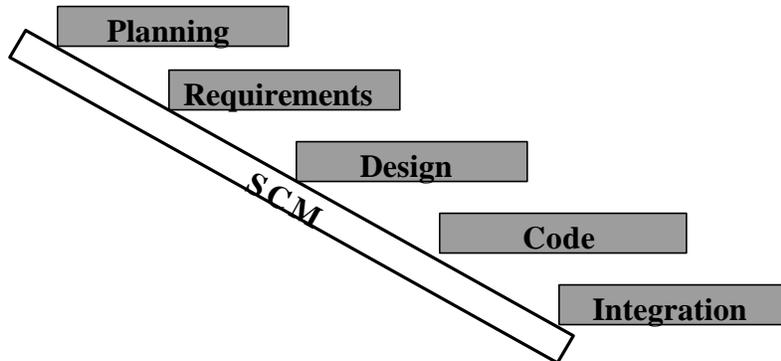


Design Assurance Software Conformity Inspection (3/7)

- **DO-178B Software Configuration Management process utilized for assurance**
 - **Integral process**
 - **Plan and records in place**
 - **Visibility to a defined and controlled configuration**
 - **Known point of review**
 - **Evidence of approval**
 - **Control, archival, and recovery**

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Configuration Management (4/7)



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Design Assurance Software Conformity Inspection (5/7)

- **Requires:**
 - **Baseline that identifies relevant software life cycle data**
 - **Development/Verification tools**
 - **Procedures used for retention, archival, & retrieval is compliant to the SCMP**

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Design Assurance Software Conformity Inspection (6/7)

- **Requires:**
 - **ACO ASE has concurred the baseline complies to its requirements and approved software plans. Or,**
 - **DER approval via FAA Form 8110-3**
 - **(unchanged code is not effected, changed code does not impact unchanged code and is of a design appropriate for its intended function)**

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Design Assurance Software Conformity Inspection (7/7)

- **Requires ASI to assure:**
 - **Baseline identifies relevant life cycle data**
 - **Completion of FAA Form 8110-3, Statement of compliance**
 - **Tool configuration is documented**
 - **Compliance with SCMP for retention, archival, and retrieval processes**

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2. Software Installation Conformity Inspection (1/6)

- **When?**
 - **After a Design Assurance Conformity Inspection**
 - **During or after the software is loaded**
 - **Line Replaceable Unit**
 - **System**
 - **Before any official FAA ground or flight test**

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Software Installation Conformity Inspection Objectives (2/6)

- **Assures:**
 - **Approved/controlled version of software**
 - **Approved/controlled version of hardware**
 - **Successful loading of software into hardware**
 - **Use of approved procedures**
 - **software loading procedures**
 - **system installation procedures**
 - **Software initializes successfully**

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Software Installation Conformity Inspection Methods (3/6)

ASI/Designee performs by one of two methods:

- **Witnessing all aspects of the actual software installation, or**
- **Review of manufacturing inspection records, documenting the results of the actual software installation**

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Software Installation Conformity Inspection Witness (4/6)

ASI/Designee can witness all aspects of the actual software installation :

- **Physical verification of correct software and hardware**
- **Successful loading of software into hardware**
- **Integrity check to verify load**
- **Successful software initialization**

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Software Conformity Review (1/3)

- **Referenced in RTCA DO-178B
Section 8.3**
- **Applicant's responsibility**
- **Not performed by an ASE, ASI, or
Designee**

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Software Conformity Review Objectives (2/3)

- **Assure:**
 - **Software life cycle data process activities are
complete**
 - **Data complies with plans and standards**
 - **Problem reports comply with the SCM Plan**
 - **Executable code can be regenerated**
 - **Approved software can load successfully**

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Software Conformity Review (3/3)

- **Assure software life cycle data are complete**
 - **Software Requirements Data**
 - **Design Description**
 - **Source Code**
 - **Executable Object Code**
 - **Software Configuration Index**
 - **Software Accomplishment Summary**

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Summary

- **Three types of software conformities**
 - **2 inspections**
 - **1 review**
- **FAA role**
- **Based on Rule**

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Appendix

Course Evaluation Forms

There are two course evaluation forms in this Appendix. Please select the one appropriate for your method of study.

- IVT broadcast
- Self-study video course

If you are taking this course via IVT and you are logged on to a keypad, you will be asked to complete the course evaluation by using the Viewer Response System keypad. Your IVT instructor will provide directions on how to complete the course evaluation. If you do not have access to a keypad, circle your responses and fax the form to the IVT studio.

If you have completed this by watching the video, please complete the Self-Study Evaluation Form and return to your directorate/division training manager (ATM).

NOTES

IVT COURSE EVALUATION

Aircraft Certification

Software Conformity Policy

September 6, 2000

Please give us your candid opinions concerning the training you've just completed. Your evaluation of the IVT course is important to us, and will help us provide the best possible products and services to you. **NOTE: Your keypad responses are not identifiable by name; only average item responses are provided to the instructor and to others responsible for the training.**

Use your Viewer Response keypad to answer the following questions.

	Very Good	Good	Average	Poor	Very Poor
1. Length of course	A	B	C	D	E
2. Depth of information	A	B	C	D	E
3. Pace of training	A	B	C	D	E
4. Clarity of objectives	A	B	C	D	E
5. Sequence of content	A	B	C	D	E
6. Quality of course materials	A	B	C	D	E
7. Quality of graphics/visual aids	A	B	C	D	E
8. Readability of text on monitor	A	B	C	D	E

SELF-STUDY VIDEO EVALUATION

Please give us your candid opinions concerning the training you've just completed. Your evaluation of the self-study video course is important to us, and will help us provide the best possible products and services to you.

Course title: _____

Date: _____

Number of years of FAA experience: _____

(Optional)Name: _____ Office phone: () _____

For the following, please darken the circle appropriate to your response.

	Very Good	Good	Average	Poor	Very Poor	N/A
1. Length of course	<input type="radio"/>					
2. Depth of information	<input type="radio"/>					
3. Pace of training	<input type="radio"/>					
4. Clarity of objectives	<input type="radio"/>					
5. Sequence of content	<input type="radio"/>					
6. Amount of activities/practice	<input type="radio"/>					
7. Quality of course materials	<input type="radio"/>					
8. Effectiveness of instructor(s)	<input type="radio"/>					
9. Overall quality of the course	<input type="radio"/>					
10. Overall effectiveness of the self-study video format	<input type="radio"/>					

11. Rate your level of knowledge of the topic before and after taking this self-study course.

	Very Low	Low	Moderate	High	Very High
BEFORE THE COURSE:	<input type="radio"/>				
AFTER THE COURSE:	<input type="radio"/>				

12. What did you like best about the course?

13. What would you improve in the course?

14. What previous experience, if any, have you had with self-study courses?

- None Moderate Considerable

15. Were you comfortable with the self-study video format?

- Yes No Undecided

If not, why not?

16. Would you like to take other self-study video courses?

- Yes No Undecided

If not, why not?

17. Additional comments:

**PLEASE SEND THIS COMPLETED FORM TO YOUR
DIRECTORATE/DIVISION TRAINING MANAGER (ATM). Note that to receive
credit in your training history, you MUST complete this form with your name and
return to your ATM.**