FAA/AVS

DO-178B/C Differences Tool

Revision: 008

DATE: 9/16/2013

Revision History

Date	Rev	Change summary
07/21/2013	Draft 001	Draft Release - prototype
07/22/2013	Draft 002	Draft Release for review
07/23/2013	Draft 003	Corrected some hyperlinks, clarified and corrected some section titles and made any references to them consistent throughout the document. Interim draft release to improve usability.
7/29/2013	001	Initial Release
8/6/2013	002	Resolved review comments, added glossary section, added list of contributors
8/6/2013	003	Corrected spelling of names of contributors
8/15/2013	006	Corrected numerous errors, expanded some descriptions
8/19/2013	007	Updated description for 6.4.1 to add missing information
9/16/13	008	Updated sections 5.4.1, Updated definition and ASE activities for MC/DC, Added derived requirements to system process.

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DISCLAIMER: While every effort has been made to ensure the accuracy of the tool, the content of the tool cannot be substituted for use of the actual documents. The impacts to ASE represent the most likely assessment but there may be other considerations depending on the project, the ASEs familiarity with the applicant, the applicant experience etc. The information herein should only be used as a guide and not policy.

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Activity
Aeronautical Data
Airborne
Alternative Method
Approved Source
Autocode Generator
Boolean Expression
Boolean Operator
Certification Authority
Certification Liaison Process
Compacted Expressions
Condition
Configuration Management
Control Category
Deactivated Code
Dead Code
Derived Requirements
Embedded Identifier
End-to-end Numerical Resolution
Equivalent Safety
Executable Object Code
Extraneous Code
Failure Condition
Formal Methods
Integrity
Modified Condition/Decision Coverage Monitoring
Multiple-Version Dissimilar Software Objective
Parameter Data Item
Parameter Data Item File
Partitioning
Previously Developed Software
Reverification
Safety Monitoring
Service Experience
Service History Data
Single Event Upset
Software Assurance
Software Conformity Review
Software Development Standards
Software Level
Structural Coverage Analysis
Supplement
Trace Data
Type Design
Unbounded Recursive Algorithm
User-Modifiable Software

References

DO-178B Software Considerations in Airborne Systems and Equipment Certification, December 1, 1992
DO-178C Software Considerations in Airborne Systems and Equipment Certification, December 13, 2011
DO-330 Software Tool Qualification Considerations, December 13, 2011
DO-331 Model-Based Development and Verification Supplement to DO-178C and DO-278, December 13, 2011
DO-332 Object-Oriented Technology and Related Techniques Supplement to DO-178C and DO-278A, December 13, 2011
DO-333 Formal Methods Supplement to DO-178C and DO 278A, December 13, 2011

1.0 Introduction

1.1 Intended audience

1.1.1 The user of this tool is assumed to have a good working knowledge of DO-178B. It is not intended as an introduction to DO-178().

1.2 Purpose

1.2.1 This tool will help the ASE who is familiar with DO-178B to focus on the additional activities required due to the changes made in going from DO-178B to DO-178C. This only covers the changes between DO-178C core document and DO-178B. It does not address the changes implemented by the supplements (DO-331, DO-332, DO-333) or the tool qualification guidelines in DO-330.

1.3 How to use the tool

1.3.1 The tool is organized into four sections; changes listed by topical grouping, changes listed by most impact to ASE, changes listed by most change to document, and changes listed by DO-178C Section number. The table of contents is the main location to navigate the document. The table of contents lists all the sections and also contains hyperlinks to all of the sections listed therein. At the top and bottom of each page is a hyperlink to take you back to the table of contents. The hyperlinks will be the most convenient way to navigate the tool. Depending on the size of your monitor you may not see the column headings and need to scroll up or down to view the column headings. The contents are designed to be used electronically. However if a print copy is desired use 11 X 17 sized paper. The content of each of the section of the tool is summarized below as well as how the ASE might use that section.

- Section 2.0 - Changes grouped by specific topics

  Changes are grouped according to the 14 topical areas listed in in section 3 of the table of contents. This allows the ASE to look at all the changes in DO-178C related to a specific topic.

- Section 3.0 - Changes grouped by amount of impact to ASE

  Changes are grouped into 3 categories according the potential impact ASEs activity in reviewing an applicant's data (see legend below). This allows the ASE to look at those changes that will most impact how they will conduct a review of applicants.

- Section 4.0 - Changes grouped by amount of change to document

  Changes are grouped by how much of the text in a specific section changed (see legend below). There is not necessarily a 1 to 1 correlation between the impact to an ASE and the amount of text that has changed. In some cases the text has been substantially relocated or rearranged but the tasks required of the ASE might not be significantly affected because the technical content has not changed. The ASE would use this section to identify where the big changes to the document occurred.

- Section 5.0 Changes listed by DO-178C Section number. The table of contents lists all the sections and also contains hyperlinks to all the main sections and subsections listed therein. You may need to scroll up or down some small amount to get to the exact subsection.

  For each section and subsection in DO-178C, the detailed changes related to that section are described. This section also contains a summary for each major section in DO-178C (e.g. 1.0, 2.0 etc.). In some cases sections haven't changed but have just been moved to a different area or renamed. This is shown in the tool. The tool also identifies any information that has been deleted from DO-178B. The ASE familiar with a specific section in DO-178B will use this section of the tool to determine what has changed in DO-178C and what they need to do differently during their review of applicant data.

1.4 Tool Description

The tool contains tables for each of the sections listed above. Below is a description of each column:

- All Section #s – This lists the section numbers as currently defined in both DO-178B and DO-178C. If the section number doesn't exist in DO-178C there will be N/As in the "Version C Title" and the "Changes Made to Version C" columns. Likewise if the section number exists only in DO-178C there will be an N/A in the "Version B title"
- Section Changes – This column will list any changes made to DO-178B section numbers. For example section 2.2.1 in DO-178B was moved to section 2.3.2 in DO-178C. Therefore "Moved to Section 2.3.2" appears in the row for 2.2.1 This is also reflected in the "~~e~~Changes Made to V~~v~~ersion C" column with an entry as to what section in DO-178B the content came from.
- Version B titles – This lists the original title of the listed section in DO-178B. In most cases this will be the same title as in DO-178C.
- Version C titles – If the title of a section was changed in DO-178C this column contains the new (DO-178C title.
- Changes Made to version C – Specific changes to a given detailed section are listed in this column. For each major section heading (e.g. 1.0, 2.0, etc.) there is a brief summary of all the significant changes within the major section. For example, the summary for all of section 2.0 states "*Section Summary: Section substantially redone. Added more feedback paths between systems and software processes and clarified existing paths. Clarified the*

interaction between the systems and software processes. Paragraphs reorganized and moved to improve clarity and consistency. Introduced the concept of Parameter Data item. Definition of partitioning was expanded and clarified." If the content came from a different section number within DO-178B, this is also indicated. For example, this column for section 2.2 states that it was formerly section 2.1 in DO-178B. When the detail of the change is overwhelming a "Take away:" entry was added to provide the major effects of the changes.

- ASE added activities– This is a relative estimate as to what impact the change will have to ASE activities. It lists the specific actions ASEs will have to take in response to the changes to a specific section in DO-178C:

Lim	Limited	Changes involve clarifications, editorial or corrections that will most likely not affect how an ASE conducts their evaluation.
Mod	Moderate	Some of the original material remains, but additional material was added or material has been changed or added such that different action, deliverables, or analysis is required. While the basic concepts have not changed, these changes will result in specific evaluation strategies to be added to the ASE's evaluation of applicant's data submitted under DO-178C. This category represents the majority of revisions in DO-178C.
Sig	Significant	A completely different approach, significantly modified approach, or substantially new material. This will require evaluations specific to DO-178C and will be substantially different than what was done for DO-178B.

- Amount of change – This is a relative estimate as to how much the text in this section has changed from DO-178B. The legend for this section is as follows:

0	No change in basic formatting, does not result in any different action, deliverables, or analysis. No additional clarification from original.
1	Rearrangement of material or formatting; could provide additional clarification,
2	Some of the original material remains but additional material is added or material has been changed or added such that different action, deliverables, or analysis are required. Basic concepts still hold
3	Full overhaul, different approach, or new material.

2.0 Changes grouped by specific topics

2.1. Parameter Data Items (PDI)

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.5.1	N/A		Parameter Data Items	**Added:** Entire Section >> Describes what a parameter data item comprises, what it contains, and what should be addressed.	**3**	**Sig**	ASE should read and understand this section as the information in this section forms the basis for the activities and objectives related to Parameter Data Items (PDI) in later section. This provides the technical basis for evaluating developer implementations of PDI.	
4.2	Software Planning Process Activities		No Change	**Added:** Bullet Points --4.2.j. and 4.2.j.1.-4., --When parameter data items are planned, the following should be addressed: --The way that parameter data items are used --The software level of the parameter data items -- The processes to develop, verify, and modify parameter data items, and any associated tool qualification -- Software load control and compatibility **Added:** Bullet Points --Bullet Points: 4.2.k., --The software planning process should address any additional considerations that are applicable, and 4.2.l., --If software development activities will be performed by a supplier, planning should address supplier oversight.	**2**	**Sig**	The ASE will have to ensure that the planning documentation provides for the activities and satisfaction of objectives related to PDI as well as provisions for supplier oversight as applicable.	
5.1.2	Software Requirements Process Activities		No Change	**Added:** Bullet Points --Derived high-level requirements and the reason for their existence should be defined -- Derived high-level requirements should be provided to the system processes, including the system safety assessment process --If parameter data items are planned, the high-level requirements should describe how any parameter data item is used by the software. The high-level requirements should also specify their structure, the attributes for each of their data elements, and, when applicable, the value of each element. The values of the parameter data item elements should be consistent with the structure of the parameter data item and the attributes of its data elements Deleted: bullet point for traceability between system requirements and HLR (separate section added for all traceability)	**2**	**Sig**	The planning documentation should be examined to ensure that there are verification activities for any PDI to ensure that the HLRs specify how they are used, their structure, attributes of each data elements, values, and consistency between the structure of the PDI and its data elements. For example, do the review checklists have reviews for these items? The ASE should examine the standards for HLRs to ensure that derived HLRs have the attributes listed in this section (e.g. justification) and the planning documentation ensures that there is an activity for the delivery to the system processes. Likewise during the SOI reviews, the results of these activities will have to be examined.	
5.4.1	Integration Process Objectives		No Change	**Added:** The integration process now includes parameter data item files as described in 5.4.1a.	**2**	**Sig**	The ASE will have to ensure that PDI files are part of the integration processes in the plans and in the actual integration process will satisfy this objective.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
5.4.2	Integration Process Activities		No Change	**Added:** Bullet Points: --Any Parameter Data Item File should be generated --The software should be loaded into the target computer for hardware/software integration **Moved:** Merged handling of patches frome DO-178B section 5.4.3 into this section.	**2**	**Sig**	The ASE will have to ensure that PDI files are part of the integration processes in the plans and in the actual integration process. The lifecycle data should show explicit integration of PDI files.	
6.6	N/A		Verification of Parameter Data Items	**Added:** Entire Section >> Explains that if all of the following conditions are met, verification of a PDI can be conducted separately from the verification of the executable Object Code. Provides the criteria and activities needed to verify PDI files.	**3**	**Sig**	The ASE will have to determine if the PDI is intended to be verified independent of the operational software. If so, they will have to confirm that the developer can show that they met all the conditions in this section. Additionally the ASE will need to confirm that the developer has fulfilled all of the objectives listed for PDI in this section. The ASE should also ensure that the developer can show that they have processes that determine when changes to the PDI require reverification/modification of the executable object code.	
7.2.1	Configuration Identification		No Change	**Modified:** Extended the identification requirements in 7.2.1.e to include PDI files since they can be separate from the executable object code data item..	**1**	**Lim**	The ASE will have to ensure that the developer has CM records demonstrating that Separate PDI Files have configuration identification	
7.2.7	Archive, Retrieval and Release		No Change	**Extended:** the identification requirements in in 7.2.7.d and 7.2.7.e to include PDI files since they can be separate from the executable object code data item..	**1**	**Lim**	The ASE will have to ensure that the developer has CM records demonstrating that separate PDI Files have configuration identification	
8.3	Software Conformity Review		No Change	**Modified bullet:** in 8.3.e, the PDI files in addition to the executable object code must be able to be regenerated from the archived source code.	**1**	**Lim**	The ASE needs to examine the conformity review records to determine if SQA did establish that the PDI files can be regenerated. Typically the ASE would also choose witness this activity.	
11.16	Software Configuration Index		No Change	**Added and modified:** Bullets describing what the SCI should Identify: --Procedures, methods, and tools for making modifications to the user-modifiable software, if any --Procedures and methods for loading the software into the target hardware. Added PDI to build instructions as well as requiring explicit identification of any PDI files used for the software project. Takeaway: SCI description now includes PDI information, User-modifiable software changes, loading instructions.	**2**	**Lim**	The ASE just needs to ensure that the SCI contains the addition items listed for 178C (11.16g PDI, 11.16j user modifiable related, 11.16k procedures for loading)	
11.22	N/A		Parameter Data Item File	**Added:** Entire Section >> Explains what a parameter data item file consists of	**3**	**Lim**	There is little actionable information in this section other than ensuring that the developer has identified each PDI file.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Table A-2	Software Development Processes		No Change	**Added:** The objectives now includes supplying the derived HLR to the system and system safety process. PDI was added to the objective relating to being loaded into the target computer. Trace data was also added as an output. **Deleted:** Satisfaction of Objectives 4, 5, and 6 (LLR developed, Derived LLR developed, and source code developed, respectively) is no longer required for level D. The corresponding circles in the objective table were deleted. **Modified:** To be consistent with the rest of the document, corrected the CC categories for software architecture, Derived High level requirements, Low level requirements, and derived low level requirements from CC2 to CC1.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, that the derived HLR and LLR were provided to the System and system safety processes. Assessment that Trace Data was produced and PDI file(s), if any, was produced as an output and loaded into the target computer.	
Table A-5	Verification of Outputs of Software Coding & Integration Processes		No Change	**Added:** Activity references, two additional objectives for verification of PDI file and PDI file is correct and complete.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the **new** objective associated with PDI files.	
Annex B	N/A		Parameter Data Item	**Added:** Define new term in DO-178C	**3**	**Sig**	ASE should ensure Applicant has properly identified any such data as part of their system/software.	
Annex B	N/A		Parameter Data Item File	**Added:** Define new term in DO-178C	**3**	**Sig**	ASE should ensure data compliance tables clearly identify this new data item	

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2.2. Tool qualification

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
4.4.1	Software Development Environment		No Change	**Added:** Bullet Point: --Known tool problems and limitations should be assessed and those issues which can adversely affect airborne software should be addressed. **Modified:** Bullet point e regarding the examination of option features to include autocode generators	**1**	**Mod**	The ASE will have to make sure the developer has identified known tool problems and limitations. The ASE must then assess whether the developer has mitigation strategies for these.	
5.3.2	Software Coding Process Activities		No Change	**Deleted** Bullet Point: --The Source Code should be traceable to the Design Description (separate section added for all traceability); Also the wording implying that compilation is part of the coding process was removed. Added Bullet Point: --Use of autocode generators should conform to the constraints defined in the planning process	**2**	**Mod**	The ASE should ensure that the planning has verification activities and data that ensure that use of autocode generators comply with any constraints identified in the process governing use of these autocode generators. If the autocode generator is qualified, the constraints should come from the tool qualification data	
11.2	Software Development Plan		No Change	**Modified:** bullet: --One bullet regarding programming languages, tools, compliers, linkers and loaders to be used became two separate bullets. Additionally, "coding method(s)" were added as well as, when applicable, options and constraints of autocode generators.	**1**	**Sig**	The ASE will need to review the PSAC for the differences related to DO-178C identified above.	
12.1.3	Change of Application or Development Environment		No Change	**Added:** Bullet Point to what activities include: --Using a different autocode generator or a different set of autocode generator options may change the Source Code or object code generated. The impact of any changes should be analyzed. **Added:** Bullet Points about when a different processor is used: --Software components that are new or will need to be modified as a result of changing the processor, including any modification for hardware/software integration. --Previous hardware/software integration tests that should be executed for the new application. It is expected that there will always be a minimal set of tests to be run. **Added:**F162Determine the software modules or interfaces that are new or will be modified to accommodate the changed hardware component --Determine the extent of reverification required.	**2**	**Mod**	The ASE needs to look for evidence that the developer has evaluated the effect on autocode generators especially the associated options that were used. The ASE will need to examine the effects of any processor or other hardware changes related to the impact on objectives, activities, and lifecycle data. Specifically, determine whether the applicant/developer has properly established which tests and analysis will have to be redone. The ASE will need to examine applicant data to ensure that they have analyzed any modules and interfaces that are either new or modified as a result of a hardware change.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
12.2.1	Qualification Criteria for Software Development Tools	**Deleted:** Entire Section in Version C	Determining if Tool Qualification is Needed	**Added:** information about tool qualification and the purpose of tool qualification (originally from section 12.2) Reworded and edited to improve clarity and be consistent with the use of DO-330 as the means of performing tool qualification. **Deleted:** Verification and Development tool categories were replaced with Tool Criteria of 12.2.2 and tool qualification levels in DO-330.	**3**	**Lim**	None, most of the impact has been moved to other sections.	
12.2.2	Qualification Criteria for Software Verification Tools	**Deleted:** Entire Section in Version C	Determining the Tool Qualification Level	**Added:** Entire Section >> Describes what criteria needs to be met if a tool qualification is needed. **Added:** Table 12-1	**3**	**Sig**	The ASE will have to use the information in this section to validate that the developer has assigned the correct tool qualification level (TQL) to the tool based on its usage and the software level of the associated operational software.	
12.2.3	Tool Qualification Data	**Deleted:** Entire Section in Version C	Tool Qualification Process	**Added:** Entire Section >> The objectives, activities, guidance, and life cycle data required for each Tool Qualification Level are described in DO-330, "Software Tool Qualification Considerations."	**3**	**Sig**	The ASE will have to ensure that the developer has satisfied the objectives and activities related to tool qualification in DO-330 as well as verifying that all of the tool life cycle data has been produced per DO-330.	
Annex B	N/A		Autocode Generator	**Added:** defines a specific type of tool for which explicit guidance is given.	**1**	**Lim**	ASE should ensure the use of an autocode generator is discussed along with the associated qualification effort in the Applicant's plans	

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2.3. Clarifications, Error correction, Gaps and Omissions

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
1.1	Purpose		No Change	**Added Bullet Points:** Expanded the purpose description to be more comprehensive--Variations in the objectives, independence, software cycle data, and control categories by software level --Additional considerations (for example, previously developed software) that are applicable to certain applications --Definition of terms provided in the glossary --In addition to guidance, supporting information is provided to assist the reader's understanding. Beyond the inconsistent usage of the term guidance throughout the document, the real meaning of these terms was confusing. (They were not part of the DO-178B/ED-12B glossary. They are still not defined in the new glossary but, as will be seen below, the revisions to the text have cleared up the confusion.) Since "guidance" conveys a slightly stronger sense of obligation than "guidelines", the SCWG decided to use the term "guidance" for all the pieces of text that are considered as actual "recommendations" .To avoid confusion, it was also decided to replace the term "guidelines" (widely used in DO-178B/ED-12B) with "supporting information", whenever the text was more "information" oriented than "recommendation" oriented. These were cases where the primary intent was to help the reader to understand the context or the text itself. Hence, all the "notes" included in the text are not guidance. Also the complete DO-248/ED-94 document falls into the "supporting information" category, and not guidance. In summary, most of the occurrences of "guidelines" were replaced by "guidance", and the others by "supporting information". Though the glossary does not include definitions for the terms "guidance" and "supporting information"	**2**	**Lim**	None	
1.2	Scope		No Change	**Clarification:** Extended the applicability to propellers and auxiliary power units. The decision for the classification of firmware into hardware or software was made a part of the systems allocation activity and not part of the DO-178C process.	**1**	**Lim**	The ASE needs to examine the systems allocation activity to determine if there is evidence and justification for the allocation of requirements between software and firmware. However it is no longer a software process responsibility.	
1.5	Document Overview		No Change	**Edited:** Rearranged and Edited Figure 1-1.	**1**	**Lim**	None	
2.0	SYSTEM ASPECTS RELATING TO SOFTWARE DEVELOPMENT		No Change	**Added:** The term "system" in the context of this document refers to the airborne system and equipment only, not to the wider definition of a system that might include operators, operational procedures, etc.	**2**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.1	Information Flow Between System and Software Life Cycle Processes	**Moved to Section 2.2**	System Requirements Allocation to Software	**Added:** Entire section >> This section describes how system requirements are developed and where safety-related requirements result from. It also describes the system safety assessment process and requirements. Lastly, it lists the system requirements allocated to software (8 bullet points).	**3**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation.	
2.2	Failure Condition and Software Level	**Moved to Section 2.3**	Information Flow Between System and Software Life Cycle Processes	**[Formerly Section 2.1]** **Edited:** Made Changes and Reformatted Figure 2-1 **Added:** This information flow includes the system safety aspects.	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to watch for are explicit feedback from the systems process on derived requirements, verification activities for HW and SW requiring coordination.	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.2.1	Failure Condition Categorization	**Moved to Section 2.3.2**	Information Flow from System Processes to Software Processes	**[Formerly Section 2.1.1]** **Deleted:** first two paragraphs and last paragraph. **Deleted:** Bullet Points: --Certification Requirements --Software level(s) and data substantiating --If the system is a component of another system **Added:** Bullet Points detailing the data passed to the software life cycle processes by the system processes: **Added:** Any evidence provided by the system processes should be considered by the software processes to be Software Verification Results (e.g. System Level Tests used to meet DO-178C Table A6 testing objectives or A7 coverage objectives) ***Take away:*** DO-178C recognizes that verification data from systems processes can be used to satisfy DO-178C objectives and activities. Added the requirement for evidence of the systems processes review of software data (e.g. derived requirements).	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to watch for are explicit feedback from the systems process on derived requirements, verification activities for HW and SW requiring coordination.	
2.2.2	Software Level Definitions	**Moved to Section 2.3.3**	Information Flow from Software Processes to System Processes	[Formerly Section 2.1.2] Deleted: Previous information in DO-178B Added: 2 paragraphs describing the software life cycle processes, what it analyzes, how it resolves issues, and how it makes data available to the system processes. Added: bullet points describing data that will facilitate analyses/evaluations: --Details of derived requirements --description of the software architecture --Evidence of system activities --Problem or change documentation --Any limitations of use --Configuration identification and any configuration status constraints -- Performance, timing, and accuracy characteristics -- Data to facilitate integration of the software into the system --Details of software verification activities proposed to be performed during system verification Take away: The specific data and associated content that should be passed to the system processes from the software processes were expanded and clarified.	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to assess is that there is explicit feedback from the systems process in response to SW process provided derived requirements, verification activities for HW and SW requiring coordination.	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.2.3	Software Level Determination	**Moved to Section 2.3.4**	Information Flow between Software Processes and Hardware Processes	**Added:** Entire Section. Describes how data is passed between the software and hardware life cycle process. **Added:** Bullet Points describing the type of data that is passed --All requirements, including derived requirements, needed for hardware/software integration --Instances where hardware and software verification activities require coordination --Identified incompatibilities between the hardware and the software. ***Take away:*** The specific data and associated content that should be passed between the software and hardware processes was added as well as consolidating the information from other sections of DO-178B related to hardware processes.	**3**	**Mod**	The ASE needs to evaluate the planning documents for planned interfaces and activities regarding the data flows specified in section 2.2.3. The ASE will also need to follow up during SOI reviews to ensure that the flows did occur and be alert to any changes that could require this to be re-evaluated.	
2.4.1	N/A		Partitioning	[Formerly Section 2.3.1] Reworded: Most of DO-178B's text. Clarified: Information on Partitioning between software components by consolidating the all of the issues into bullet points and removing ambiguous wording as needed. Extended the notion of partitioning to software components executing on different hardware platforms which extends the partitioning analysis to implementations such as multicore processors. ***Take away:*** While this doesn't add any new requirements for partitioning the guidance is now clearer and more detailed	**3**	**Lim**	None	
2.5	System Design Considerations for Field - Loadable Software	**Moved to Section 2.5.5**	Software Considerations in System Life Cycle Processes	**Added:** Entire Section >> This section provides an overview of those software-related issues (not necessarily mutually exclusive) that should be considered, as appropriate, by the system life cycle processes	**2**	**Lim**	None	
2.5.4	N/A	**Extracted from section 2.4**	Option-Selectable Software	**Inserted:** Collected sections from 2.4 relative to Option Selectable software and modified the references to be consistent with DO-178C.	**1**	**Lim**	None	4.2.h, 5.2.4, 6.4.4.3.d.2, Glossary (deactivated code)
2.5.5	N/A	**Moved from section 2.5**	Field-Loadable Software	**[Formerly Section 2.5]** Very minor wording changes - essentially no change	**1**	**Lim**	None	
2.5.6	N/A	**Moved from section 2.7**	Software Considerations in System Verification	**[Formerly Section 2.7]** **Deleted:** Last paragraph about coverage of code structure by system verification tests as it is addressed more generally in 2.2.1 and 2.6	**1**	**Lim**	None	
3.0	SOFTWARE LIFE CYCLE		No Change	Minor editorial changes	**1**	**Lim**	None	
4.6	Review and Assurance of the Software Planning Process		Review of the Software Planning Process	**Modifed:** Changed Guidance to Activities for consistent terminology usage.	**1**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
5.0	SOFTWARE DEVELOPMENT PROCESSES		No Change	**Added:** Bullet Point --Software coding process. **Added:** Note - The applicant may be required to justify software development processes that produce a single level of requirements. Reformatted: Took the paragraph and broke it into easy to read bullet points. **Added:** Bullet Points --The specification of a periodic monitor's iteration rate when not specified by the system requirements allocated to software. --The addition of scaling limits when using fixed point arithmetic.	**1**	**Mod**	If the developer is proposing merging of high level and low level requirements, the ASE will find the justification and determine whether the reasoning supports a smooth transition between abstraction layers of system and the single level of requirements. Some indications where this may not be appropriate would be single system requirements tracing to an inordinately large number of merged high/low level requirements.	
5.2.2	Software Design Process Activities		No Change	**Added Bullet Point:** --Interfaces between software components, in the form of data flow and control flow, should be defined to be consistent between the components.	**1**	**Mod**	The planning documentation should be examined to ensure that there is a verification activity to ensure that data and control flow between components is consistent	
5.2.4	N/A		Designing for Deactivated Code	**Clarified:** Most of the material came from section 5.4.3 but was rearranged and clarified. Generalized the requirements on the deactivation mechanism to insure that deactivated items have no adverse effect on the other software. **Added:** The development of deactivated code should comply with DO-178B.	**3**	**Lim**	ASE must ensure that deactivated code complies with DO-178C. This was not clear in DO-178B where some developers only were concerned with the development assurance of the deactivation mechanism. While there were substantial changes in the text, the remaining information mainly consolidated what was already in DO-178B.	
5.3	Software Coding Process		No Change	**Added:** Note - for the purpose of this document, compiling, linking, and loading are dealt with under the Integration Process (see 5.4)	**1**	**Lim**	None	
5.3.1	Software Coding Process Objectives		No Change	**Deleted:** part of a sentence- that is traceable, verifiable, consistent, and correctly implements to make the obejctive consistent with the Annex A tables.	**1**	**Lim**	None	
6.0	SOFTWARE VERIFICATION PROCESS		No Change	**Added:** a Reference for the verification of the outputs of the planning process **Added:** Bullet Point - Verification of Source Code	**1**	**Lim**	None	
6.2	Software Verification Process Activities		Overview of Software Verification Process Activities	**Deleted:** Bullet Points: for requirements and verification of software requirements related to traceability (separate section added for all traceability) and the bullet points for guidance for the software verification activities related to traceability (separate section added for all traceability). **Added:** new bullet points for software verification considerations including reverification considerations (extracted from DO-0248B) and clarification of verification independence	**2**	**Mod**	The ASE will have to ensure that the DO-178C clarifications of verification independence Is being used by the developer. This is especially important when looking at low level requirements (LLR) based test cases. The LLR test cases cannot be developed by the same person who coded those LLRs.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.3	Software Reviews and Analyses		No Change	**Added:** A paragraph that describes what to do when the verification objectives described in the section cannot be completely satisfied via reviews and analyses alone.	**1**	**Lim**	None	
6.3.2	Reviews and Analyses of the Low -Level Requirements		No Change	**Modified:** Incorporated errata into 6.3.2.c by changing software requirements to low-level requirements. Also made some editing changes to provide consistent terminology	**1**	**Lim**	None	
6.3.4	Reviews and Analyses of the Source Code		No Change	**Added:** information to bullet for accuracy and consistency of source code: The compiler (including its options), the linker (including its options), and some hardware features may have an impact on the worst-case execution timing and this impact should be assessed. Also added floating-point arithmetic as a consideration.	**1**	**Mod**	The ASE will have to evaluate the developers worst case execution analysis to determine if the effects of compiler, linker, and hardware have been included. The effects of developer selection of options should also be included in the analysis. (Note: while this might have been implicitly done under DO-178B (i.e. the design already incorporates these choices), now there will need to be explicit identification of the impacts). The ASE should evaluate whether the developers have accounted for inaccuracies due to floating point arithmetic errors.	
6.3.5	Reviews and Analyses of the Outputs of the Integration Process		No Change	**Added:** line and bullet: These review and analysis activities detect and report errors that may have been introduced during the integration process. The objective is to: a. Ensure that the outputs of the integration process are complete and correct. **Added:** Compiler warnings	**1**	**Mod**	The ASE will examine the outputs of the integration process to see how the developer addressed compiler warnings if there were any generated in the compilation of the delivered product.	
6.4.1	Test Environment		-	**Edited:** Improved the wording in the introductory paragraph to more strongly favor the target computer. "Guidance for the.." was changed to "Activities related to.." to ensure consistent use of the term "guidance".	**1**	**Lim**	None	
6.4.2	Requirements-Based Test Case Selection		Requirements-Based Test Selection	**Added:** Note: Robustness test cases are requirements-based. The robustness testing criteria cannot be fully satisfied if the software requirements do not specify the correct software response to abnormal conditions and inputs. The test cases may reveal inadequacies in the software requirements, in which case the software requirements should be modified. Conversely, if a complete set of requirements exists that covers all abnormal conditions and inputs, the robustness test cases will follow from those software requirements **Added:** Bullet Point: To section 6.4.2.3 - Test procedures are generated from the test cases	**2**	**Mod**	The ASE will need to ensure that the developer of high and low level requirements now includes responses to abnormal conditions. Additionally, tests written against those abnormal conditions are now considered robustness requirements tests. In DO-178B some interpretations would consider requirements that specified behavior under all conditions complete requirements and the associated test cases would have been considered normal range tests. DO-178C removes this ambiguity.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.4.4.1	Requirements-Based Test Coverage Analysis		No Change	**Added:** Bullet Points: with 6.4.4.1.c and 6.4.4.1.d, Any test cases and procedures used to establish structural coverage must be traceable to requirements.	**1**	**Lim**	None, the ASEs were already requiring that structural coverage analysis be the result of requirements based tests cases. It is now explicitly defined in DO-178C	
6.4.4.3	Structural Coverage Analysis Resolution		No Change	**Edited:** Renamed a bullet point (6.4.4.3.c) and added additional information about extraneous code to it. **Added:** Expansion on the discussion of the two different categories of deactivated code. Added the term extraneous code which is a superset of dead code. Dead code is there due to design errors. Extraneous is any code that is not traceable to a system or software requirement and includes dead code. **Added:** Also extended the structural coverage analysis resolution to the interfaces between components (data and control coupling) that was not exercised as part of the testing activity.	**2**	**Mod**	The ASE must ensure that the developer has properly categorized code detected by structural coverage analysis into the proper categories defined in this section and the glossary. The ASE must also ensure that the structural coverage analysis resolution includes an deficiences found as part of the data and control coupling coverage results.	Glossary (dead code, extraneous code, deactivated code)
7.0	SOFTWARE CONFIGURATION MANAGEMENT PROCESS		No Change	**Added:** Bullet Points: 7.0.a.-h. which came from the original 7.1.a.-h. and describes what the SCM process assists in while working in cooperation with other software life cycle processes.	**2**	**Lim**	None, sections 7.0 and 7.1 have been reorganized to make the presentation of objectives clearer but there is no change to the ASE activities.	
7.1	Software Configuration Management Process Objectives		No Change	**Moved:** Bullet Points: Moved the description of what the SCM process assists in, into section 7.0.a.-h. **Added:** Bullet Points: 7.1.a.-i. which describes what are the SCM process objectives .	**2**	**Lim**	None, sections 7.0 and 7.1 have been reorganized to make the presentation of objectives and activities clearer but there is no change to the ASE activities.	
7.2.3	Problem Reporting, Tracking and Corrective Action		No Change	**Deleted Note:** The problem reporting and change control activities are related	**1**	**Lim**	none	
7.2.4	Change Control		No Change	**Editorial:** Moved objective related material to 7.1, constrained the recording, approval and tracking of changes only to those involved in creating a derivative baseline.	**1**	**Lim**	The ASE does not have to evaluate changes not related to those needed to create a derivative baseline. In other words, temporary or exploratory baselines are not under the purview of DO-178C	
7.2.6	Configuration Status Accounting		No Change	**Editorial:** Moved objective related material to 7.1,	**1**	**Lim**	None	
7.3	Data Control Categories		No Change	**Reformatted:** Table 7-1 is reformatted in a more user friendly way and corrected errors in references.	**1**	**Lim**	None	
7.4	N/A		Software Load Control	**[Formerly Section 7.2.8]** **Deleted Note:** about where to find additional guidance	**1**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
8.1	Software Quality Assurance Process Objectives		No Change	**Added:** Bullet: Software plans and standards are developed and reviewed for compliance with this document and for consistency	**1**	**Lim**	While this was a requirement under DO-178B it was vague as to what was required of the SQA person. The ASE should examine SQA records to determine that this objective has been satisfied. The SQA records may consist of a matrix mapping the plans and standards to DO-178C activities and objectives or it may just be a record stating the review has been accomplished. If it is the latter, the ASE should check the planning documents against a sample of the planning data identified herein and compare that with the conclusion provided in the SQA records.	
9.0	CERTIFICATION LIAISON PROCESS		No Change	**Rearranged:** Rearranged paragraph into easy to read bullets. **Added:** Bullets to the objectives of the certification liaison process: --Gain agreement on the means of compliance through approval of the Plan for Software Aspects of Certification --Provide compliance substantiation	**2**	**Mod**	The ASE already uses the PSAC as a means of establishing agreement. In cases where the PSAC is being reviewed by the ASE, they will need to ensure that the changes identified within this document are captured by the PSAC as applicable to a specific applicant/developer.	
10.0	OVERVIEW OF AIRCRAFT AND ENGINE CERTIFICATION		OVERVIEW OF CERTIFICATION PROCESS	**Added:** Describes the terms related to aircraft approval for flight with its associated equipment (i.e. Certification, approval, and qualification).	**1**	**Lim**	None	
11.0	SOFTWARE LIFE CYCLE DATA		No Change	**Added:** Notes: --The applicant may package software life cycle data items in any manner the applicant finds convenient (for example, as individual data items or as a combined data item). --The term "data" refers to evidence and other information and does not imply the format such data should take.	**2**	**Lim**	None	
11.2	Software Development Plan		No Change	**Modified:** bullet: --One bullet regarding programming languages, tools, compliers, linkers and loaders to be used became two separate bullets. Additionally, "coding method(s)" were added as well as, when applicable, options and constraints of autocode generators.	**1**	**Sig**	The ASE will need to review the PSAC for the differences related to DO-178C identified above.	
11.3	Software Verification Plan		No Change	**Clarification:** Changed reverification guidelines to reverification methods to be consistent with the use of guidance and guidelines elsewhere in the document.	**1**	**Lim**	None	
11.11	Source Code		No Change	**Clarified:** The description was changed to separate the data and activities that generate the object code from the description for the source code itself.	**1**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
11.20	Software Accomplishment Summary		No Change	**Added:** Bullet Points: --This section now needs to describe how supplier processes and outputs comply with plans and standards. **Modified:**F153The software status bullet has been modified to include a problem report summary which should includes a description of each problem and any associated errors, functional limitations, operational restrictions, potential adverse effect(s) on safety together with a justification for allowing the Problem Report to remain open, and details of any mitigating action that has been or needs to be carried out.	**2**	**Mod**	The ASE will need to examine the software status against the additional details listed in 11.20k (PDI, function limitations, justification for leaving problem reports open, etc.). Since this is basically a completed version of the PSAC, with the exception of 11.20k, the information unique to 178C should already be included. This leaves the ASE with only the task of assuring that all of the relevant PSAC material is in the SAS and any differences since the PSAC approval/acceptance have been included. This assumes that the PSAC, SAS, and SCI are being provided to the ASE.	
12.0	ADDITIONAL CONSIDERATIONS		No Change	**Added:** The use of additional considerations and the proposed impact on the guidance provided in the other sections of this document should be agreed on a case-by-case basis with the certification authorities. **Deleted:** Removed formal methods as an additional consideration as formal methods now has its own supplement.	**2**	**Lim**	None, the section just makes explicit what already exists. And the removal of formal methods reduces the scope of additional considerations.	
12.1	Use of Previously Developed Software		No Change	**Added:** Unresolved Problem Reports associated with the previously developed software (PDS) should be evaluated for impact	**1**	**Lim**	IF PDS is used, the ASE should ensure that the developer has evaluated the impact of unresolved problem reports in the proposed environment.	
12.1.3	Change of Application or Development Environment		No Change	**Added:** Bullet Point to what activities include: --Using a different autocode generator or a different set of autocode generator options may change the Source Code or object code generated. The impact of any changes should be analyzed. **Added:** Bullet Points about when a different processor is used: --Software components that are new or will need to be modified as a result of changing the processor, including any modification for hardware/software integration. --Previous hardware/software integration tests that should be executed for the new application. It is expected that there will always be a minimal set of tests to be run. **Added:**F162Determine the software modules or interfaces that are new or will be modified to accommodate the changed hardware component --Determine the extent of reverification required.	**2**	**Mod**	The ASE needs to look for evidence that the developer has evaluated the effect on autocode generators especially the associated options that were used. The ASE will need to examine the effects of any processor or other hardware changes related to the impact on objectives, activities, and lifecycle data. Specifically, determine whether the applicant/developer has properly established which tests and analysis will have to be redone. The ASE will need to examine applicant data to ensure that they have analyzed any modules and interfaces that are either new or modified as a result of a hardware change.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
12.2.1	Qualification Criteria for Software Development Tools	**Deleted:** Entire Section in Version C	Determining if Tool Qualification is Needed	**Added:** information about tool qualification and the purpose of tool qualification (originally from section 12.2) Reworded and edited to improve clarity and be consistent with the use of DO-330 as the means of performing tool qualification. **Deleted:** Verification and Development tool categories were replaced with Tool Criteria of 12.2.2 and tool qualification levels in DO-330.	**3**	**Lim**	None, most of the impact has been moved to other sections.	
12.3	Alternative Methods		No Change	**Added:** information to bullet points about guidance for using alternative methods: --or the applicable supplement --One technique for presenting the rationale for using an alternative method is an assurance case, in which arguments are explicitly given to link the evidence to the claims of compliance with the system safety objectives.	**2**	**Mod**	The ASE will have to evaluate the developer rationale for using alternative methods. The use of an assurance case is recognized as a means of presenting this justification. This is a technique new to DO-178C and will generally require assistance from technical specialists to perform the evaluation.	
12.3.2.1	N/A		Independence of Multiple-Version Dissimilar Software	**[Formerly Section 12.3.3.1]** **Added:** Note: Section 12.3.2.1 only addresses the subject of independence. Reduction of software levels is not discussed or intended.	**1**	**Lim**	None	
12.3.2.5	Multiple Simulators and Verification		No Change	**[Former Section 12.3.3.5]** Minor editorial changes	**1**	**Lim**	None	
12.3.4	Software Reliability Models	**Moved to Section 12.3.3**	Product Service history	**[Formerly Section 12.3.5]** **Deleted:** Bullet points about guidance for the use of product service history **Added:** paragraph to discuss that the use of service history data for certification credit is predicated upon sufficiency, relevance, and types of problems occurring during the service history period. The use, conditions of use, and results of software service history should be defined, assessed by the system processes, including the system safety assessment process, and submitted to the appropriate certification authority. Guidance for determining applicability of service history and the length of service history needed is presented below	**3**	**Sig**	There are some technical challenges in using product service history. This section was heavily modified to recognize some research done by the FAA. In addition to the technical disciplines involved, the revisions to this section are considerable. If an applicant chooses to make use of product service history, technical specialist should be involved.	
12.3.4.1	N/A		Relevance of Service History	**Added:** Entire Section >> Describes the steps in establishing the relevance of service history	**3**	**Sig**	See 12.3.4	
12.3.4.2	N/A		Sufficiency of Accumulated Service History	**Added:** Entire Section >> Describes what the required amount of service history is determined by	**3**	**Sig**	See 12.3.4	
12.3.4.3	N/A		Collection, Reporting, and Analysis of Problems Found During Service History	**Added:** Entire Section >> Describes the specific data to be collected from each recorded problem and how to address the completeness of the software's error history.	**3**	**Sig**	See 12.3.4	

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12.3.4.4	N/A		Service History Information to be Included in the Plan for Software Aspects of Certification	**Added:** Entire Section >> Explains what items should be specified and agreed upon when seeking certification credit for service history.	**3**	**Sig**	See 12.3.4	
Appendix A	BACKGROUND OF DOCUMENT DO-178		BACKGROUND OF DO-178/ED-12 DOCUMENT	Completely revised	**2**	**Lim**	None	
Annex A	PROCESS OBJECTIVES AND OUTPUTS BY SOFTWARE LEVEL		No Change	***Revised:*** (Completely revised.) Emphasized that tables not be used as a checklist and the full body of the document should be used to interpret the table	**2**	**Lim**	None, ASEs already used the paragraph references in the tables to understand the objectives. The references to activities for a specific objective are now included	
Table A-9	Software Quality Assurance Process		No Change	Added: Activity references, additional objective for assurance that software plans and standards are developed and reviewed for compliance with DO-178C and reviewed for consistency between plans, Split the DO-178B objective stating software life cycle processes comply with plans and standards into a separate objective related to plans and another objective devoted to standards.	**2**	**Mod**	The ASEs will have to assess whether: 1. the developer has evidence showing compliance with all the activities listed, 2: The SQA organization has evidence of compliance with the objectives associated with plans and standards compliance with 178C.	
Annex B	Acronyms		No Change	**Modified:** Acronym list modified to reflect usage within DO-178C	**2**	**Mod**	None	
Annex B	N/A		Aeronautical Data	**Added:** Clarifies data covered by other guidance (e.g., DO-200A) from the data discussed internal to DO-178C (e.g., parameter data)	**1**	**Lim**	ASE should exclude data covered by other guidance from their DO-178C specific review.	
Annex B	N/A		Airborne	**Added:** provides clarity on domain being discussed.	**1**	**Lim**	None	
Annex B	N/A		Alternative Method	**Added:** moved definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Approved Source	**Added:** Provides clarity on where the data that is actually being approved can be found.	**1**	**Lim**	ASE should ensure the associated location is clearly identified in the project data.	
Annex B	Certification Authority		No Change	**Modified:** Note 1 change: addition of APU type certification to ensure consistency with EASA Certification Specifications Note 2 addition: ensure consistency with regimen of delegated organizations and/or individuals	**2**	**Lim**	None	
Annex B	N/A		Certification Liaison Process	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Compacted Expressions	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	Configuration Management		No Change	**Modified:** reformatted only	**1**	**Lim**	None	
Annex B	N/A		Control Category	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Annex B	Deactivated Code		No Change	**Modified:** correct numerous misconceptions concerning what constitutes deactivate code	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	Dead Code		No Change	**Modified:** added a list of exceptions often mistaken for dead code	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	Derived Requirements		No Change	**Modified:** Makes the definition more precise by addressing functionality that goes beyond that specified in the higher-level requirements	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	N/A		Embedded Identifier	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		End-to-end Numerical Resolution	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Equivalent Safety	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Executable Object Code	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	Failure Condition		No Change	**Modified:** Removed regulatory references unique to regulatory authorities	**1**	**Lim**	None	
Annex B	N/A		Integrity	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Objective	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Partitioning	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Previously Developed Software	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Reverification	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Safety Monitoring	**Added:** separated out from monitoring definition that appeared in DO-178B	**1**	**Lim**	None	
Annex B	N/A		Service Experience	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Service History Data	**Added:** distinguish the supporting data used to make a service history argument from the argument itself	**1**	**Lim**	None	
Annex B	N/A		Software Assurance	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Software Conformity Review	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Software Development Standards	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Software Level	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Structural Coverage Analysis	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Type Design	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Unbounded Recursive Algorithm	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Annex B	N/A		User-Modifiable Software	**Added:** move definition from text to glossary.	**1**	**Lim**	None	

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2.4. Supplier Oversight

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
1.3	Relationship to Other Documents		No Change	**Added:** Any project specific standards need to be an input to decisions when planning for supplier oversight	**1**	**Lim**	None	
1.4	How to Use This Document		No Change	**Added Bullet Points:** --Using this document requires that the applicant should satisfy all applicable objectives and providing oversight of all of its suppliers. --The applicant should plan a set of activities that satisfy the objectives and . --The applicant should address any additional considerations in its software plans and standards. --The applicant should perform the planned activities and provide evidence as indicated in section 11 to substantiate that the objectives have been satisfied. --discussion on when and how the supplements are to be used. As an example, one of the bullet points above that was added to this section, reinforces the point that activities are a major part of the overall guidance. Hence, while the Annex A tables in DO-178B/ED-12B refer only to the objectives, they now also include references to each activity. Accordingly, a specific review of DO-178B/ED-12B was performed in order to assess the completeness and consistency of the objectives and activities identification. The above added bullet points explain the main resulting modifications. ***Take away:*** These modifications address the increased focus on demonstrating satisfaction of activities as well as objectives (including submitting any alternative activities to the FAA), increased focus supplier ovrsight, and use of external supplements.	**2**	**Sig**	The ASE needs to examine the planning documents against the activities listed for the objectives to ensure that all the activities described in 178C are planned. If there are activities proposed that are different than in 178C, documentation requesting approval of these alternate activities from the FAA needs to exist. The impact of other changes to this section are addressed elsewhere in this tool.	
4.2	Software Planning Process Activities		No Change	**Added:** Bullet Points --4.2.j. and 4.2.j.1.-4., --When parameter data items are planned, the following should be addressed: --The way that parameter data items are used --The software level of the parameter data items --The processes to develop, verify, and modify parameter data items, and any associated tool qualification --Software load control and compatibility **Added:** Bullet Points --Bullet Points: 4.2.k., --The software planning process should address any additional considerations that are applicable, and 4.2.l., --If software development activities will be performed by a supplier, planning should address supplier oversight.	**2**	**Sig**	The ASE will have to ensure that the planning documentation provides for the activities and satisfaction of objectives related to PDI as well as provisions for supplier oversight as applicable.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
7.2	Software Configuration Management Process Activities		No Change	**Added:** If software life cycle activities will be performed by a supplier, then configuration management activities should be applied to the supplier	**1**	**Lim**	The ASE will have to evaluate whether the developer has ensured that the objectives and activities for SCM have been satisfied by all of their suppliers as well.	
8.2	Software Quality Assurance Process Activities		No Change	**Added:** Bullet: The SQA process should provide assurance that supplier processes and outputs comply with approved software plans and standards.	**1**	**Mod**	The ASE will have to evaluate whether the developer SQA has ensured that the supplier has complied with all of the SQA objectives and activities. This may be done by the developer providing the SQA process or delegated to the supplier SQA organization. In either case the processes used by the supplier need to be authorized by the developer and the developer SQA must have evidence of evaluating the SQA of the supplier.	
11.1	Plan for Software Aspects of Certification		No Change	**Added:** Bullet: --Supplier oversight: This section describes the means of ensuring that supplier processes and outputs will comply with approved software plans and standards	**1**	**Sig**	The ASE will need to review the PSAC for the differences related to DO-178C identified above. This document can be used as a checklist or the ASE can create their own abbreviated checklist.	
11.20	Software Accomplishment Summary		No Change	**Added:** Bullet Points: --This section now needs to describe how supplier processes and outputs comply with plans and standards. **Modified:**F153The software status bullet has been modified to include a problem report summary which should include a description of each problem and any associated errors, functional limitations, operational restrictions, potential adverse effect(s) on safety together with a justification for allowing the Problem Report to remain open, and details of any mitigating action that has been or needs to be carried out.	**2**	**Mod**	The ASE will need to examine the software status against the additional details listed in 11.20k (PDI, function limitations, justification for leaving problem reports open, etc.). Since this is basically a completed version of the PSAC, with the exception of 11.20k, the information unique to 178C should already be included. This leaves the ASE with only the task of assuring that all of the relevant PSAC material is in the SAS and any differences since the PSAC approval/acceptance have been included. This assumes that the PSAC, SAS, and SCI are being provided to the ASE.	

2.5. Coordination between system and software processes (including handling of derived requirements)

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.1	Information Flow Between System and Software Life Cycle Processes	**Moved to Section 2.2**	System Requirements Allocation to Software	**Added:** Entire section >> This section describes how system requirements are developed and where safety-related requirements result from. It also describes the system safety assessment process and requirements. Lastly, it lists the system requirements allocated to software (8 bullet points).	**3**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation.	
2.2	Failure Condition and Software Level	**Moved to Section 2.3**	Information Flow Between System and Software Life Cycle Processes	**[Formerly Section 2.1]** **Edited:** Made Changes and Reformatted Figure 2-1 **Added:** This information flow includes the system safety aspects.	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to watch for are explicit feedback from the systems process on derived requirements, verification activities for HW and SW requiring coordination.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.2.1	Failure Condition Categorization	**Moved to Section 2.3.2**	Information Flow from System Processes to Software Processes	**[Formerly Section 2.1.1]** **Deleted:** first two paragraphs and last paragraph. **Deleted:** Bullet Points: --Certification Requirements --Software level(s) and data substantiating --If the system is a component of another system **Added:** Bullet Points detailing the data passed to the software life cycle processes by the system processes: **Added:** Any evidence provided by the system processes should be considered by the software processes to be Software Verification Results (e.g. System Level Tests used to meet DO-178C Table A6 testing objectives or A7 coverage objectives) ***Take away:*** DO-178C recognizes that verification data from systems processes can be used to satisfy DO-178C objectives and activities. Added the requirement for evidence of the systems processes review of software data (e.g. derived requirements).	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to watch for are explicit feedback from the systems process on derived requirements, verification activities for HW and SW requiring coordination.	
2.2.2	Software Level Definitions	**Moved to Section 2.3.3**	Information Flow from Software Processes to System Processes	[Formerly Section 2.1.2] Deleted: Previous information in DO-178B Added: 2 paragraphs describing the software life cycle processes, what it analyzes, how it resolves issues, and how it makes data available to the system processes. Added: bullet points describing data that will facilitate analyses/evaluations: --Details of derived requirements --description of the software architecture --Evidence of system activities --Problem or change documentation --Any limitations of use --Configuration identification and any configuration status constraints -- Performance, timing, and accuracy characteristics -- Data to facilitate integration of the software into the system --Details of software verification activities proposed to be performed during system verification Take away: The specific data and associated content that should be passed to the system processes from the software processes were expanded and clarified.	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to assess is that there is explicit feedback from the systems process in response to SW process provided derived requirements, verification activities for HW and SW requiring coordination.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.2.3	Software Level Determination	**Moved to Section 2.3.4**	Information Flow between Software Processes and Hardware Processes	**Added:** Entire Section. Describes how data is passed between the software and hardware life cycle process. **Added:** Bullet Points describing the type of data that is passed --All requirements, including derived requirements, needed for hardware/software integration --Instances where hardware and software verification activities require coordination --Identified incompatibilities between the hardware and the software. ***Take away:*** The specific data and associated content that should be passed between the software and hardware processes was added as well as consolidating the information from other sections of DO-178B related to hardware processes.	**3**	**Mod**	The ASE needs to evaluate the planning documents for planned interfaces and activities regarding the data flows specified in section 2.2.3. The ASE will also need to follow up during SOI reviews to ensure that the flows did occur and be alert to any changes that could require this to be re-evaluated.	
2.3	System Architectural Considerations	**Moved to Section 2.4**	System Safety Assessment Process and Software Level	**Added:** Entire Section >> This section provides a brief introduction to how the software level for software components is determined and how architectural considerations may influence the allocation of a software level.	**3**	**Lim**	None	
2.3.1	Partitioning	**Moved to Section 2.4.1**	Relationship between Software Errors and Failure Conditions	**Added:** Entire Section >> **Added:** Figure 2-2 which shows a sequence of events for software error leading to a failure condition at aircraft level **Added:** paragraphs describing figure 2-2	**3**	**Lim**	None	
2.3.2	Multiple -Version Dissimilar Software	**Moved to Section 2.4.2**	Failure Condition Categorization	**[Formerly Section 2.2.1]** **Reformatted:** Took the Information from DO-178B and converted it into an easy to read chart adapting the defintions of the failure conditions categories of catastrophic, hazardous/severe major, major, and minor from other published guidance material.	**1**	**Lim**	NOTE: This section does not supersede the external guidance on failure condition definition and should not be relied up for interpretation of the different categories of failure codition. Consider the information within as only summary information only included as a convenience.	
2.3.3	Safety Monitoring	**Moved to Section 2.4.3**	Software Level Definition	**[Formerly Section 2.2.2]** **Added:** The applicant should always consider the appropriate certification guidance and system development considerations for categorizing the failure condition severity and the software level.	**1**	**Lim**	None	
2.3.4	N/A		Software Level Determination	**[Formerly Section 2.2.3]** **Deleted:** Last 4 paragraphs describing parallel implementation, serial implementation, software levels, and strategies that depart from the guidelines.	**1**	**Lim**	None	
2.4	System Considerations for User -Modifiable Software, Option-Selectable Software and Commercial Off-The-Shelf Software	**Moved to section 2.5**	Architectural Considerations	**Added:** Entire Section >> This section provides information on several architectural strategies that may limit the impact of failures, or detect failures and provide acceptable system responses to contain them. It also describes serial implementation.	**1**	**Mod**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.5	System Design Considerations for Field - Loadable Software	**Moved to Section 2.5.5**	Software Considerations in System Life Cycle Processes	**Added:** Entire Section >> This section provides an overview of those software-related issues (not necessarily mutually exclusive) that should be considered, as appropriate, by the system life cycle processes	**2**	**Lim**	None	
2.6	System Requirements Considerations for Software Verification	**Renamed**	System Considerations in Software Life Cycle Processes	**Added:** Credit may be taken from system life cycle processes for the satisfaction, or partial satisfaction, of the software objectives as defined in this document. In such cases, the system activities for which credit is being sought should be shown to meet the applicable objectives of this document with evidence of the completion of planned activities and their outputs identified as part of the software life cycle data.	**3**	**Sig**	The ASE may be required to examine system lifecycle that could be proposed to provide satisfaction of the activities and objectives in DO-178C. Even if the system data has been approved under ARP-4754, it will have to be evaluated against the criteria in DO-178C.	2.2.1
5.1.1	Software Requirements Process Objectives		No Change	Small wording change in 5.2.1 b. Derived high level requirements are to be supplied to the system process as well as the safety analysis process	**1**	**Mod**	The ASE should ensure that the planning includes explicit transmittal of derived high level requirements to the system process in addition to the safety analysis process. During SOI reviews there should be reviewable evidence that this has occurred.	
5.1.2	Software Requirements Process Activities		No Change	**Added:** Bullet Points --Derived high-level requirements and the reason for their existence should be defined -- Derived high-level requirements should be provided to the system processes, including the system safety assessment process --If parameter data items are planned, the high-level requirements should describe how any parameter data item is used by the software. The high-level requirements should also specify their structure, the attributes for each of their data elements, and, when applicable, the value of each element. The values of the parameter data item elements should be consistent with the structure of the parameter data item and the attributes of its data elements Deleted: bullet point for traceability between system requirements and HLR (separate section added for all traceability)	**2**	**Sig**	The planning documentation should be examined to ensure that there are verification activities for any PDI to ensure that the HLRs specify how they are used, their structure, attributes of each data elements, values, and consistency between the structure of the PDI and its data elements. For example, do the review checklists have reviews for these items? The ASE should examine the standards for HLRs to ensure that derived HLRs have the attributes listed in this section (e.g. justification) and the planning documentation ensures that there is an activity for the delivery to the system processes. Likewise during the SOI reviews, the results of these activities will have to be examined.	
5.2.1	Software Design Process Objectives		No Change	Small wording change in 5.2.1 b. Derived low level requirements are to be supplied to the system process as well as the safety analysis process	**1**	**Mod**	The ASE should ensure that the planning includes explicit transmittal of derived high level requirements to the system process in addition to the safety analysis process. During SOI reviews there should be reviewable evidence that this has occurred.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
5.2.3	Designing for User-Modifiable Software		No Change	**Added: --T**he software level of the protection between the user modifiable software and the non modifiable software should be the same level as non modifiable software. If protection is provided by a tool the tool is categorized and qualified as defined in section 12.2.	**2**	**Mod**	If software protection is used, the ASE should examine the plans to verify that the software level of the protection is the same level as the non modifiable software. Or if or if a tool is used for the protection that the tool is qualified to the appropriate TQL.	
6.3.3	Reviews and Analyses of the Software Architecture		No Change	**Added:** information to a bullet: If the interface is to a component of a lower software level, it should also be confirmed that the higher software level component has appropriate protection mechanisms in place to protect itself from potential erroneous inputs from the lower software level component. **Clarified:** Incorporated errata in the description of partitioning to eliminate confusion over whether DO-178B implied that breaches were tolerated.	**1**	**Mod**	The ASE will have to ensure that the developer has included in their review process of software architecture verification activities (e.g. via checklists or analysis) to ensure that there are protection mechanisms in place if the developers design incorporates communication between components of different software levels. During SOI reviews, the adequacy of this mechanism should also be evaluated.	
7.2.5	Change Review		No Change	**Editorial:** Moved objective related material to 7.1 Added: change impact assessment must include the impact on the system requirements and feedback is required to be provided to the system processes. Any responses to this feedback needs to be assessed by the software process.	**2**	**Mod**	The ASE must ensure that the developer has a process that evaluates all software changes for impact on the system requirements and the means for ensuring two way information flow between the systems process and the software process for any changes impacting the system requirements. Additionally the ASE should look for data to support that the process is being implemented.	
11.14	Software Verification Results		No Change	**Added:** Any discrepancies found should be recorded and tracked via problem reporting. Additionally, evidence provided in support of the system processes' assessment of information provided by the software processes (see 2.2.1.f and 2.2.1.g) should be considered to be Software Verification Results.	**1**	**Mod**	The ASE should ensure that any discrepancies identified in verification results should have corresponding problem reports. The ASE will have to look for evidence, if appropriate to the project, for any information provided to the system processes as par of the software verification results.	
11.17	Problem Reports		No Change	**Added:** more information under the problem description bullet: The problem description should contain sufficient detail to facilitate the assessment of the potential safety or functional effects of the problem.	**1**	**Lim**	ASE will need to scrutinize problem reports to ensure that sufficient details are included to analyze if there is any system impact.	
12.3.2.1	N/A		Independence of Multiple-Version Dissimilar Software	**[Formerly Section 12.3.3.1]** **Added:** Note: Section 12.3.2.1 only addresses the subject of independence. Reduction of software levels is not discussed or intended.	**1**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Annex B	Derived Requirements		No Change	**Modified:** Makes the definition more precise by addressing functionality that goes beyond that specified in the higher-level requirements	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	Monitoring		No Change	**Modified:** Deleted definition associated with safety context; separate term added to address this - see safety monitoring	**2**	**Lim**	None	
Annex B	Multiple-Version Dissimilar Software		No Change	**Modified:** Clarified definition and added example	**2**	**Lim**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	N/A		Single Event Upset	**Added:** missing in DO-178B; needed to support discussion of emergent safety issue not directly considered in DO-178B	**3**	**Sig**	ASE should ensure SEU is considered by the Applicant; note that this consideration may be part of the hardware design.	

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2.6. Structural coverage

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.6	System Requirements Considerations for Software Verification	**Renamed**	System Considerations in Software Life Cycle Processes	**Added:** Credit may be taken from system life cycle processes for the satisfaction, or partial satisfaction, of the software objectives as defined in this document. In such cases, the system activities for which credit is being sought should be shown to meet the applicable objectives of this document with evidence of the completion of planned activities and their outputs identified as part of the software life cycle data.	**3**	**Sig**	The ASE may be required to examine system lifecycle that could be proposed to provide satisfaction of the activities and objectives in DO-178C. Even if the system data has been approved under ARP-4754, it will have to be evaluated against the criteria in DO-178C.	2.2.1
5.2.4	N/A		Designing for Deactivated Code	**Clarified:** Most of the material came from section 5.4.3 but was rearranged and clarified. Generalized the requirements on the deactivation mechanism to insure that deactivated items have no adverse effect on the other software. **Added:** The development of deactivated code should comply with DO-178B.	**3**	**Lim**	ASE must ensure that deactivated code complies with DO-178C. This was not clear in DO-178B where some developers only were concerned with the development assurance of the deactivation mechanism. While there were substantial changes in the text, the remaining information mainly consolidated what was already in DO-178B.	
6.4.4	Test Coverage Analysis		No Change	**Reorganized:** This entire section and its sub paragraphs were substantially reorganized to explicitly identify the objectives as separate from the activities. The basic content has not changed. **Added Bullet Points:** with 6.4.4.a.-d. discussing objectives for test coverage	**2**	**Lim**	None	
6.4.4.2	Structural Coverage Analysis		No Change	**Added:** Note: Describes what "Additional code that is not directly traceable to Source Code Statements" entails. The interfaces between compoents as part of what must be exercised by the requirements based test. **Added:** Bullet Point: 6.4.4.2.d for Structural coverage analysis resolution but the guidance is deferred to section 6.4.4.3	**1**	**Mod**	The ASE can now accept structural coverage analysis that is based on the source code, object code, or executable object code. The text relating to test coverage of unexpected code generated by the compiler is now linked to objective 9 in table A-7 (previously incorrectly referred to as source to object code traceability). The ASE is now directed to look for test coverage of the data and control coupling between components - while this was a clarification, it was not consistently applied under DO-178B.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.4.4.3	Structural Coverage Analysis Resolution		No Change	**Edited:** Renamed a bullet point (6.4.4.3.c) and added additional information about extraneous code to it. **Added:** Expansion on the discussion of the two different categories of deactivated code. Added the term extraneous code which is a superset of dead code. Dead code is there due to design errors. Extraneous is any code that is not traceable to a system or software requirement and includes dead code. **Added:** Also extended the structural coverage analysis resolution to the interfaces between components (data and control coupling) that was not exercised as part of the testing activity.	**2**	**Mod**	The ASE must ensure that the developer has properly categorized code detected by structural coverage analysis into the proper categories defined in this section and the glossary. The ASE must also ensure that the structural coverage analysis resolution includes an deficiences found as part of the data and control coupling coverage results.	Glossary (dead code, extraneous code, deactivated code)
Table A-7	Verification of Verification Process Results		No Change	**Added:** Activity references, extra objective for verification of additional executable object code that is not related directly to the source code. **Modified:** Output for objective 1 was corrected to read SW verification results.	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the objective associated verification of additional executable object code that is not related directly to the source code.	
Annex B	Condition		No Change	**Modified:** Makes definition more precise by explicitly allowing for the unary operator.	**1**	**Lim**	None	
Annex B	Deactivated Code		No Change	**Modified:** correct numerous misconceptions concerning what constitutes deactivate code	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	Dead Code		No Change	**Modified:** added a list of exceptions often mistaken for dead code	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	N/A		Extraneous Code	**Added:** Missing in DO-178B; added to clarify meaning	**2**	**Mod**	ASE will need to ensure that the applicant has processes to properly characterize the different types of dead and deactivated code and has properly done so.	
Annex B	Modified Condition/Decision Coverage		No Change	**Modified:** Added second form of condition independence (e.g. allows masking of logic as input to the MD/DC coverage)	**2**	**Lim**	The ASE is no able to except masking MC/DC in addition to unique MC/DC coverage.	

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2.7. Level D

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Table A-2	Software Development Processes		No Change	**Added:** The objectives now includes supplying the derived HLR to the system and system safety process. PDI was added to the objective relating to being loaded into the target computer. Trace data was also added as an output. **Deleted:** Satisfaction of Objectives 4, 5, and 6 (LLR developed, Derived LLR developed, and source code developed, respectively) is no longer required for level D. The corresponding circles in the objective table were deleted. **Modified:** To be consistent with the rest of the document, corrected the CC categories for software architecture, Derived High level requirements, Low level requirements, and derived low level requirements from CC2 to CC1.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, that the derived HLR and LLR were provided to the System and system safety processes. Assessment that Trace Data was produced and PDI file(s), if any, was produced as an output and loaded into the target computer.	

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2.8. Traceability

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
5.1.2	Software Requirements Process Activities		No Change	**Added:** Bullet Points --Derived high-level requirements and the reason for their existence should be defined -- Derived high-level requirements should be provided to the system processes, including the system safety assessment process --If parameter data items are planned, the high-level requirements should describe how any parameter data item is used by the software. The high-level requirements should also specify their structure, the attributes for each of their data elements, and, when applicable, the value of each element. The values of the parameter data item elements should be consistent with the structure of the parameter data item and the attributes of its data elements Deleted: bullet point for traceability between system requirements and HLR (separate section added for all traceability)	**2**	**Sig**	The planning documentation should be examined to ensure that there are verification activities for any PDI to ensure that the HLRs specify how they are used, their structure, attributes of each data elements, values, and consistency between the structure of the PDI and its data elements. For example, do the review checklists have reviews for these items? The ASE should examine the standards for HLRs to ensure that derived HLRs have the attributes listed in this section (e.g. justification) and the planning documentation ensures that there is an activity for the delivery to the system processes. Likewise during the SOI reviews, the results of these activities will have to be examined.	
5.5	Traceability		Software Development Process Traceability	**Extensively revised** Entire Section >> Describes what software development process traceability activities include as well as clarifying that traceability is bidirectional; introduced trace data as a new life cycle data item.	**2**	**Mod**	While this section was extensively revised, the actual impact on the ASE activities is quite small and limited to ensuring that trace data is captured as a separate lifecycle data item. Bidirectional traceability was already part of DO-178B but obscured and in practice was always evaluated in both directions.	
11.21	N/A		Trace Data	**Added:** Entire Section >> Explains what trace data is and that it should demonstrate bi-directional associations between the 6 bullet point items listed in that section.	**3**	**Lim**	Other than assuring that the developer has made all trace data as an identifiable software life cycle data item, the evaluation of the data hasn't changed from DO-178B	
Annex B	N/A		Trace Data	**Added:** Addresses a new data item introduced in DO-178C	**2**	**Mod**	ASE should ensure data compliance tables clearly identify this new data item	

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2.9. Topics related to the increased emphasis on activities for objectives

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
1.4	How to Use This Document		No Change	**Added Bullet Points:** --Using this document requires that the applicant should satisfy all applicable objectives and providing oversight of all of its suppliers. --The applicant should plan a set of activities that satisfy the objectives and . --The applicant should address any additional considerations in its software plans and standards. --The applicant should perform the planned activities and provide evidence as indicated in section 11 to substantiate that the objectives have been satisfied. --discussion on when and how the supplements are to be used. As an example, one of the bullet points above that was added to this section, reinforces the point that activities are a major part of the overall guidance. Hence, while the Annex A tables in DO-178B/ED-12B refer only to the objectives, they now also include references to each activity. Accordingly, a specific review of DO-178B/ED-12B was performed in order to assess the completeness and consistency of the objectives and activities identification. The above added bullet points explain the main resulting modifications. ***Take away:*** These modifications address the increased focus on demonstrating satisfaction of activities as well as objectives (including submitting any alternative activities to the FAA), increased focus supplier ovrsight, and use of external supplements.	**2**	**Sig**	The ASE needs to examine the planning documents against the activities listed for the objectives to ensure that all the activities described in 178C are planned. If there are activities proposed that are different than in 178C, documentation requesting approval of these alternate activities from the FAA needs to exist. The impact of other changes to this section are addressed elsewhere in this tool.	
6.4.4	Test Coverage Analysis		No Change	**Reorganized:** This entire section and its sub paragraphs were substantially reorganized to explicitly identify the objectives as separate from the activities. The basic content has not changed. **Added Bullet Points:** with 6.4.4.a.-d. discussing objectives for test coverage	**2**	**Lim**	None	
7.1	Software Configuration Management Process Objectives		No Change	**Moved:** Bullet Points: Moved the description of what the SCM process assists in, into section 7.0.a.-h. **Added:** Bullet Points: 7.1.a.-i. which describes what are the SCM process objectives .	**2**	**Lim**	None, sections 7.0 and 7.1 have been reorganized to make the presentation of objectives and activities clearer but there is no change to the ASE activities.	
Table A-1	Software Planning Process		No Change	**Added:** Activity references Deleted: SQA records from the outputs of objectives 6 (plans compliance to 178C) and 7 (coordination of plans)	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Table A-2	Software Development Processes		No Change	**Added:** The objectives now includes supplying the derived HLR to the system and system safety process. PDI was added to the objective relating to being loaded into the target computer. Trace data was also added as an output. **Deleted:** Satisfaction of Objectives 4, 5, and 6 (LLR developed, Derived LLR developed, and source code developed, respectively) is no longer required for level D. The corresponding circles in the objective table were deleted. **Modified:** To be consistent with the rest of the document, corrected the CC categories for software architecture, Derived High level requirements, Low level requirements, and derived low level requirements from CC2 to CC1.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, that the derived HLR and LLR were provided to the System and system safety processes. Assessment that Trace Data was produced and PDI file(s), if any, was produced as an output and loaded into the target computer.	
Table A-3	Verification of Outputs of Software Requirements Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-4	Verification of Outputs of Software Design Process		No Change	**Added:** Activity references **Modified:** Corrected paragraph references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-5	Verification of Outputs of Software Coding & Integration Processes		No Change	**Added:** Activity references, two additional objectives for verification of PDI file and PDI file is correct and complete.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the **new** objective associated with PDI files.	
Table A-6	Testing of Outputs of Integration Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-7	Verification of Verification Process Results		No Change	**Added:** Activity references, extra objective for verification of additional executable object code that is not related directly to the source code. **Modified:** Output for objective 1 was corrected to read SW verification results.	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the objective associated verification of additional executable object code that is not related directly to the source code.	
Table A-8	Software Configuration Management Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-9	Software Quality Assurance Process		No Change	Added: Activity references, additional objective for assurance that software plans and standards are developed and reviewed for compliance with DO-178C and reviewed for consistency between plans, Split the DO-178B objective stating software life cycle processes comply with plans and standards into a separate objective related to plans and another objective devoted to standards.	**2**	**Mod**	The ASEs will have to assess whether: 1. the developer has evidence showing compliance with all the activities listed, 2: The SQA organization has evidence of compliance with the objectives associated with plans and standards compliance with 178C.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Table A-10	Certification Liaison Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Annex B	N/A		Activity	**Added:** Key aspect of DO-178C's structure including new reference columns in Annex A	**1**	**Lim**	None	

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2.10 Testing

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.6	System Requirements Considerations for Software Verification	**Renamed**	System Considerations in Software Life Cycle Processes	**Added:** Credit may be taken from system life cycle processes for the satisfaction, or partial satisfaction, of the software objectives as defined in this document. In such cases, the system activities for which credit is being sought should be shown to meet the applicable objectives of this document with evidence of the completion of planned activities and their outputs identified as part of the software life cycle data.	**3**	**Sig**	The ASE may be required to examine system lifecycle that could be proposed to provide satisfaction of the activities and objectives in DO-178C. Even if the system data has been approved under ARP-4754, it will have to be evaluated against the criteria in DO-178C.	2.2.1
4.5	Software Development Standards		No Change	**Added Bullet Point:** --4.5.d --Robustness should be considered in the software development standards. **Added Note:** If allocated to software by system requirements, practices to detect and control errors in stored data, and refresh and monitor hardware status and configuration may be used to mitigate single event upsets.	**2**	**Mod**	When reviewing the standards the ASE will have to establish that they address robustness. While it is obvious this will affect standards associated with verification, it may also affect requirements and coding.	
6.1	Software Verification Process Objectives		Purpose of Software Verification	**Added:** Bullet Point - e. The Executable Object Code is robust with respect to the software requirements such that it can respond correctly to abnormal inputs and conditions. This makes it consistent with robustness tests being related to robust requirements. **Clarified:** related absence of unintended function to having the executable object code satisfying the the software requirements.	**1**	**Lim**	None	
6.4	Software Testing Process		Software Testing	**Edited:** Paragraph substantially reorganized: Content mostly the same - just easier to find stuff. **Added:** paragraph and bullet points: new 6.4.a.-6.4.e. Describes what software testing is used for and what the objectives are. Deleted bullet points: original 6.4.a.-6.4.d. about satisfying software testing objectives. **Deleted:** bullet points: about satisfying software testing objectives **Edited:** Reformatted Figure 6-1 and included missing items such as structural coverage resolution and annotated the drawing with the appropriate section references.	**3**	**Mod**	The changes to this section make the ASEs job easier than in DO-178B. The objectives are clearly identified and in one section instead of disguised in other sections of the document. Figure 6-1 now more clearly shows the relationship between the different test activities. The ASEs should use this section as an index into the rest of the testing guidance.	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.4.2	Requirements-Based Test Case Selection		Requirements-Based Test Selection	**Added:** Note: Robustness test cases are requirements-based. The robustness testing criteria cannot be fully satisfied if the software requirements do not specify the correct software response to abnormal conditions and inputs. The test cases may reveal inadequacies in the software requirements, in which case the software requirements should be modified. Conversely, if a complete set of requirements exists that covers all abnormal conditions and inputs, the robustness test cases will follow from those software requirements **Added:** Bullet Point: To section 6.4.2.3 - Test procedures are generated from the test cases	**2**	**Mod**	The ASE will need to ensure that the developer of high and low level requirements now includes responses to abnormal conditions. Additionally, tests written against those abnormal conditions are now considered robustness requirements tests. In DO-178B some interpretations would consider requirements that specified behavior under all conditions complete requirements and the associated test cases would have been considered normal range tests. DO-178C removes this ambiguity.	
6.4.2.1	Normal Range Test Cases		No Change	**Deleted:** Note - The note in DO-178B suggested that the developer could use MC/DC as a criterion for selecting a complete set of Logic tests.	**1**	**Mod**	The ASE needs to be aware that it is up to the developer to determine when adequate logic coverage of requirements is obtained and the ASE must determine if their approach is adequate. Unless another approach is provided by the developer and justified, the ASE will need to establish that all logic conditions and combination of those conditions have been tested.	
11.14	Software Verification Results		No Change	**Added:** Any discrepancies found should be recorded and tracked via problem reporting. Additionally, evidence provided in support of the system processes' assessment of information provided by the software processes (see 2.2.1.f and 2.2.1.g) should be considered to be Software Verification Results.	**1**	**Mod**	The ASE should ensure that any discrepancies identified in verification results should have corresponding problem reports. The ASE will have to look for evidence, if appropriate to the project, for any information provided to the system processes as par of the software verification results.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
12.1.3	Change of Application or Development Environment		No Change	**Added:** Bullet Point to what activities include: --Using a different autocode generator or a different set of autocode generator options may change the Source Code or object code generated. The impact of any changes should be analyzed. **Added:** Bullet Points about when a different processor is used: --Software components that are new or will need to be modified as a result of changing the processor, including any modification for hardware/software integration. --Previous hardware/software integration tests that should be executed for the new application. It is expected that there will always be a minimal set of tests to be run. **Added:**F162Determine the software modules or interfaces that are new or will be modified to accommodate the changed hardware component --Determine the extent of reverification required.	**2**	**Mod**	The ASE needs to look for evidence that the developer has evaluated the effect on autocode generators especially the associated options that were used. The ASE will need to examine the effects of any processor or other hardware changes related to the impact on objectives, activities, and lifecycle data. Specifically, determine whether the applicant/developer has properly established which tests and analysis will have to be redone. The ASE will need to examine applicant data to ensure that they have analyzed any modules and interfaces that are either new or modified as a result of a hardware change.	

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2.11 Hidden objectives

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.5.2	N/A		User-Modifiable Software	**[Foremerly part of section 2.4, FAA order 8110.49 chapter 7]** **Modified:** Consolidated the information from section 2.4 and chapter 7 of FAA order 8110.49. Tied the classification of User-Modifiable software to the systems requirements.	**2**	**Lim**	While there was consolidation of information from order 8110.49 and other sections in DO-178B, the ASE will be performing identical to what was done in DO-178B and 8110.49	
5.5	Traceability		Software Development Process Traceability	**Extensively revised** Entire Section >> Describes what software development process traceability activities include as well as clarifying that traceability is bidirectional; introduced trace data as a new life cycle data item.	**2**	**Mod**	While this section was extensively revised, the actual impact on the ASE activities is quite small and limited to ensuring that trace data is captured as a separate lifecycle data item. Bidirectional traceability was already part of DO-178B but obscured and in practice was always evaluated in both directions.	
11.21	N/A		Trace Data	**Added:** Entire Section >> Explains what trace data is and that it should demonstrate bi-directional associations between the 6 bullet point items listed in that section.	**3**	**Lim**	Other than assuring that the developer has made all trace data as an identifiable software life cycle data item, the evaluation of the data hasn't changed from DO-178B	
Table A-7	Verification of Verification Process Results		No Change	**Added:** Activity references, extra objective for verification of additional executable object code that is not related directly to the source code. **Modified:** Output for objective 1 was corrected to read SW verification results.	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the objective associated verification of additional executable object code that is not related directly to the source code.	
Annex B	N/A		User-Modifiable Software	**Added:** move definition from text to glossary.	**1**	**Lim**	None	

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2.12 Documents used in conjunction with DO-178C (e.g. Supplements, Tool Qualification)

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
1.4	How to Use This Document		No Change	**Added Bullet Points:** --Using this document requires that the applicant should satisfy all applicable objectives and providing oversight of all of its suppliers. --The applicant should plan a set of activities that satisfy the objectives and . --The applicant should address any additional considerations in its software plans and standards. --The applicant should perform the planned activities and provide evidence as indicated in section 11 to substantiate that the objectives have been satisfied. --discussion on when and how the supplements are to be used. As an example, one of the bullet points above that was added to this section, reinforces the point that activities are a major part of the overall guidance. Hence, while the Annex A tables in DO-178B/ED-12B refer only to the objectives, they now also include references to each activity. Accordingly, a specific review of DO-178B/ED-12B was performed in order to assess the completeness and consistency of the objectives and activities identification. The above added bullet points explain the main resulting modifications. ***Take away:*** These modifications address the increased focus on demonstrating satisfaction of activities as well as objectives (including submitting any alternative activities to the FAA), increased focus supplier ovrsight, and use of external supplements.	**2**	**Sig**	The ASE needs to examine the planning documents against the activities listed for the objectives to ensure that all the activities described in 178C are planned. If there are activities proposed that are different than in 178C, documentation requesting approval of these alternate activities from the FAA needs to exist. The impact of other changes to this section are addressed elsewhere in this tool.	
12.0	ADDITIONAL CONSIDERATIONS		No Change	**Added:** The use of additional considerations and the proposed impact on the guidance provided in the other sections of this document should be agreed on a case-by-case basis with the certification authorities. **Deleted:** Removed formal methods as an additional consideration as formal methods now has its own supplement.	**2**	**Lim**	None, the section just makes explicit what already exists. And the removal of formal methods reduces the scope of additional considerations.	
12.2.3	Tool Qualification Data	**Deleted:** Entire Section in Version C	Tool Qualification Process	**Added:** Entire Section >> The objectives, activities, guidance, and life cycle data required for each Tool Qualification Level are described in DO-330, "Software Tool Qualification Considerations."	**3**	**Sig**	The ASE will have to ensure that the developer has satisfied the objectives and activities related to tool qualification in DO-330 as well as verifying that all of the tool life cycle data has been produced per DO-330.	
Annex B	Formal Methods		No Change	**Modified:** Added connection to a formal model	**2**	**Lim**	None - clarification to support supplements	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Annex B	N/A		Supplement	**Added:** Defines the new adjunct guidance introduced for a specific technology or method	**3**	**Sig**	ASE should ensure that an Applicant using a technology or method that is covered by a supplement is aware of the additional guidance in the supplement.	

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2.13 Partitioning

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.4.1	N/A		Partitioning	[Formerly Section 2.3.1] Reworded: Most of DO-178B's text. Clarified: Information on Partitioning between software components by consolidating the all of the issues into bullet points and removing ambiguous wording as needed. Extended the notion of partitioning to software components executing on different hardware platforms which extends the partitioning analysis to implementations such as multicore processors. ***Take away:*** While this doesn't add any new requirements for partitioning the guidance is now clearer and more detailed	**3**	**Lim**	None	
6.3.3	Reviews and Analyses of the Software Architecture		No Change	**Added:** information to a bullet: If the interface is to a component of a lower software level, it should also be confirmed that the higher software level component has appropriate protection mechanisms in place to protect itself from potential erroneous inputs from the lower software level component. **Clarified:** Incorporated errata in the description of partitioning to eliminate confusion over whether DO-178B implied that breaches were tolerated.	**1**	**Mod**	The ASE will have to ensure that the developer has included in their review process of software architecture verification activities (e.g. via checklists or analysis) to ensure that there are protection mechanisms in place if the developers design incorporates communication between components of different software levels. During SOI reviews, the adequacy of this mechanism should also be evaluated.	

3.0 Changes grouped by amount of impact to ASE

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
1.4	How to Use This Document		No Change	**Added Bullet Points:** --Using this document requires that the applicant should satisfy all applicable objectives and providing oversight of all of its suppliers. --The applicant should plan a set of activities that satisfy the objectives and . --The applicant should address any additional considerations in its software plans and standards. --The applicant should perform the planned activities and provide evidence as indicated in section 11 to substantiate that the objectives have been satisfied. --discussion on when and how the supplements are to be used. As an example, one of the bullet points above that was added to this section, reinforces the point that activities are a major part of the overall guidance. Hence, while the Annex A tables in DO-178B/ED-12B refer only to the objectives, they now also include references to each activity. Accordingly, a specific review of DO-178B/ED-12B was performed in order to assess the completeness and consistency of the objectives and activities identification. The above added bullet points explain the main resulting modifications. ***Take away:*** These modifications address the increased focus on demonstrating satisfaction of activities as well as objectives (including submitting any alternative activities to the FAA), increased focus supplier ovrsight, and use of external supplements.	**2**	**Sig**	The ASE needs to examine the planning documents against the activities listed for the objectives to ensure that all the activities described in 178C are planned. If there are activities proposed that are different than in 178C, documentation requesting approval of these alternate activities from the FAA needs to exist. The impact of other changes to this section are addressed elsewhere in this tool.	
2.5.1	N/A		Parameter Data Items	**Added:** Entire Section >> Describes what a parameter data item comprises, what it contains, and what should be addressed.	**3**	**Sig**	ASE should read and understand this section as the information in this section forms the basis for the activities and objectives related to Parameter Data Items (PDI) in later section. This provides the technical basis for evaluating developer implementations of PDI.	
2.6	System Requirements Considerations for Software Verification	**Renamed**	System Considerations in Software Life Cycle Processes	**Added:** Credit may be taken from system life cycle processes for the satisfaction, or partial satisfaction, of the software objectives as defined in this document. In such cases, the system activities for which credit is being sought should be shown to meet the applicable objectives of this document with evidence of the completion of planned activities and their outputs identified as part of the software life cycle data.	**3**	**Sig**	The ASE may be required to examine system lifecycle that could be proposed to provide satisfaction of the activities and objectives in DO-178C. Even if the system data has been approved under ARP-4754, it will have to be evaluated against the criteria in DO-178C.	2.2.1

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
4.2	Software Planning Process Activities		No Change	**Added:** Bullet Points --4.2.j. and 4.2.j.1.-4., --When parameter data items are planned, the following should be addressed: --The way that parameter data items are used --The software level of the parameter data items --The processes to develop, verify, and modify parameter data items, and any associated tool qualification --Software load control and compatibility **Added:** Bullet Points --Bullet Points: 4.2.k., --The software planning process should address any additional considerations that are applicable, and 4.2.l., --If software development activities will be performed by a supplier, planning should address supplier oversight.	**2**	**Sig**	The ASE will have to ensure that the planning documentation provides for the activities and satisfaction of objectives related to PDI as well as provisions for supplier oversight as applicable.	
5.1.2	Software Requirements Process Activities		No Change	**Added:** Bullet Points --Derived high-level requirements and the reason for their existence should be defined --Derived high-level requirements should be provided to the system processes, including the system safety assessment process --If parameter data items are planned, the high-level requirements should describe how any parameter data item is used by the software. The high-level requirements should also specify their structure, the attributes for each of their data elements, and, when applicable, the value of each element. The values of the parameter data item elements should be consistent with the structure of the parameter data item and the attributes of its data elements Deleted: bullet point for traceability between system requirements and HLR (separate section added for all traceability)	**2**	**Sig**	The planning documentation should be examined to ensure that there are verification activities for any PDI to ensure that the HLRs specify how they are used, their structure, attributes of each data elements, values, and consistency between the structure of the PDI and its data elements. For example, do the review checklists have reviews for these items? The ASE should examine the standards for HLRs to ensure that derived HLRs have the attributes listed in this section (e.g. justification) and the planning documentation ensures that there is an activity for the delivery to the system processes. Likewise during the SOI reviews, the results of these activities will have to be examined.	
5.4.2	Integration Process Activities		No Change	**Added:** Bullet Points: --Any Parameter Data Item File should be generated --The software should be loaded into the target computer for hardware/software integration **Moved:** Merged handling of patches frome DO-178B section 5.4.3 into this section.	**2**	**Sig**	The ASE will have to ensure that PDI files are part of the integration processes in the plans and in the actual integration process. The lifecycle data should show explicit integration of PDI files.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.6	N/A		Verification of Parameter Data Items	**Added:** Entire Section >> Explains that if all of the following conditions are met, verification of a PDI can be conducted separately from the verification of the executable Object Code. Provides the criteria and activities needed to verify PDI files.	**3**	**Sig**	The ASE will have to determine if the PDI is intended to be verified independent of the operational software. If so, they will have to confirm that the developer can show that they met all the conditions in this section. Additionally the ASE will need to confirm that the developer has fulfilled all of the objectives listed for PDI in this section. The ASE should also ensure that the developer can show that they have processes that determine when changes to the PDI require reverification/modification of the executable object code.	
11.1	Plan for Software Aspects of Certification		No Change	**Added:** Bullet: --Supplier oversight: This section describes the means of ensuring that supplier processes and outputs will comply with approved software plans and standards	**1**	**Sig**	The ASE will need to review the PSAC for the differences related to DO-178C identified above. This document can be used as a checklist or the ASE can create their own abbreviated checklist.	
11.2	Software Development Plan		No Change	**Modified:** bullet: --One bullet regarding programming languages, tools, compliers, linkers and loaders to be used became two separate bullets. Additionally, "coding method(s)" were added as well as, when applicable, options and constraints of autocode generators.	**1**	**Sig**	The ASE will need to review the PSAC for the differences related to DO-178C identified above.	
12.2.2	Qualification Criteria for Software Verification Tools	**Deleted:** Entire Section in Version C	Determining the Tool Qualification Level	**Added:** Entire Section >> Describes what criteria needs to be met if a tool qualification is needed. **Added:** Table 12-1	**3**	**Sig**	The ASE will have to use the information in this section to validate that the developer has assigned the correct tool qualification level (TQL) to the tool based on its usage and the software level of the associated operational software.	
12.2.3	Tool Qualification Data	**Deleted:** Entire Section in Version C	Tool Qualification Process	**Added:** Entire Section >> The objectives, activities, guidance, and life cycle data required for each Tool Qualification Level are described in DO-330, "Software Tool Qualification Considerations."	**3**	**Sig**	The ASE will have to ensure that the developer has satisfied the objectives and activities related to tool qualification in DO-330 as well as verifying that all of the tool life cycle data has been produced per DO-330.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
12.3.4	Software Reliability Models	**Moved to Section 12.3.3**	Product Service history	**[Formerly Section 12.3.5]** **Deleted:** Bullet points about guidance for the use of product service history **Added:** paragraph to discuss that the use of service history data for certification credit is predicated upon sufficiency, relevance, and types of problems occurring during the service history period. The use, conditions of use, and results of software service history should be defined, assessed by the system processes, including the system safety assessment process, and submitted to the appropriate certification authority. Guidance for determining applicability of service history and the length of service history needed is presented below	**3**	**Sig**	There are some technical challenges in using product service history. This section was heavily modified to recognize some research done by the FAA. In addition to the technical disciplines involved, the revisions to this section are considerable. If an applicant chooses to make use of product service history, technical specialist should be involved.	
12.3.4.1	N/A		Relevance of Service History	**Added:** Entire Section >> Describes the steps in establishing the relevance of service history	**3**	**Sig**	See 12.3.4	
12.3.4.2	N/A		Sufficiency of Accumulated Service History	**Added:** Entire Section >> Describes what the required amount of service history is determined by	**3**	**Sig**	See 12.3.4	
12.3.4.3	N/A		Collection, Reporting, and Analysis of Problems Found During Service History	**Added:** Entire Section >> Describes the specific data to be collected from each recorded problem and how to address the completeness of the software's error history.	**3**	**Sig**	See 12.3.4	
12.3.4.4	N/A		Service History Information to be Included in the Plan for Software Aspects of Certification	**Added:** Entire Section >> Explains what items should be specified and agreed upon when seeking certification credit for service history.	**3**	**Sig**	See 12.3.4	
Annex B	N/A		Parameter Data Item	**Added:** Define new term in DO-178C	**3**	**Sig**	ASE should ensure Applicant has properly identified any such data as part of their system/software.	
Annex B	N/A		Parameter Data Item File	**Added:** Define new term in DO-178C	**3**	**Sig**	ASE should ensure data compliance tables clearly identify this new data item	
Annex B	N/A		Single Event Upset	**Added:** missing in DO-178B; needed to support discussion of emergent safety issue not directly considered in DO-178B	**3**	**Sig**	ASE should ensure SEU is considered by the Applicant; note that this consideration may be part of the hardware design.	
Annex B	N/A		Supplement	**Added:** Defines the new adjunct guidance introduced for a specific technology or method	**3**	**Sig**	ASE should ensure that an Applicant using a technology or method that is covered by a supplement is aware of the additional guidance in the supplement.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.1	Information Flow Between System and Software Life Cycle Processes	**Moved to Section 2.2**	System Requirements Allocation to Software	**Added:** Entire section >> This section describes how system requirements are developed and where safety-related requirements result from. It also describes the system safety assessment process and requirements. Lastly, it lists the system requirements allocated to software (8 bullet points).	**3**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation.	
2.2	Failure Condition and Software Level	**Moved to Section 2.3**	Information Flow Between System and Software Life Cycle Processes	**[Formerly Section 2.1]** **Edited:** Made Changes and Reformatted Figure 2-1 **Added:** This information flow includes the system safety aspects.	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to watch for are explicit feedback from the systems process on derived requirements, verification activities for HW and SW requiring coordination.	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.2.1	Failure Condition Categorization	**Moved to Section 2.3.2**	Information Flow from System Processes to Software Processes	**[Formerly Section 2.1.1]** **Deleted:** first two paragraphs and last paragraph. **Deleted:** Bullet Points: --Certification Requirements --Software level(s) and data substantiating --If the system is a component of another system **Added:** Bullet Points detailing the data passed to the software life cycle processes by the system processes: **Added:** Any evidence provided by the system processes should be considered by the software processes to be Software Verification Results (e.g. System Level Tests used to meet DO-178C Table A6 testing objectives or A7 coverage objectives) ***Take away:*** DO-178C recognizes that verification data from systems processes can be used to satisfy DO-178C objectives and activities. Added the requirement for evidence of the systems processes review of software data (e.g. derived requirements).	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to watch for are explicit feedback from the systems process on derived requirements, verification activities for HW and SW requiring coordination.	
2.2.2	Software Level Definitions	**Moved to Section 2.3.3**	Information Flow from Software Processes to System Processes	[Formerly Section 2.1.2] Deleted: Previous information in DO-178B Added: 2 paragraphs describing the software life cycle processes, what it analyzes, how it resolves issues, and how it makes data available to the system processes. Added: bullet points describing data that will facilitate analyses/evaluations: --Details of derived requirements --description of the software architecture --Evidence of system activities --Problem or change documentation --Any limitations of use --Configuration identification and any configuration status constraints -- Performance, timing, and accuracy characteristics -- Data to facilitate integration of the software into the system --Details of software verification activities proposed to be performed during system verification Take away: The specific data and associated content that should be passed to the system processes from the software processes were expanded and clarified.	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to assess is that there is explicit feedback from the systems process in response to SW process provided derived requirements, verification activities for HW and SW requiring coordination.	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.2.3	Software Level Determination	**Moved to Section 2.3.4**	Information Flow between Software Processes and Hardware Processes	**Added:** Entire Section. Describes how data is passed between the software and hardware life cycle process. **Added:** Bullet Points describing the type of data that is passed --All requirements, including derived requirements, needed for hardware/software integration --Instances where hardware and software verification activities require coordination --Identified incompatibilities between the hardware and the software. ***Take away:*** The specific data and associated content that should be passed between the software and hardware processes was added as well as consolidating the information from other sections of DO-178B related to hardware processes.	**3**	**Mod**	The ASE needs to evaluate the planning documents for planned interfaces and activities regarding the data flows specified in section 2.2.3. The ASE will also need to follow up during SOI reviews to ensure that the flows did occur and be alert to any changes that could require this to be re-evaluated.	
4.4.1	Software Development Environment		No Change	**Added:** Bullet Point: --Known tool problems and limitations should be assessed and those issues which can adversely affect airborne software should be addressed. **Modified:** Bullet point e regarding the examination of option features to include autocode generators	**1**	**Mod**	The ASE will have to make sure the developer has identified known tool problems and limitations. The ASE must then assess whether the developer has mitigation strategies for these.	
4.5	Software Development Standards		No Change	**Added Bullet Point:** --4.5.d --Robustness should be considered in the software development standards. **Added Note:** If allocated to software by system requirements, practices to detect and control errors in stored data, and refresh and monitor hardware status and configuration may be used to mitigate single event upsets.	**2**	**Mod**	When reviewing the standards the ASE will have to establish that they address robustness. While it is obvious this will affect standards associated with verification, it may also affect requirements and coding.	
5.0	SOFTWARE DEVELOPMENT PROCESSES		No Change	**Added:** Bullet Point --Software coding process. **Added:** Note - The applicant may be required to justify software development processes that produce a single level of requirements. Reformatted: Took the paragraph and broke it into easy to read bullet points. **Added:** Bullet Points --The specification of a periodic monitor's iteration rate when not specified by the system requirements allocated to software. --The addition of scaling limits when using fixed point arithmetic.	**1**	**Mod**	If the developer is proposing merging of high level and low level requirements, the ASE will find the justification and determine whether the reasoning supports a smooth transition between abstraction layers of system and the single level of requirements. Some indications where this may not be appropriate would be single system requirements tracing to an inordinately large number of merged high/low level requirements.	
5.1.1	Software Requirements Process Objectives		No Change	Small wording change in 5.2.1 b. Derived high level requirements are to be supplied to the system process as well as the safety analysis process	**1**	**Mod**	The ASE should ensure that the planning includes explicit transmittal of derived high level requirements to the system process in addition to the safety analysis process. During SOI reviews there should be reviewable evidence that this has occurred.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
5.2.1	Software Design Process Objectives		No Change	Small wording change in 5.2.1 b. Derived low level requirements are to be supplied to the system process as well as the safety analysis process	**1**	**Mod**	The ASE should ensure that the planning includes explicit transmittal of derived high level requirements to the system process in addition to the safety analysis process. During SOI reviews there should be reviewable evidence that this has occurred.	
5.2.2	Software Design Process Activities		No Change	**Added Bullet Point:** --Interfaces between software components, in the form of data flow and control flow, should be defined to be consistent between the components.	**1**	**Mod**	The planning documentation should be examined to ensure that there is a verification activity to ensure that data and control flow between components is consistent	
5.2.3	Designing for User-Modifiable Software		No Change	**Added: --T**he software level of the protection between the user modifiable software and the non modifiable software should be the same level as non modifiable software. If protection is provided by a tool the tool is categorized and qualified as defined in section 12.2.	**2**	**Mod**	If software protection is used, the ASE should examine the plans to verify that the software level of the protection is the same level as the non modifiable software. Or if or if a tool is used for the protection that the tool is qualified to the appropriate TQL.	
5.3.2	Software Coding Process Activities		No Change	**Deleted** Bullet Point: --The Source Code should be traceable to the Design Description (separate section added for all traceability); Also the wording implying that compilation is part of the coding process was removed. Added Bullet Point: --Use of autocode generators should conform to the constraints defined in the planning process	**2**	**Mod**	The ASE should ensure that the planning has verification activities and data that ensure that use of autocode generators comply with any constraints identified in the process governing use of these autocode generators. If the autocode generator is qualified, the constraints should come from the tool qualification data	
5.5	Traceability		Software Development Process Traceability	**Extensively revised** Entire Section >> Describes what software development process traceability activities include as well as clarifying that traceability is bidirectional; introduced trace data as a new life cycle data item.	**2**	**Mod**	While this section was extensively revised, the actual impact on the ASE activities is quite small and limited to ensuring that trace data is captured as a separate lifecycle data item. Bidirectional traceability was already part of DO-178B but obscured and in practice was always evaluated in both directions.	
6.2	Software Verification Process Activities		Overview of Software Verification Process Activities	**Deleted:** Bullet Points: for requirements and verification of software requirements related to traceability (separate section added for all traceability) and the bullet points for guidance for the software verification activities related to traceability (separate section added for all traceability). **Added:** new bullet points for software verification considerations including reverification considerations (extracted from DO-0248B) and clarification of verification independence	**2**	**Mod**	The ASE will have to ensure that the DO-178C clarifications of verification independence Is being used by the developer. This is especially important when looking at low level requirements (LLR) based test cases. The LLR test cases cannot be developed by the same person who coded those LLRs.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.3.3	Reviews and Analyses of the Software Architecture		No Change	**Added:** information to a bullet: If the interface is to a component of a lower software level, it should also be confirmed that the higher software level component has appropriate protection mechanisms in place to protect itself from potential erroneous inputs from the lower software level component. **Clarified:** Incorporated errata in the description of partitioning to eliminate confusion over whether DO-178B implied that breaches were tolerated.	**1**	**Mod**	The ASE will have to ensure that the developer has included in their review process of software architecture verification activities (e.g. via checklists or analysis) to ensure that there are protection mechanisms in place if the developers design incorporates communication between components of different software levels. During SOI reviews, the adequacy of this mechanism should also be evaluated.	
6.3.4	Reviews and Analyses of the Source Code		No Change	**Added:** information to bullet for accuracy and consistency of source code: The compiler (including its options), the linker (including its options), and some hardware features may have an impact on the worst-case execution timing and this impact should be assessed. Also added floating-point arithmetic as a consideration.	**1**	**Mod**	The ASE will have to evaluate the developers worst case execution analysis to determine if the effects of compiler, linker, and hardware have been included. The effects of developer selection of options should also be included in the analysis. (Note: while this might have been implicitly done under DO-178B (i.e. the design already incorporates these choices), now there will need to be explicit identification of the impacts). The ASE should evaluate whether the developers have accounted for inaccuracies due to floating point arithmetic errors.	
6.3.5	Reviews and Analyses of the Outputs of the Integration Process		No Change	**Added:** line and bullet: These review and analysis activities detect and report errors that may have been introduced during the integration process. The objective is to: a. Ensure that the outputs of the integration process are complete and correct. **Added:** Compiler warnings	**1**	**Mod**	The ASE will examine the outputs of the integration process to see how the developer addressed compiler warnings if there were any generated in the compilation of the delivered product.	
6.4	Software Testing Process		Software Testing	**Edited:** Paragraph substantially reorganized: Content mostly the same - just easier to find stuff. **Added:** paragraph and bullet points: new 6.4.a.-6.4.e. Describes what software testing is used for and what the objectives are. Deleted bullet points: original 6.4.a.-6.4.d. about satisfying software testing objectives. **Deleted:** bullet points: about satisfying software testing objectives **Edited:** Reformatted Figure 6-1 and included missing items such as structural coverage resolution and annotated the drawing with the appropriate section references.	**3**	**Mod**	The changes to this section make the ASEs job easier than in DO-178B. The objectives are clearly identified and in one section instead of disguised in other sections of the document. Figure 6-1 now more clearly shows the relationship between the different test activities. The ASEs should use this section as an index into the rest of the testing guidance.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.4.2	Requirements-Based Test Case Selection		Requirements-Based Test Selection	**Added:** Note: Robustness test cases are requirements-based. The robustness testing criteria cannot be fully satisfied if the software requirements do not specify the correct software response to abnormal conditions and inputs. The test cases may reveal inadequacies in the software requirements, in which case the software requirements should be modified. Conversely, if a complete set of requirements exists that covers all abnormal conditions and inputs, the robustness test cases will follow from those software requirements **Added:** Bullet Point: To section 6.4.2.3 - Test procedures are generated from the test cases	**2**	**Mod**	The ASE will need to ensure that the developer of high and low level requirements now includes responses to abnormal conditions. Additionally, tests written against those abnormal conditions are now considered robustness requirements tests. In DO-178B some interpretations would consider requirements that specified behavior under all conditions complete requirements and the associated test cases would have been considered normal range tests. DO-178C removes this ambiguity.	
6.4.2.1	Normal Range Test Cases		No Change	**Deleted:** Note - The note in DO-178B suggested that the developer could use MC/DC as a criterion for selecting a complete set of Logic tests.	**1**	**Mod**	The ASE needs to be aware that it is up to the developer to determine when adequate logic coverage of requirements is obtained and the ASE must determine if their approach is adequate. Unless another approach is provided by the developer and justified, the ASE will need to establish that all logic conditions and combination of those conditions have been tested.	
6.4.4.2	Structural Coverage Analysis		No Change	**Added:** Note: Describes what "Additional code that is not directly traceable to Source Code Statements" entails. The interfaces between compoents as part of what must be exercised by the requirements based test. **Added:** Bullet Point: 6.4.4.2.d for Structural coverage analysis resolution but the guidance is deferred to section 6.4.4.3	**1**	**Mod**	The ASE can now accept structural coverage analysis that is based on the source code, object code, or executable object code. The text relating to test coverage of unexpected code generated by the compiler is now linked to objective 9 in table A-7 (previously incorrectly referred to as source to object code traceability). The ASE is now directed to look for test coverage of the data and control coupling between components - while this was a clarification, it was not consistently applied under DO-178B.	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.4.4.3	Structural Coverage Analysis Resolution		No Change	**Edited:** Renamed a bullet point (6.4.4.3.c) and added additional information about extraneous code to it. **Added:** Expansion on the discussion of the two different categories of deactivated code. Added the term extraneous code which is a superset of dead code. Dead code is there due to design errors. Extraneous is any code that is not traceable to a system or software requirement and includes dead code. **Added:** Also extended the structural coverage analysis resolution to the interfaces between components (data and control coupling) that was not exercised as part of the testing activity.	**2**	**Mod**	The ASE must ensure that the developer has properly categorized code detected by structural coverage analysis into the proper categories defined in this section and the glossary. The ASE must also ensure that the structural coverage analysis resolution includes an deficiences found as part of the data and control coupling coverage results.	Glossary (dead code, extraneous code, deactivated code)
6.5	N/A		Software Verification Process Traceability	**Added:** Entire Section >> New section. Describes what software verification process traceability activities include	**3**	**Mod**	The actual impact on the ASE activities is quite small and limited to ensuring that trace data is captured as a separate lifecycle data item. Trace data existed before but was not formally defined nor captured as a separate life cycle data item. It was part of verification data under DO-178B. Bidirectional traceability was already part of DO-178B but obscured and in practice was always evaluated in both directions.	
7.2.5	Change Review		No Change	**Editorial:** Moved objective related material to 7.1 Added: change impact assessment must include the impact on the system requirements and feedback is required to be provided to the system processes. Any responses to this feedback needs to be assessed by the software process.	**2**	**Mod**	The ASE must ensure that the developer has a process that evaluates all software changes for impact on the system requirements and the means for ensuring two way information flow between the systems process and the software process for any changes impacting the system requirements. Additionally the ASE should look for data to support that the process is being implemented.	
8.2	Software Quality Assurance Process Activities		No Change	**Added:** Bullet: The SQA process should provide assurance that supplier processes and outputs comply with approved software plans and standards.	**1**	**Mod**	The ASE will have to evaluate whether the developer SQA has ensured that the supplier has complied with all of the SQA objectives and activities. This may be done by the developer providing the SQA process or delegated to the supplier SQA organization. In either case the processes used by the supplier need to be authorized by the developer and the developer SQA must have evidence of evaluating the SQA of the supplier.	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
9.0	CERTIFICATION LIAISON PROCESS		No Change	**Rearranged:** Rearranged paragraph into easy to read bullets. **Added:** Bullets to the objectives of the certification liaison process: --Gain agreement on the means of compliance through approval of the Plan for Software Aspects of Certification --Provide compliance substantiation	**2**	**Mod**	The ASE already uses the PSAC as a means of establishing agreement. In cases where the PSAC is being reviewed by the ASE, they will need to ensure that the changes identified within this document are captured by the PSAC as applicable to a specific applicant/developer.	
11.14	Software Verification Results		No Change	**Added:** Any discrepancies found should be recorded and tracked via problem reporting. Additionally, evidence provided in support of the system processes' assessment of information provided by the software processes (see 2.2.1.f and 2.2.1.g) should be considered to be Software Verification Results.	**1**	**Mod**	The ASE should ensure that any discrepancies identified in verification results should have corresponding problem reports. The ASE will have to look for evidence, if appropriate to the project, for any information provided to the system processes as par of the software verification results.	
11.20	Software Accomplishment Summary		No Change	**Added:** Bullet Points: --This section now needs to describe how supplier processes and outputs comply with plans and standards. **Modified:**F153The software status bullet has been modified to include a problem report summary which should includes a description of each problem and any associated errors, functional limitations, operational restrictions, potential adverse effect(s) on safety together with a justification for allowing the Problem Report to remain open, and details of any mitigating action that has been or needs to be carried out.	**2**	**Mod**	The ASE will need to examine the software status against the additional details listed in 11.20k (PDI, function limitations, justification for leaving problem reports open, etc.). Since this is basically a completed version of the PSAC, with the exception of 11.20k, the information unique to 178C should already be included. This leaves the ASE with only the task of assuring that all of the relevant PSAC material is in the SAS and any differences since the PSAC approval/acceptance have been included. This assumes that the PSAC, SAS, and SCI are being provided to the ASE.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
12.1.3	Change of Application or Development Environment		No Change	**Added:** Bullet Point to what activities include: --Using a different autocode generator or a different set of autocode generator options may change the Source Code or object code generated. The impact of any changes should be analyzed. **Added:** Bullet Points about when a different processor is used: --Software components that are new or will need to be modified as a result of changing the processor, including any modification for hardware/software integration. --Previous hardware/software integration tests that should be executed for the new application. It is expected that there will always be a minimal set of tests to be run. **Added:**F162Determine the software modules or interfaces that are new or will be modified to accommodate the changed hardware component --Determine the extent of reverification required.	**2**	**Mod**	The ASE needs to look for evidence that the developer has evaluated the effect on autocode generators especially the associated options that were used. The ASE will need to examine the effects of any processor or other hardware changes related to the impact on objectives, activities, and lifecycle data. Specifically, determine whether the applicant/developer has properly established which tests and analysis will have to be redone. The ASE will need to examine applicant data to ensure that they have analyzed any modules and interfaces that are either new or modified as a result of a hardware change.	
12.3	Alternative Methods		No Change	**Added:** information to bullet points about guidance for using alternative methods: --or the applicable supplement --One technique for presenting the rationale for using an alternative method is an assurance case, in which arguments are explicitly given to link the evidence to the claims of compliance with the system safety objectives.	**2**	**Mod**	The ASE will have to evaluate the developer rationale for using alternative methods. The use of an assurance case is recognized as a means of presenting this justification. This is a technique new to DO-178C and will generally require assistance from technical specialists to perform the evaluation.	
Table A-1	Software Planning Process		No Change	**Added:** Activity references Deleted: SQA records from the outputs of objectives 6 (plans compliance to 178C) and 7 (coordination of plans)	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-2	Software Development Processes		No Change	**Added:** The objectives now includes supplying the derived HLR to the system and system safety process. PDI was added to the objective relating to being loaded into the target computer. Trace data was also added as an output. **Deleted:** Satisfaction of Objectives 4, 5, and 6 (LLR developed, Derived LLR developed, and source code developed, respectively) is no longer required for level D. The corresponding circles in the objective table were deleted. **Modified:** To be consistent with the rest of the document, corrected the CC categories for software architecture, Derived High level requirements, Low level requirements, and derived low level requirements from CC2 to CC1.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, that the derived HLR and LLR were provided to the System and system safety processes. Assessment that Trace Data was produced and PDI file(s), if any, was produced as an output and loaded into the target computer.	
Table A-3	Verification of Outputs of Software Requirements Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	

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Table A-4	Verification of Outputs of Software Design Process		No Change	**Added:** Activity references **Modified:** Corrected paragraph references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-5	Verification of Outputs of Software Coding & Integration Processes		No Change	**Added:** Activity references, two additional objectives for verification of PDI file and PDI file is correct and complete.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the **new** objective associated with PDI files.	
Table A-6	Testing of Outputs of Integration Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-7	Verification of Verification Process Results		No Change	**Added:** Activity references, extra objective for verification of additional executable object code that is not related directly to the source code. **Modified:** Output for objective 1 was corrected to read SW verification results.	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the objective associated verification of additional executable object code that is not related directly to the source code.	
Table A-8	Software Configuration Management Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-9	Software Quality Assurance Process		No Change	Added: Activity references, additional objective for assurance that software plans and standards are developed and reviewed for compliance with DO-178C and reviewed for consistency between plans, Split the DO-178B objective stating software life cycle processes comply with plans and standards into a separate objective related to plans and another objective devoted to standards.	**2**	**Mod**	The ASEs will have to assess whether: 1. the developer has evidence showing compliance with all the activities listed, 2: The SQA organization has evidence of compliance with the objectives associated with plans and standards compliance with 178C.	
Table A-10	Certification Liaison Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Annex B	Acronyms		No Change	**Modified:** Acronym list modified to reflect usage within DO-178C	**2**	**Mod**	None	
Annex B	Deactivated Code		No Change	**Modified:** correct numerous misconceptions concerning what constitutes deactivate code	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	Dead Code		No Change	**Modified:** added a list of exceptions often mistaken for dead code	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	Derived Requirements		No Change	**Modified:** Makes the definition more precise by addressing functionality that goes beyond that specified in the higher-level requirements	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Annex B	N/A		Extraneous Code	**Added:** Missing in DO-178B; added to clarify meaning	**2**	**Mod**	ASE will need to ensure that the applicant has processes to properly characterize the different types of dead and deactivated code and has properly done so.	
Annex B	N/A		Trace Data	**Added:** Addresses a new data item introduced in DO-178C	**2**	**Mod**	ASE should ensure data compliance tables clearly identify this new data item	
1.2	Scope		No Change	**Clarification:** Extended the applicability to propellers and auxiliary power units. The decision for the classification of firmware into hardware or software was made a part of the systems allocation activity and not part of the DO-178C process.	**1**	**Lim**	The ASE needs to examine the systems allocation activity to determine if there is evidence and justification for the allocation of requirements between software and firmware. However it is no longer a software process responsibility.	
2.3.2	Multiple -Version Dissimilar Software	**Moved to Section 2.4.2**	Failure Condition Categorization	**[Formerly Section 2.2.1]** **Reformatted:** Took the Information from DO-178B and converted it into an easy to read chart adapting the defintions of the failure conditions categories of catastrophic, hazardous/severe major, major, and minor from other published guidance material.	**1**	**Lim**	NOTE: This section does not supersede the external guidance on failure condition definition and should not be relied up for interpretation of the different categories of failure codition. Consider the information within as only summary information only included as a convenience.	
2.5.2	N/A		User-Modifiable Software	**[Foremerly part of section 2.4, FAA order 8110.49 chapter 7]** **Modified:** Consolidated the information from section 2.4 and chapter 7 of FAA order 8110.49. Tied the classification of User-Modifiable software to the systems requirements.	**2**	**Lim**	While there was consolidation of information from order 8110.49 and other sections in DO-178B, the ASE will be performing identical to what was done in DO-178B and 8110.49	
5.2.4	N/A		Designing for Deactivated Code	**Clarified:** Most of the material came from section 5.4.3 but was rearranged and clarified. Generalized the requirements on the deactivation mechanism to insure that deactivated items have no adverse effect on the other software. **Added:** The development of deactivated code should comply with DO-178B.	**3**	**Lim**	ASE must ensure that deactivated code complies with DO-178C. This was not clear in DO-178B where some developers only were concerned with the development assurance of the deactivation mechanism. While there were substantial changes in the text, the remaining information mainly consolidated what was already in DO-178B.	
6.4.4.1	Requirements-Based Test Coverage Analysis		No Change	**Added:** Bullet Points: with 6.4.4.1.c and 6.4.4.1.d, Any test cases and procedures used to establish structural coverage must be traceable to requirements.	**1**	**Lim**	None, the ASEs were already requiring that structural coverage analysis be the result of requirements based tests cases. It is now explicitly defined in DO-178C	
7.0	SOFTWARE CONFIGURATION MANAGEMENT PROCESS		No Change	**Added:** Bullet Points: 7.0.a.-h. which came from the original 7.1.a.-h. and describes what the SCM process assists in while working in cooperation with other software life cycle processes.	**2**	**Lim**	None, sections 7.0 and 7.1 have been reorganized to make the presentation of objectives clearer but there is no change to the ASE activities.	
7.1	Software Configuration Management Process Objectives		No Change	**Moved:** Bullet Points: Moved the description of what the SCM process assists in, into section 7.0.a.-h. **Added:** Bullet Points: 7.1.a.-i. which describes what are the SCM process objectives .	**2**	**Lim**	None, sections 7.0 and 7.1 have been reorganized to make the presentation of objectives and activities clearer but there is no change to the ASE activities.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
7.2	Software Configuration Management Process Activities		No Change	**Added:** If software life cycle activities will be performed by a supplier, then configuration management activities should be applied to the supplier	**1**	**Lim**	The ASE will have to evaluate whether the developer has ensured that the objectives and activities for SCM have been satisfied by all of their suppliers as well.	
7.2.1	Configuration Identification		No Change	**Modified:** Extended the identification requirements in 7.2.1.e to include PDI files since they can be separate from the executable object code data item..	**1**	**Lim**	The ASE will have to ensure that the developer has CM records demonstrating that Separate PDI Files have configuration identification	
7.2.4	Change Control		No Change	**Editorial:** Moved objective related material to 7.1, constrained the recording, approval and tracking of changes only to those involved in creating a derivative baseline.	**1**	**Lim**	The ASE does not have to evaluate changes not related to those needed to create a derivative baseline. In other words, temporary or exploratory baselines are not under the purview of DO-178C	
7.2.7	Archive, Retrieval and Release		No Change	**Extended:** the identification requirements in in 7.2.7.d and 7.2.7.e to include PDI files since they can be separate from the executable object code data item..	**1**	**Lim**	The ASE will have to ensure that the developer has CM records demonstrating that separate PDI Files have configuration identification	
8.1	Software Quality Assurance Process Objectives		No Change	**Added:** Bullet: Software plans and standards are developed and reviewed for compliance with this document and for consistency	**1**	**Lim**	While this was a requirement under DO-178B it was vague as to what was required of the SQA person. The ASE should examine SQA records to determine that this objective has been satisfied. The SQA records may consist of a matrix mapping the plans and standards to DO-178C activities and objectives or it may just be a record stating the review has been accomplished. If it is the latter, the ASE should check the planning documents against a sample of the planning data identified herein and compare that with the conclusion provided in the SQA records.	
8.3	Software Conformity Review		No Change	**Modified bullet:** in 8.3.e, the PDI files in addition to the executable object code must be able to be regenerated from the archived source code.	**1**	**Lim**	The ASE needs to examine the conformity review records to determine if SQA did establish that the PDI files can be regenerated. Typically the ASE would also choose witness this activity.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
11.16	Software Configuration Index		No Change	**Added and modified:** Bullets describing what the SCI should Identify: --Procedures, methods, and tools for making modifications to the user-modifiable software, if any --Procedures and methods for loading the software into the target hardware. Added PDI to build instructions as well as requiring explicit identification of any PDI files used for the software project. Takeaway: SCI description now includes PDI information, User-modifiable software changes, loading instructions.	**2**	**Lim**	The ASE just needs to ensure that the SCI contains the addition items listed for 178C (11.16g PDI, 11.16j user modifiable related, 11.16k procedures for loading)	
11.17	Problem Reports		No Change	**Added:** more information under the problem description bullet: The problem description should contain sufficient detail to facilitate the assessment of the potential safety or functional effects of the problem.	**1**	**Lim**	ASE will need to scrutinize problem reports to ensure that sufficient details are included to analyze if there is any system impact.	
11.21	N/A		Trace Data	**Added:** Entire Section >> Explains what trace data is and that it should demonstrate bi-directional associations between the 6 bullet point items listed in that section.	**3**	**Lim**	Other than assuring that the developer has made all trace data as an identifiable software life cycle data item, the evaluation of the data hasn't changed from DO-178B	
11.22	N/A		Parameter Data Item File	**Added:** Entire Section >> Explains what a parameter data item file consists of	**3**	**Lim**	There is little actionable information in this section other than ensuring that the developer has identified each PDI file.	
12.0	ADDITIONAL CONSIDERATIONS		No Change	**Added:** The use of additional considerations and the proposed impact on the guidance provided in the other sections of this document should be agreed on a case-by-case basis with the certification authorities. **Deleted:** Removed formal methods as an additional consideration as formal methods now has its own supplement.	**2**	**Lim**	None, the section just makes explicit what already exists. And the removal of formal methods reduces the scope of additional considerations.	
12.1	Use of Previously Developed Software		No Change	**Added:** Unresolved Problem Reports associated with the previously developed software (PDS) should be evaluated for impact	**1**	**Lim**	IF PDS is used, the ASE should ensure that the developer has evaluated the impact of unresolved problem reports in the proposed environment.	
12.2.1	Qualification Criteria for Software Development Tools	**Deleted:** Entire Section in Version C	Determining if Tool Qualification is Needed	**Added:** information about tool qualification and the purpose of tool qualification (originally from section 12.2) Reworded and edited to improve clarity and be consistent with the use of DO-330 as the means of performing tool qualification. **Deleted:** Verification and Development tool categories were replaced with Tool Criteria of 12.2.2 and tool qualification levels in DO-330.	**3**	**Lim**	None, most of the impact has been moved to other sections.	
Annex A	PROCESS OBJECTIVES AND OUTPUTS BY SOFTWARE LEVEL		No Change	***Revised:*** (Completely revised.) Emphasized that tables not be used as a checklist and the full body of the document should be used to interpret the table	**2**	**Lim**	None, ASEs already used the paragraph references in the tables to understand the objectives. The references to activities for a specific objective are now included	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Annex B	N/A		Aeronautical Data	**Added:** Clarifies data covered by other guidance (e.g., DO-200A) from the data discussed internal to DO-178C (e.g., parameter data)	**1**	**Lim**	ASE should exclude data covered by other guidance from their DO-178C specific review.	
Annex B	N/A		Approved Source	**Added:** Provides clarity on where the data that is actually being approved can be found.	**1**	**Lim**	ASE should ensure the associated location is clearly identified in the project data.	
Annex B	N/A		Autocode Generator	**Added:** defines a specific type of tool for which explicit guidance is given.	**1**	**Lim**	ASE should ensure the use of an autocode generator is discussed along with the associated qualification effort in the Applicant's plans	
Annex B	Formal Methods		No Change	**Modified:** Added connection to a formal model	**2**	**Lim**	None - clarification to support supplements	
Annex B	Multiple-Version Dissimilar Software		No Change	**Modified:** Clarified definition and added example	**2**	**Lim**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	

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4.0 Changes grouped by amount of change to document

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.1	Information Flow Between System and Software Life Cycle Processes	**Moved to Section 2.2**	System Requirements Allocation to Software	**Added:** Entire section >> This section describes how system requirements are developed and where safety-related requirements result from. It also describes the system safety assessment process and requirements. Lastly, it lists the system requirements allocated to software (8 bullet points).	**3**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation.	
2.2.3	Software Level Determination	**Moved to Section 2.3.4**	Information Flow between Software Processes and Hardware Processes	**Added:** Entire Section. Describes how data is passed between the software and hardware life cycle process. **Added:** Bullet Points describing the type of data that is passed --All requirements, including derived requirements, needed for hardware/software integration --Instances where hardware and software verification activities require coordination --Identified incompatibilities between the hardware and the software. ***Take away:*** The specific data and associated content that should be passed between the software and hardware processes was added as well as consolidating the information from other sections of DO-178B related to hardware processes.	**3**	**Mod**	The ASE needs to evaluate the planning documents for planned interfaces and activities regarding the data flows specified in section 2.2.3. The ASE will also need to follow up during SOI reviews to ensure that the flows did occur and be alert to any changes that could require this to be re-evaluated.	
2.3	System Architectural Considerations	**Moved to Section 2.4**	System Safety Assessment Process and Software Level	**Added:** Entire Section >> This section provides a brief introduction to how the software level for software components is determined and how architectural considerations may influence the allocation of a software level.	**3**	**Lim**	None	
2.3.1	Partitioning	**Moved to Section 2.4.1**	Relationship between Software Errors and Failure Conditions	**Added:** Entire Section >> **Added:** Figure 2-2 which shows a sequence of events for software error leading to a failure condition at aircraft level **Added:** paragraphs describing figure 2-2	**3**	**Lim**	None	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.4.1	N/A		Partitioning	[Formerly Section 2.3.1] Reworded: Most of DO-178B's text. Clarified: Information on Partitioning between software components by consolidating the all of the issues into bullet points and removing ambiguous wording as needed. Extended the notion of partitioning to software components executing on different hardware platforms which extends the partitioning analysis to implementations such as multicore processors. ***Take away:*** While this doesn't add any new requirements for partitioning the guidance is now clearer and more detailed	**3**	**Lim**	None	
2.5.1	N/A		Parameter Data Items	**Added:** Entire Section >> Describes what a parameter data item comprises, what it contains, and what should be addressed.	**3**	**Sig**	ASE should read and understand this section as the information in this section forms the basis for the activities and objectives related to Parameter Data Items (PDI) in later section. This provides the technical basis for evaluating developer implementations of PDI.	
2.6	System Requirements Considerations for Software Verification	**Renamed**	System Considerations in Software Life Cycle Processes	**Added:** Credit may be taken from system life cycle processes for the satisfaction, or partial satisfaction, of the software objectives as defined in this document. In such cases, the system activities for which credit is being sought should be shown to meet the applicable objectives of this document with evidence of the completion of planned activities and their outputs identified as part of the software life cycle data.	**3**	**Sig**	The ASE may be required to examine system lifecycle that could be proposed to provide satisfaction of the activities and objectives in DO-178C. Even if the system data has been approved under ARP-4754, it will have to be evaluated against the criteria in DO-178C.	2.2.1
5.2.4	N/A		Designing for Deactivated Code	**Clarified:** Most of the material came from section 5.4.3 but was rearranged and clarified. Generalized the requirements on the deactivation mechanism to insure that deactivated items have no adverse effect on the other software. **Added:** The development of deactivated code should comply with DO-178B.	**3**	**Lim**	ASE must ensure that deactivated code complies with DO-178C. This was not clear in DO-178B where some developers only were concerned with the development assurance of the deactivation mechanism. While there were substantial changes in the text, the remaining information mainly consolidated what was already in DO-178B.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.4	Software Testing Process		Software Testing	**Edited:** Paragraph substantially reorganized: Content mostly the same - just easier to find stuff. **Added:** paragraph and bullet points: new 6.4.a.-6.4.e. Describes what software testing is used for and what the objectives are. Deleted bullet points: original 6.4.a.-6.4.d. about satisfying software testing objectives. **Deleted:** bullet points: about satisfying software testing objectives **Edited:** Reformatted Figure 6-1 and included missing items such as structural coverage resolution and annotated the drawing with the appropriate section references.	**3**	**Mod**	The changes to this section make the ASEs job easier than in DO-178B. The objectives are clearly identified and in one section instead of disguised in other sections of the document. Figure 6-1 now more clearly shows the relationship between the different test activities. The ASEs should use this section as an index into the rest of the testing guidance.	
6.5	N/A		Software Verification Process Traceability	**Added:** Entire Section >> New section. Describes what software verification process traceability activities include	**3**	**Mod**	The actual impact on the ASE activities is quite small and limited to ensuring that trace data is captured as a separate lifecycle data item. Trace data existed before but was not formally defined nor captured as a separate life cycle data item. It was part of verification data under DO-178B. Bidirectional traceability was already part of DO-178B but obscured and in practice was always evaluated in both directions.	
6.6	N/A		Verification of Parameter Data Items	**Added:** Entire Section >> Explains that if all of the following conditions are met, verification of a PDI can be conducted separately from the verification of the executable Object Code. Provides the criteria and activities needed to verify PDI files.	**3**	**Sig**	The ASE will have to determine if the PDI is intended to be verified independent of the operational software. If so, they will have to confirm that the developer can show that they met all the conditions in this section. Additionally the ASE will need to confirm that the developer has fulfilled all of the objectives listed for PDI in this section. The ASE should also ensure that the developer can show that they have processes that determine when changes to the PDI require reverification/modification of the executable object code.	
11.21	N/A		Trace Data	**Added:** Entire Section >> Explains what trace data is and that it should demonstrate bi-directional associations between the 6 bullet point items listed in that section.	**3**	**Lim**	Other than assuring that the developer has made all trace data as an identifiable software life cycle data item, the evaluation of the data hasn't changed from DO-178B	
11.22	N/A		Parameter Data Item File	**Added:** Entire Section >> Explains what a parameter data item file consists of	**3**	**Lim**	There is little actionable information in this section other than ensuring that the developer has identified each PDI file.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
12.2.1	Qualification Criteria for Software Development Tools	**Deleted:** Entire Section in Version C	Determining if Tool Qualification is Needed	**Added:** information about tool qualification and the purpose of tool qualification (originally from section 12.2) Reworded and edited to improve clarity and be consistent with the use of DO-330 as the means of performing tool qualification. **Deleted:** Verification and Development tool categories were replaced with Tool Criteria of 12.2.2 and tool qualification levels in DO-330.	**3**	**Lim**	None, most of the impact has been moved to other sections.	
12.2.2	Qualification Criteria for Software Verification Tools	**Deleted:** Entire Section in Version C	Determining the Tool Qualification Level	**Added:** Entire Section >> Describes what criteria needs to be met if a tool qualification is needed. **Added:** Table 12-1	**3**	**Sig**	The ASE will have to use the information in this section to validate that the developer has assigned the correct tool qualification level (TQL) to the tool based on its usage and the software level of the associated operational software.	
12.2.3	Tool Qualification Data	**Deleted:** Entire Section in Version C	Tool Qualification Process	**Added:** Entire Section >> The objectives, activities, guidance, and life cycle data required for each Tool Qualification Level are described in DO-330, "Software Tool Qualification Considerations."	**3**	**Sig**	The ASE will have to ensure that the developer has satisfied the objectives and activities related to tool qualification in DO-330 as well as verifying that all of the tool life cycle data has been produced per DO-330.	
12.3.4	Software Reliability Models	**Moved to Section 12.3.3**	Product Service history	**[Formerly Section 12.3.5]** **Deleted:** Bullet points about guidance for the use of product service history **Added:** paragraph to discuss that the use of service history data for certification credit is predicated upon sufficiency, relevance, and types of problems occurring during the service history period. The use, conditions of use, and results of software service history should be defined, assessed by the system processes, including the system safety assessment process, and submitted to the appropriate certification authority. Guidance for determining applicability of service history and the length of service history needed is presented below	**3**	**Sig**	There are some technical challenges in using product service history. This section was heavily modified to recognize some research done by the FAA. In addition to the technical disciplines involved, the revisions to this section are considerable. If an applicant chooses to make use of product service history, technical specialist should be involved.	
12.3.4.1	N/A		Relevance of Service History	**Added:** Entire Section >> Describes the steps in establishing the relevance of service history	**3**	**Sig**	See 12.3.4	
12.3.4.2	N/A		Sufficiency of Accumulated Service History	**Added:** Entire Section >> Describes what the required amount of service history is determined by	**3**	**Sig**	See 12.3.4	
12.3.4.3	N/A		Collection, Reporting, and Analysis of Problems Found During Service History	**Added:** Entire Section >> Describes the specific data to be collected from each recorded problem and how to address the completeness of the software's error history.	**3**	**Sig**	See 12.3.4	
12.3.4.4	N/A		Service History Information to be Included in the Plan for Software Aspects of Certification	**Added:** Entire Section >> Explains what items should be specified and agreed upon when seeking certification credit for service history.	**3**	**Sig**	See 12.3.4	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Annex B	N/A		Parameter Data Item	**Added:** Define new term in DO-178C	**3**	**Sig**	ASE should ensure Applicant has properly identified any such data as part of their system/software.	
Annex B	N/A		Parameter Data Item File	**Added:** Define new term in DO-178C	**3**	**Sig**	ASE should ensure data compliance tables clearly identify this new data item	
Annex B	N/A		Single Event Upset	**Added:** missing in DO-178B; needed to support discussion of emergent safety issue not directly considered in DO-178B	**3**	**Sig**	ASE should ensure SEU is considered by the Applicant; note that this consideration may be part of the hardware design.	
Annex B	N/A		Supplement	**Added:** Defines the new adjunct guidance introduced for a specific technology or method	**3**	**Sig**	ASE should ensure that an Applicant using a technology or method that is covered by a supplement is aware of the additional guidance in the supplement.	
1.1	Purpose		No Change	**Added Bullet Points:** Expanded the purpose description to be more comprehensive--Variations in the objectives, independence, software cycle data, and control categories by software level --Additional considerations (for example, previously developed software) that are applicable to certain applications --Definition of terms provided in the glossary --In addition to guidance, supporting information is provided to assist the reader's understanding. Beyond the inconsistent usage of the term guidance throughout the document, the real meaning of these terms was confusing. (They were not part of the DO-178B/ED-12B glossary. They are still not defined in the new glossary but, as will be seen below, the revisions to the text have cleared up the confusion.) Since "guidance" conveys a slightly stronger sense of obligation than "guidelines", the SCWG decided to use the term "guidance" for all the pieces of text that are considered as actual "recommendations" .To avoid confusion, it was also decided to replace the term "guidelines" (widely used in DO-178B/ED-12B) with "supporting information", whenever the text was more "information" oriented than "recommendation" oriented. These were cases where the primary intent was to help the reader to understand the context or the text itself. Hence, all the "notes" included in the text are not guidance. Also the complete DO-248/ED-94 document falls into the "supporting information" category, and not guidance. In summary, most of the occurrences of "guidelines" were replaced by "guidance", and the others by "supporting information". Though the glossary does not include definitions for the terms "guidance" and "supporting information"	**2**	**Lim**	None	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
1.4	How to Use This Document		No Change	**Added Bullet Points:** --Using this document requires that the applicant should satisfy all applicable objectives and providing oversight of all of its suppliers. --The applicant should plan a set of activities that satisfy the objectives and . --The applicant should address any additional considerations in its software plans and standards. --The applicant should perform the planned activities and provide evidence as indicated in section 11 to substantiate that the objectives have been satisfied. --discussion on when and how the supplements are to be used. As an example, one of the bullet points above that was added to this section, reinforces the point that activities are a major part of the overall guidance. Hence, while the Annex A tables in DO-178B/ED-12B refer only to the objectives, they now also include references to each activity. Accordingly, a specific review of DO-178B/ED-12B was performed in order to assess the completeness and consistency of the objectives and activities identification. The above added bullet points explain the main resulting modifications. ***Take away:*** These modifications address the increased focus on demonstrating satisfaction of activities as well as objectives (including submitting any alternative activities to the FAA), increased focus supplier ovrsight, and use of external supplements.	**2**	**Sig**	The ASE needs to examine the planning documents against the activities listed for the objectives to ensure that all the activities described in 178C are planned. If there are activities proposed that are different than in 178C, documentation requesting approval of these alternate activities from the FAA needs to exist. The impact of other changes to this section are addressed elsewhere in this tool.	
2.0 (Summary)	SYSTEM ASPECTS RELATING TO SOFTWARE DEVELOPMENT			***Section Summary:*** *Section substantially redone. Added more feedback paths between systems and software processes and clarified existing paths. Clarified the interaction between the systems and software processes. Paragraphs reorganized and moved to improve clarity and consistency. Introduced the concept of Parameter Data item. Definition of partitioning was expanded and clarified*	**2**	**N/A**	N/A	
2.0	SYSTEM ASPECTS RELATING TO SOFTWARE DEVELOPMENT		No Change	**Added:** The term "system" in the context of this document refers to the airborne system and equipment only, not to the wider definition of a system that might include operators, operational procedures, etc.	**2**	**Lim**	None	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.2	Failure Condition and Software Level	**Moved to Section 2.3**	Information Flow Between System and Software Life Cycle Processes	**[Formerly Section 2.1]** **Edited:** Made Changes and Reformatted Figure 2-1 **Added:** This information flow includes the system safety aspects.	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to watch for are explicit feedback from the systems process on derived requirements, verification activities for HW and SW requiring coordination.	
2.2.1	Failure Condition Categorization	**Moved to Section 2.3.2**	Information Flow from System Processes to Software Processes	**[Formerly Section 2.1.1]** **Deleted:** first two paragraphs and last paragraph. **Deleted:** Bullet Points: --Certification Requirements -- Software level(s) and data substantiating --If the system is a component of another system **Added:** Bullet Points detailing the data passed to the software life cycle processes by the system processes: **Added:** Any evidence provided by the system processes should be considered by the software processes to be Software Verification Results (e.g. System Level Tests used to meet DO-178C Table A6 testing objectives or A7 coverage objectives) ***Take away:*** DO-178C recognizes that verification data from systems processes can be used to satisfy DO-178C objectives and activities. Added the requirement for evidence of the systems processes review of software data (e.g. derived requirements).	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to watch for are explicit feedback from the systems process on derived requirements, verification activities for HW and SW requiring coordination.	

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2.2.2	Software Level Definitions	**Moved to Section 2.3.3**	Information Flow from Software Processes to System Processes	[Formerly Section 2.1.2] Deleted: Previous information in DO-178B Added: 2 paragraphs describing the software life cycle processes, what it analyzes, how it resolves issues, and how it makes data available to the system processes. Added: bullet points describing data that will facilitate analyses/evaluations: --Details of derived requirements --description of the software architecture --Evidence of system activities --Problem or change documentation --Any limitations of use --Configuration identification and any configuration status constraints -- Performance, timing, and accuracy characteristics -- Data to facilitate integration of the software into the system --Details of software verification activities proposed to be performed during system verification Take away: The specific data and associated content that should be passed to the system processes from the software processes were expanded and clarified.	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to assess is that there is explicit feedback from the systems process in response to SW process provided derived requirements, verification activities for HW and SW requiring coordination.	
2.5	System Design Considerations for Field - Loadable Software	**Moved to Section 2.5.5**	Software Considerations in System Life Cycle Processes	**Added:** Entire Section >> This section provides an overview of those software-related issues (not necessarily mutually exclusive) that should be considered, as appropriate, by the system life cycle processes	**2**	**Lim**	None	
2.5.2	N/A		User-Modifiable Software	**[Foremerly part of section 2.4, FAA order 8110.49 chapter 7]** **Modified:** Consolidated the information from section 2.4 and chapter 7 of FAA order 8110.49. Tied the classification of User-Modifiable software to the systems requirements.	**2**	**Lim**	While there was consolidation of information from order 8110.49 and other sections in DO-178B, the ASE will be performing identical to what was done in DO-178B and 8110.49	
4.0 (Summary)				***Section Summary:*** *PDI, supplier oversight, and known tool problems/limitations added to planning activities. Robustness to be included in standards.*	**2**	**N/A**	N/A	
4.2	Software Planning Process Activities		No Change	**Added:** Bullet Points --4.2.j. and 4.2.j.1.-4., --When parameter data items are planned, the following should be addressed: --The way that parameter data items are used --The software level of the parameter data items -- The processes to develop, verify, and modify parameter data items, and any associated tool qualification -- Software load control and compatibility **Added:** Bullet Points --Bullet Points: 4.2.k., --The software planning process should address any additional considerations that are applicable, and 4.2.l., --If software development activities will be performed by a supplier, planning should address supplier oversight.	**2**	**Sig**	The ASE will have to ensure that the planning documentation provides for the activities and satisfaction of objectives related to PDI as well as provisions for supplier oversight as applicable.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
4.5	Software Development Standards		No Change	**Added Bullet Point:** --4.5.d --Robustness should be considered in the software development standards. **Added Note:** If allocated to software by system requirements, practices to detect and control errors in stored data, and refresh and monitor hardware status and configuration may be used to mitigate single event upsets.	**2**	**Mod**	When reviewing the standards the ASE will have to establish that they address robustness. While it is obvious this will affect standards associated with verification, it may also affect requirements and coding.	
5.0 (Summary)				***Section Summary:*** *Using same requirements for HLR and LLR needs justification. More detail provided for the use of code generators, user modifiable software, and ensuring consistent data and control flow between components. The systems/software process interfaces covered in section have related sections here ensuring their implementation, Expanded to include PDI, explicit recognition of trace data and activities for deactivated code.*	**2**	**N/A**	N/A	
5.1.2	Software Requirements Process Activities		No Change	**Added:** Bullet Points --Derived high-level requirements and the reason for their existence should be defined --Derived high-level requirements should be provided to the system processes, including the system safety assessment process --If parameter data items are planned, the high-level requirements should describe how any parameter data item is used by the software. The high-level requirements should also specify their structure, the attributes for each of their data elements, and, when applicable, the value of each element. The values of the parameter data item elements should be consistent with the structure of the parameter data item and the attributes of its data elements Deleted: bullet point for traceability between system requirements and HLR (separate section added for all traceability)	**2**	**Sig**	The planning documentation should be examined to ensure that there are verification activities for any PDI to ensure that the HLRs specify how they are used, their structure, attributes of each data elements, values, and consistency between the structure of the PDI and its data elements. For example, do the review checklists have reviews for these items? The ASE should examine the standards for HLRs to ensure that derived HLRs have the attributes listed in this section (e.g. justification) and the planning documentation ensures that there is an activity for the delivery to the system processes. Likewise during the SOI reviews, the results of these activities will have to be examined.	
5.2.3	Designing for User-Modifiable Software		No Change	**Added: --T**he software level of the protection between the user modifiable software and the non modifiable software should be the same level as non modifiable software. If protection is provided by a tool the tool is categorized and qualified as defined in section 12.2.	**2**	**Mod**	If software protection is used, the ASE should examine the plans to verify that the software level of the protection is the same level as the non modifiable software. Or if or if a tool is used for the protection that the tool is qualified to the appropriate TQL.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
5.3.2	Software Coding Process Activities		No Change	**Deleted** Bullet Point: --The Source Code should be traceable to the Design Description (separate section added for all traceability); Also the wording implying that compilation is part of the coding process was removed. Added Bullet Point: --Use of autocode generators should conform to the constraints defined in the planning process	**2**	**Mod**	The ASE should ensure that the planning has verification activities and data that ensure that use of autocode generators comply with any constraints identified in the process governing use of these autocode generators. If the autocode generator is qualified, the constraints should come from the tool qualification data	
5.4.2	Integration Process Activities		No Change	**Added:** Bullet Points: --Any Parameter Data Item File should be generated --The software should be loaded into the target computer for hardware/software integration **Moved:** Merged handling of patches frome DO-178B section 5.4.3 into this section.	**2**	**Sig**	The ASE will have to ensure that PDI files are part of the integration processes in the plans and in the actual integration process. The lifecycle data should show explicit integration of PDI files.	
5.5	Traceability		Software Development Process Traceability	**Extensively revised** Entire Section >> Describes what software development process traceability activities include as well as clarifying that traceability is bidirectional; introduced trace data as a new life cycle data item.	**2**	**Mod**	While this section was extensively revised, the actual impact on the ASE activities is quite small and limited to ensuring that trace data is captured as a separate lifecycle data item. Bidirectional traceability was already part of DO-178B but obscured and in practice was always evaluated in both directions.	
6.0 (Summary)	SOFTWARE VERIFICATION PROCESS			***Section Summary:*** ***Traceability has its own section and most of the traceability in DO-178B has been moved into this section and clarified. The verification activities and objectives (including testing) for PDI was added. Robustness testing is now a direct product of robustness specifications in requirements. Attention was focused on communication between software components of different software levels. Clarified that all testing is to be requirements based. Added two categories of deactivated code with regards and associated test criteria.***	**2**	**N/A**		
6.2	Software Verification Process Activities		Overview of Software Verification Process Activities	**Deleted:** Bullet Points: for requirements and verification of software requirements related to traceability (separate section added for all traceability) and the bullet points for guidance for the software verification activities related to traceability (separate section added for all traceability). **Added:** new bullet points for software verification considerations including reverification considerations (extracted from DO-0248B) and clarification of verification independence	**2**	**Mod**	The ASE will have to ensure that the DO-178C clarifications of verification independence Is being used by the developer. This is especially important when looking at low level requirements (LLR) based test cases. The LLR test cases cannot be developed by the same person who coded those LLRs.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.4.2	Requirements-Based Test Case Selection		Requirements-Based Test Selection	**Added:** Note: Robustness test cases are requirements-based. The robustness testing criteria cannot be fully satisfied if the software requirements do not specify the correct software response to abnormal conditions and inputs. The test cases may reveal inadequacies in the software requirements, in which case the software requirements should be modified. Conversely, if a complete set of requirements exists that covers all abnormal conditions and inputs, the robustness test cases will follow from those software requirements **Added:** Bullet Point: To section 6.4.2.3 - Test procedures are generated from the test cases	**2**	**Mod**	The ASE will need to ensure that the developer of high and low level requirements now includes responses to abnormal conditions. Additionally, tests written against those abnormal conditions are now considered robustness requirements tests. In DO-178B some interpretations would consider requirements that specified behavior under all conditions complete requirements and the associated test cases would have been considered normal range tests. DO-178C removes this ambiguity.	
6.4.4	Test Coverage Analysis		No Change	**Reorganized:** This entire section and its sub paragraphs were substantially reorganized to explicitly identify the objectives as separate from the activities. The basic content has not changed. **Added Bullet Points:** with 6.4.4.a.-d. discussing objectives for test coverage	**2**	**Lim**	None	
6.4.4.3	Structural Coverage Analysis Resolution		No Change	**Edited:** Renamed a bullet point (6.4.4.3.c) and added additional information about extraneous code to it. **Added:** Expansion on the discussion of the two different categories of deactivated code. Added the term extraneous code which is a superset of dead code. Dead code is there due to design errors. Extraneous is any code that is not traceable to a system or software requirement and includes dead code. **Added:** Also extended the structural coverage analysis resolution to the interfaces between components (data and control coupling) that was not exercised as part of the testing activity.	**2**	**Mod**	The ASE must ensure that the developer has properly categorized code detected by structural coverage analysis into the proper categories defined in this section and the glossary. The ASE must also ensure that the structural coverage analysis resolution includes an deficiences found as part of the data and control coupling coverage results.	Glossary (dead code, extraneous code, deactivated code)
7.0 (Summary)	SOFTWARE CONFIGURATION MANAGEMENT PROCESS			***Section Summary:*** *The main changes were adding clarification for extending the SCM processes and oversight to supplier and recognizing PDI as a configuration item. Also added the effect on the system process to the change impact analysis.*	**2**	**N/A**		
7.0	SOFTWARE CONFIGURATION MANAGEMENT PROCESS		No Change	**Added:** Bullet Points: 7.0.a.-h. which came from the original 7.1.a.-h. and describes what the SCM process assists in while working in cooperation with other software life cycle processes.	**2**	**Lim**	None, sections 7.0 and 7.1 have been reorganized to make the presentation of objectives clearer but there is no change to the ASE activities.	
7.1	Software Configuration Management Process Objectives		No Change	**Moved:** Bullet Points: Moved the description of what the SCM process assists in, into section 7.0.a.-h. **Added:** Bullet Points: 7.1.a.-i. which describes what are the SCM process objectives .	**2**	**Lim**	None, sections 7.0 and 7.1 have been reorganized to make the presentation of objectives and activities clearer but there is no change to the ASE activities.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
7.2.5	Change Review		No Change	**Editorial:** Moved objective related material to 7.1 Added: change impact assessment must include the impact on the system requirements and feedback is required to be provided to the system processes. Any responses to this feedback needs to be assessed by the software process.	**2**	**Mod**	The ASE must ensure that the developer has a process that evaluates all software changes for impact on the system requirements and the means for ensuring two way information flow between the systems process and the software process for any changes impacting the system requirements. Additionally the ASE should look for data to support that the process is being implemented.	
9.0	CERTIFICATION LIAISON PROCESS		No Change	**Rearranged:** Rearranged paragraph into easy to read bullets. **Added:** Bullets to the objectives of the certification liaison process: --Gain agreement on the means of compliance through approval of the Plan for Software Aspects of Certification --Provide compliance substantiation	**2**	**Mod**	The ASE already uses the PSAC as a means of establishing agreement. In cases where the PSAC is being reviewed by the ASE, they will need to ensure that the changes identified within this document are captured by the PSAC as applicable to a specific applicant/developer.	
11.0	SOFTWARE LIFE CYCLE DATA		No Change	**Added:** Notes: --The applicant may package software life cycle data items in any manner the applicant finds convenient (for example, as individual data items or as a combined data item). --The term "data" refers to evidence and other information and does not imply the format such data should take.	**2**	**Lim**	None	
11.16	Software Configuration Index		No Change	**Added and modified:** Bullets describing what the SCI should Identify: --Procedures, methods, and tools for making modifications to the user-modifiable software, if any --Procedures and methods for loading the software into the target hardware. Added PDI to build instructions as well as requiring explicit identification of any PDI files used for the software project. Takeaway: SCI description now includes PDI information, User-modifiable software changes, loading instructions.	**2**	**Lim**	The ASE just needs to ensure that the SCI contains the addition items listed for 178C (11.16g PDI, 11.16j user modifiable related, 11.16k procedures for loading)	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
11.20	Software Accomplishment Summary		No Change	**Added:** Bullet Points: --This section now needs to describe how supplier processes and outputs comply with plans and standards. **Modified:**F153The software status bullet has been modified to include a problem report summary which should includes a description of each problem and any associated errors, functional limitations, operational restrictions, potential adverse effect(s) on safety together with a justification for allowing the Problem Report to remain open, and details of any mitigating action that has been or needs to be carried out.	**2**	**Mod**	The ASE will need to examine the software status against the additional details listed in 11.20k (PDI, function limitations, justification for leaving problem reports open, etc.). Since this is basically a completed version of the PSAC, with the exception of 11.20k, the information unique to 178C should already be included. This leaves the ASE with only the task of assuring that all of the relevant PSAC material is in the SAS and any differences since the PSAC approval/acceptance have been included. This assumes that the PSAC, SAS, and SCI are being provided to the ASE.	
12.0 (Summary)	ADDITIONAL CONSIDERATIONS			***Section Summary:*** *With the publication of DO-330 the tool qualification section was drastically changed. Its main purpose is to establish tool qualification levels and invoke DO-330. The section on service history was drastically revised as well as the section change application development environment.*	**2**	**N/A**		
12.0	ADDITIONAL CONSIDERATIONS		No Change	**Added:** The use of additional considerations and the proposed impact on the guidance provided in the other sections of this document should be agreed on a case-by-case basis with the certification authorities. **Deleted:** Removed formal methods as an additional consideration as formal methods now has its own supplement.	**2**	**Lim**	None, the section just makes explicit what already exists. And the removal of formal methods reduces the scope of additional considerations.	
12.1.3	Change of Application or Development Environment		No Change	**Added:** Bullet Point to what activities include: --Using a different autocode generator or a different set of autocode generator options may change the Source Code or object code generated. The impact of any changes should be analyzed. **Added:** Bullet Points about when a different processor is used: --Software components that are new or will need to be modified as a result of changing the processor, including any modification for hardware/software integration. --Previous hardware/software integration tests that should be executed for the new application. It is expected that there will always be a minimal set of tests to be run. **Added:**F162Determine the software modules or interfaces that are new or will be modified to accommodate the changed hardware component --Determine the extent of reverification required.	**2**	**Mod**	The ASE needs to look for evidence that the developer has evaluated the effect on autocode generators especially the associated options that were used. The ASE will need to examine the effects of any processor or other hardware changes related to the impact on objectives, activities, and lifecycle data. Specifically, determine whether the applicant/developer has properly established which tests and analysis will have to be redone. The ASE will need to examine applicant data to ensure that they have analyzed any modules and interfaces that are either new or modified as a result of a hardware change.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
12.3	Alternative Methods		No Change	**Added:** information to bullet points about guidance for using alternative methods: --or the applicable supplement --One technique for presenting the rationale for using an alternative method is an assurance case, in which arguments are explicitly given to link the evidence to the claims of compliance with the system safety objectives.	**2**	**Mod**	The ASE will have to evaluate the developer rationale for using alternative methods. The use of an assurance case is recognized as a means of presenting this justification. This is a technique new to DO-178C and will generally require assistance from technical specialists to perform the evaluation.	
Appendix A	BACKGROUND OF DOCUMENT DO-178		BACKGROUND OF DO-178/ED-12 DOCUMENT	Completely revised	**2**	**Lim**	None	
Annex A	PROCESS OBJECTIVES AND OUTPUTS BY SOFTWARE LEVEL		No Change	***Revised:*** (Completely revised.) Emphasized that tables not be used as a checklist and the full body of the document should be used to interpret the table	**2**	**Lim**	None, ASEs already used the paragraph references in the tables to understand the objectives. The references to activities for a specific objective are now included	
Table A-2	Software Development Processes		No Change	**Added:** The objectives now includes supplying the derived HLR to the system and system safety process. PDI was added to the objective relating to being loaded into the target computer. Trace data was also added as an output. **Deleted:** Satisfaction of Objectives 4, 5, and 6 (LLR developed, Derived LLR developed, and source code developed, respectively) is no longer required for level D. The corresponding circles in the objective table were deleted. **Modified:** To be consistent with the rest of the document, corrected the CC categories for software architecture, Derived High level requirements, Low level requirements, and derived low level requirements from CC2 to CC1.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, that the derived HLR and LLR were provided to the System and system safety processes. Assessment that Trace Data was produced and PDI file(s), if any, was produced as an output and loaded into the target computer.	
Table A-5	Verification of Outputs of Software Coding & Integration Processes		No Change	**Added:** Activity references, two additional objectives for verification of PDI file and PDI file is correct and complete.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the **new** objective associated with PDI files.	
Table A-9	Software Quality Assurance Process		No Change	Added: Activity references, additional objective for assurance that software plans and standards are developed and reviewed for compliance with DO-178C and reviewed for consistency between plans, Split the DO-178B objective stating software life cycle processes comply with plans and standards into a separate objective related to plans and another objective devoted to standards.	**2**	**Mod**	The ASEs will have to assess whether: 1. the developer has evidence showing compliance with all the activities listed, 2: The SQA organization has evidence of compliance with the objectives associated with plans and standards compliance with 178C.	
Annex B	Acronyms		No Change	**Modified:** Acronym list modified to reflect usage within DO-178C	**2**	**Mod**	None	

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Annex B	Certification Authority		No Change	**Modified:** Note 1 change: addition of APU type certification to ensure consistency with EASA Certification Specifications Note 2 addition: ensure consistency with regimen of delegated organizations and/or individuals	**2**	**Lim**	None	
Annex B	Deactivated Code		No Change	**Modified:** correct numerous misconceptions concerning what constitutes deactivate code	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	Dead Code		No Change	**Modified:** added a list of exceptions often mistaken for dead code	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	Derived Requirements		No Change	**Modified:** Makes the definition more precise by addressing functionality that goes beyond that specified in the higher-level requirements	**2**	**Mod**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	N/A		Extraneous Code	**Added:** Missing in DO-178B; added to clarify meaning	**2**	**Mod**	ASE will need to ensure that the applicant has processes to properly characterize the different types of dead and deactivated code and has properly done so.	
Annex B	Formal Methods		No Change	**Modified:** Added connection to a formal model	**2**	**Lim**	None - clarification to support supplements	
Annex B	Modified Condition/Decision Coverage		No Change	**Modified:** Added second form of condition independence (e.g. allows masking of logic as input to the MD/DC coverage)	**2**	**Lim**	The ASE is no able to except masking MC/DC in addition to unique MC/DC coverage.	
Annex B	Monitoring		No Change	**Modified:** Deleted definition associated with safety context; separate term added to address this - see safety monitoring	**2**	**Lim**	None	
Annex B	Multiple-Version Dissimilar Software		No Change	**Modified:** Clarified definition and added example	**2**	**Lim**	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	N/A		Trace Data	**Added:** Addresses a new data item introduced in DO-178C	**2**	**Mod**	ASE should ensure data compliance tables clearly identify this new data item	
1.0 (Summary)	INTRODUCTION			***Section Summary:*** *Introduced explicit recognition of outsourcing and associated oversight. Provided additional emphasis on activities and associated assurance. Included references to supplements to support specific techniques.*	**1**	**N/A**	N/A	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
1.2	Scope		No Change	**Clarification:** Extended the applicability to propellers and auxiliary power units. The decision for the classification of firmware into hardware or software was made a part of the systems allocation activity and not part of the DO-178C process.	1	Lim	The ASE needs to examine the systems allocation activity to determine if there is evidence and justification for the allocation of requirements between software and firmware. However it is no longer a software process responsibility.	
1.3	Relationship to Other Documents		No Change	**Added:** Any project specific standards need to be an input to decisions when planning for supplier oversight	1	Lim	None	
1.5	Document Overview		No Change	**Edited:** Rearranged and Edited Figure 1-1.	1	Lim	None	
2.3.2	Multiple -Version Dissimilar Software	**Moved to Section 2.4.2**	Failure Condition Categorization	**[Formerly Section 2.2.1]** **Reformatted:** Took the Information from DO-178B and converted it into an easy to read chart adapting the defintions of the failure conditions categories of catastrophic, hazardous/severe major, major, and minor from other published guidance material.	1	Lim	NOTE: This section does not supersede the external guidance on failure condition definition and should not be relied up for interpretation of the different categories of failure codition. Consider the information within as only summary information only included as a convenience.	
2.3.3	Safety Monitoring	**Moved to Section 2.4.3**	Software Level Definition	**[Formerly Section 2.2.2]** **Added:** The applicant should always consider the appropriate certification guidance and system development considerations for categorizing the failure condition severity and the software level.	1	Lim	None	
2.3.4	N/A		Software Level Determination	**[Formerly Section 2.2.3]** **Deleted:** Last 4 paragraphs describing parallel implementation, serial implementation, software levels, and strategies that depart from the guidelines.	1	Lim	None	
2.4	System Considerations for User -Modifiable Software, Option-Selectable Software and Commercial Off-The-Shelf Software	**Moved to section 2.5**	Architectural Considerations	**Added:** Entire Section >> This section provides information on several architectural strategies that may limit the impact of failures, or detect failures and provide acceptable system responses to contain them. It also describes serial implementation.	1	Mod	None	
2.5.4	N/A	**Extracted from section 2.4**	Option-Selectable Software	**Inserted:** Collected sections from 2.4 relative to Option Selectable software and modified the references to be consistent with DO-178C.	1	Lim	None	4.2.h, 5.2.4, 6.4.4.3.d.2, Glossary (deactivated code)
2.5.5	N/A	**Moved from section 2.5**	Field-Loadable Software	**[Formerly Section 2.5]** Very minor wording changes - essentially no change	1	Lim	None	
2.5.6	N/A	**Moved from section 2.7**	Software Considerations in System Verification	**[Formerly Section 2.7]** **Deleted:** Last paragraph about coverage of code structure by system verification tests as it is addressed more generally in 2.2.1 and 2.6	1	Lim	None	
3.0	SOFTWARE LIFE CYCLE		No Change	Minor editorial changes	1	Lim	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
4.4.1	Software Development Environment		No Change	**Added:** Bullet Point: --Known tool problems and limitations should be assessed and those issues which can adversely affect airborne software should be addressed. **Modified:** Bullet point e regarding the examination of option features to include autocode generators	**1**	**Mod**	The ASE will have to make sure the developer has identified known tool problems and limitations. The ASE must then assess whether the developer has mitigation strategies for these.	
4.6	Review and Assurance of the Software Planning Process		Review of the Software Planning Process	**Modifed:** Changed Guidance to Activities for consistent terminology usage.	**1**	**Lim**	None	
5.0	SOFTWARE DEVELOPMENT PROCESSES		No Change	**Added:** Bullet Point --Software coding process. **Added:** Note - The applicant may be required to justify software development processes that produce a single level of requirements. Reformatted: Took the paragraph and broke it into easy to read bullet points. **Added:** Bullet Points --The specification of a periodic monitor's iteration rate when not specified by the system requirements allocated to software. --The addition of scaling limits when using fixed point arithmetic.	**1**	**Mod**	If the developer is proposing merging of high level and low level requirements, the ASE will find the justification and determine whether the reasoning supports a smooth transition between abstraction layers of system and the single level of requirements. Some indications where this may not be appropriate would be single system requirements tracing to an inordinately large number of merged high/low level requirements.	
5.1.1	Software Requirements Process Objectives		No Change	Small wording change in 5.2.1 b. Derived high level requirements are to be supplied to the system process as well as the safety analysis process	**1**	**Mod**	The ASE should ensure that the planning includes explicit transmittal of derived high level requirements to the system process in addition to the safety analysis process. During SOI reviews there should be reviewable evidence that this has occurred.	
5.2.1	Software Design Process Objectives		No Change	Small wording change in 5.2.1 b. Derived low level requirements are to be supplied to the system process as well as the safety analysis process	**1**	**Mod**	The ASE should ensure that the planning includes explicit transmittal of derived high level requirements to the system process in addition to the safety analysis process. During SOI reviews there should be reviewable evidence that this has occurred.	
5.2.2	Software Design Process Activities		No Change	**Added Bullet Point:** --Interfaces between software components, in the form of data flow and control flow, should be defined to be consistent between the components.	**1**	**Mod**	The planning documentation should be examined to ensure that there is a verification activity to ensure that data and control flow between components is consistent	
5.3	Software Coding Process		No Change	**Added:** Note - for the purpose of this document, compiling, linking, and loading are dealt with under the Integration Process (see 5.4)	**1**	**Lim**	None	
5.3.1	Software Coding Process Objectives		No Change	**Deleted:** part of a sentence- that is traceable, verifiable, consistent, and correctly implements to make the obejctive consistent with the Annex A tables.	**1**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.0	SOFTWARE VERIFICATION PROCESS		No Change	**Added:** a Reference for the verification of the outputs of the planning process **Added:** Bullet Point - Verification of Source Code	**1**	**Lim**	None	
6.1	Software Verification Process Objectives		Purpose of Software Verification	**Added:** Bullet Point - e. The Executable Object Code is robust with respect to the software requirements such that it can respond correctly to abnormal inputs and conditions. This makes it consistent with robustness tests being related to robust requirements. **Clarified:** related absence of unintended function to having the executable object code satisfying the the software requirements.	**1**	**Lim**	None	
6.3	Software Reviews and Analyses		No Change	**Added:** A paragraph that describes what to do when the verification objectives described in the section cannot be completely satisfied via reviews and analyses alone.	**1**	**Lim**	None	
6.3.3	Reviews and Analyses of the Software Architecture		No Change	**Added:** information to a bullet: If the interface is to a component of a lower software level, it should also be confirmed that the higher software level component has appropriate protection mechanisms in place to protect itself from potential erroneous inputs from the lower software level component. **Clarified:** Incorporated errata in the description of partitioning to eliminate confusion over whether DO-178B implied that breaches were tolerated.	**1**	**Mod**	The ASE will have to ensure that the developer has included in their review process of software architecture verification activities (e.g. via checklists or analysis) to ensure that there are protection mechanisms in place if the developers design incorporates communication between components of different software levels. During SOI reviews, the adequacy of this mechanism should also be evaluated.	
6.3.4	Reviews and Analyses of the Source Code		No Change	**Added:** information to bullet for accuracy and consistency of source code: The compiler (including its options), the linker (including its options), and some hardware features may have an impact on the worst-case execution timing and this impact should be assessed. Also added floating-point arithmetic as a consideration.	**1**	**Mod**	The ASE will have to evaluate the developers worst case execution analysis to determine if the effects of compiler, linker, and hardware have been included. The effects of developer selection of options should also be included in the analysis. (Note: while this might have been implicitly done under DO-178B (i.e. the design already incorporates these choices), now there will need to be explicit identification of the impacts). The ASE should evaluate whether the developers have accounted for inaccuracies due to floating point arithmetic errors.	
6.3.5	Reviews and Analyses of the Outputs of the Integration Process		No Change	**Added:** line and bullet: These review and analysis activities detect and report errors that may have been introduced during the integration process. The objective is to: a. Ensure that the outputs of the integration process are complete and correct. **Added:** Compiler warnings	**1**	**Mod**	The ASE will examine the outputs of the integration process to see how the developer addressed compiler warnings if there were any generated in the compilation of the delivered product.	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.4.2.1	Normal Range Test Cases		No Change	**Deleted:** Note - The note in DO-178B suggested that the developer could use MC/DC as a criterion for selecting a complete set of Logic tests.	**1**	**Mod**	The ASE needs to be aware that it is up to the developer to determine when adequate logic coverage of requirements is obtained and the ASE must determine if their approach is adequate. Unless another approach is provided by the developer and justified, the ASE will need to establish that all logic conditions and combination of those conditions have been tested.	
6.4.4.1	Requirements-Based Test Coverage Analysis		No Change	**Added:** Bullet Points: with 6.4.4.1.c and 6.4.4.1.d, Any test cases and procedures used to establish structural coverage must be traceable to requirements.	**1**	**Lim**	None, the ASEs were already requiring that structural coverage analysis be the result of requirements based tests cases. It is now explicitly defined in DO-178C	
6.4.4.2	Structural Coverage Analysis		No Change	**Added:** Note: Describes what "Additional code that is not directly traceable to Source Code Statements" entails. The interfaces between compoents as part of what must be exercised by the requirements based test. **Added:** Bullet Point: 6.4.4.2.d for Structural coverage analysis resolution but the guidance is deferred to section 6.4.4.3	**1**	**Mod**	The ASE can now accept structural coverage analysis that is based on the source code, object code, or executable object code. The text relating to test coverage of unexpected code generated by the compiler is now linked to objective 9 in table A-7 (previously incorrectly referred to as source to object code traceability). The ASE is now directed to look for test coverage of the data and control coupling between components - while this was a clarification, it was not consistently applied under DO-178B.	
7.2	Software Configuration Management Process Activities		No Change	**Added:** If software life cycle activities will be performed by a supplier, then configuration management activities should be applied to the supplier	**1**	**Lim**	The ASE will have to evaluate whether the developer has ensured that the objectives and activities for SCM have been satisfied by all of their suppliers as well.	
7.2.1	Configuration Identification		No Change	**Modified:** Extended the identification requirements in 7.2.1.e to include PDI files since they can be separate from the executable object code data item..	**1**	**Lim**	The ASE will have to ensure that the developer has CM records demonstrating that Separate PDI Files have configuration identification	
7.2.3	Problem Reporting, Tracking and Corrective Action		No Change	**Deleted Note:** The problem reporting and change control activities are related	**1**	**Lim**	none	
7.2.4	Change Control		No Change	**Editorial:** Moved objective related material to 7.1, constrained the recording, approval and tracking of changes only to those involved in creating a derivative baseline.	**1**	**Lim**	The ASE does not have to evaluate changes not related to those needed to create a derivative baseline. In other words, temporary or exploratory baselines are not under the purview of DO-178C	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
7.2.6	Configuration Status Accounting		No Change	**Editorial:** Moved objective related material to 7.1,	**1**	**Lim**	None	
7.2.7	Archive, Retrieval and Release		No Change	**Extended:** the identification requirements in in 7.2.7.d and 7.2.7.e to include PDI files since they can be separate from the executable object code data item..	**1**	**Lim**	The ASE will have to ensure that the developer has CM records demonstrating that separate PDI Files have configuration identification	
7.3	Data Control Categories		No Change	**Reformatted:** Table 7-1 is reformatted in a more user friendly way and corrected errors in references.	**1**	**Lim**	None	
7.4	N/A		Software Load Control	**[Formerly Section 7.2.8]** **Deleted Note:** about where to find additional guidance	**1**	**Lim**	None	
8.0 (Summary)	SOFTWARE QUALITY ASSURANCE PROCESS			***Section Summary:*** *Clarified SQA's responsibility for supplier oversight, added PDI as part of the regeneration review process,*	**1**	**N/A**		
8.1	Software Quality Assurance Process Objectives		No Change	**Added:** Bullet: Software plans and standards are developed and reviewed for compliance with this document and for consistency	**1**	**Lim**	While this was a requirement under DO-178B it was vague as to what was required of the SQA person. The ASE should examine SQA records to determine that this objective has been satisfied. The SQA records may consist of a matrix mapping the plans and standards to DO-178C activities and objectives or it may just be a record stating the review has been accomplished. If it is the latter, the ASE should check the planning documents against a sample of the planning data identified herein and compare that with the conclusion provided in the SQA records.	
8.2	Software Quality Assurance Process Activities		No Change	**Added:** Bullet: The SQA process should provide assurance that supplier processes and outputs comply with approved software plans and standards.	**1**	**Mod**	The ASE will have to evaluate whether the developer SQA has ensured that the supplier has complied with all of the SQA objectives and activities. This may be done by the developer providing the SQA process or delegated to the supplier SQA organization. In either case the processes used by the supplier need to be authorized by the developer and the developer SQA must have evidence of evaluating the SQA of the supplier.	
8.3	Software Conformity Review		No Change	**Modified bullet:** in 8.3.e, the PDI files in addition to the executable object code must be able to be regenerated from the archived source code.	**1**	**Lim**	The ASE needs to examine the conformity review records to determine if SQA did establish that the PDI files can be regenerated. Typically the ASE would also choose witness this activity.	
9.0 (Summary)	CERTIFICATION LIAISON PROCESS			***Section Summary:*** *Mostly minor changes and reorganization*	**1**	**N/A**		

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
10.0 (Summary)	OVERVIEW OF AIRCRAFT AND ENGINE CERTIFICATION			***Section Summary:*** *The title was changed and expanded descriptions of terminology.*	**1**	**N/A**		
10.0	OVERVIEW OF AIRCRAFT AND ENGINE CERTIFICATION		OVERVIEW OF CERTIFICATION PROCESS	**Added:** Describes the terms related to aircraft approval for flight with its associated equipment (i.e. Certification, approval, and qualification).	**1**	**Lim**	None	
11.0 (Summary)	SOFTWARE LIFE CYCLE DATA			***Section Summary:*** *Trace data and PDI files were added to the list of software lifecycle data. Changes to other life cycle data descriptions were made to accommodate the changes in the interaction between the system process and the software process, autocode generation, and supplier oversight. Also the problem reporting was clarified and enhanced.*	**1**	**N/A**		
11.1	Plan for Software Aspects of Certification		No Change	**Added:** Bullet: --Supplier oversight: This section describes the means of ensuring that supplier processes and outputs will comply with approved software plans and standards	**1**	**Sig**	The ASE will need to review the PSAC for the differences related to DO-178C identified above. This document can be used as a checklist or the ASE can create their own abbreviated checklist.	
11.2	Software Development Plan		No Change	**Modified:** bullet: --One bullet regarding programming languages, tools, compliers, linkers and loaders to be used became two separate bullets. Additionally, "coding method(s)" were added as well as, when applicable, options and constraints of autocode generators.	**1**	**Sig**	The ASE will need to review the PSAC for the differences related to DO-178C identified above.	
11.3	Software Verification Plan		No Change	**Clarification:** Changed reverification guidelines to reverification methods to be consistent with the use of guidance and guidelines elsewhere in the document.	**1**	**Lim**	None	
11.11	Source Code		No Change	**Clarified:** The description was changed to separate the data and activities that generate the object code from the description for the source code itself.	**1**	**Lim**	None	
11.14	Software Verification Results		No Change	**Added:** Any discrepancies found should be recorded and tracked via problem reporting. Additionally, evidence provided in support of the system processes' assessment of information provided by the software processes (see 2.2.1.f and 2.2.1.g) should be considered to be Software Verification Results.	**1**	**Mod**	The ASE should ensure that any discrepancies identified in verification results should have corresponding problem reports. The ASE will have to look for evidence, if appropriate to the project, for any information provided to the system processes as par of the software verification results.	
11.17	Problem Reports		No Change	**Added:** more information under the problem description bullet: The problem description should contain sufficient detail to facilitate the assessment of the potential safety or functional effects of the problem.	**1**	**Lim**	ASE will need to scrutinize problem reports to ensure that sufficient details are included to analyze if there is any system impact.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
12.1	Use of Previously Developed Software		No Change	**Added:** Unresolved Problem Reports associated with the previously developed software (PDS) should be evaluated for impact	**1**	**Lim**	IF PDS is used, the ASE should ensure that the developer has evaluated the impact of unresolved problem reports in the proposed environment.	
12.3.2.1	N/A		Independence of Multiple-Version Dissimilar Software	**[Formerly Section 12.3.3.1]** **Added:** Note: Section 12.3.2.1 only addresses the subject of independence. Reduction of software levels is not discussed or intended.	**1**	**Lim**	None	
12.3.2.5	Multiple Simulators and Verification		No Change	**[Former Section 12.3.3.5]** Minor editorial changes	**1**	**Lim**	None	
Annex A (Summary)	PROCESS OBJECTIVES AND OUTPUTS BY SOFTWARE LEVEL			***Section Summary:*** *Activities were added as a separate column to the objective tables. Additional objectives were added for PDI, verification of executable object code not traceable to source code, and to recognize the interaction between the systems and software processes. The SQA table was rearranged and objectives split out to provide better clarity.*	**1**	**N/A**		
Table A-1	Software Planning Process		No Change	**Added:** Activity references Deleted: SQA records from the outputs of objectives 6 (plans compliance to 178C) and 7 (coordination of plans)	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-3	Verification of Outputs of Software Requirements Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-4	Verification of Outputs of Software Design Process		No Change	**Added:** Activity references **Modified:** Corrected paragraph references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-6	Testing of Outputs of Integration Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-7	Verification of Verification Process Results		No Change	**Added:** Activity references, extra objective for verification of additional executable object code that is not related directly to the source code. **Modified:** Output for objective 1 was corrected to read SW verification results.	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the objective associated verification of additional executable object code that is not related directly to the source code.	
Table A-8	Software Configuration Management Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-10	Certification Liaison Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Annex B (Summary)	Acronyms and Glossary of Terms (summary)		No Change	Updates to the glossary were made to move definitions from the text to a central glossary, as well as provide definitions for new or modified terms.	**1**	**N/A**	N/A	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Annex B	N/A		Activity	**Added:** Key aspect of DO-178C's structure including new reference columns in Annex A	**1**	**Lim**	None	
Annex B	N/A		Aeronautical Data	**Added:** Clarifies data covered by other guidance (e.g., DO-200A) from the data discussed internal to DO-178C (e.g., parameter data)	**1**	**Lim**	ASE should exclude data covered by other guidance from their DO-178C specific review.	
Annex B	N/A		Airborne	**Added:** provides clarity on domain being discussed.	**1**	**Lim**	None	
Annex B	N/A		Alternative Method	**Added:** moved definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Approved Source	**Added:** Provides clarity on where the data that is actually being approved can be found.	**1**	**Lim**	ASE should ensure the associated location is clearly identified in the project data.	
Annex B	N/A		Autocode Generator	**Added:** defines a specific type of tool for which explicit guidance is given.	**1**	**Lim**	ASE should ensure the use of an autocode generator is discussed along with the associated qualification effort in the Applicant's plans	
Annex B	N/A		Boolean Expression	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Boolean Operator	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Certification Liaison Process	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Compacted Expressions	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	Condition		No Change	**Modified:** Makes definition more precise by explicitly allowing for the unary operator.	**1**	**Lim**	None	
Annex B	Configuration Management		No Change	**Modified:** reformatted only	**1**	**Lim**	None	
Annex B	N/A		Control Category	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Embedded Identifier	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		End-to-end Numerical Resolution	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Equivalent Safety	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Executable Object Code	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	Failure Condition		No Change	**Modified:** Removed regulatory references unique to regulatory authorities	**1**	**Lim**	None	
Annex B	N/A		Integrity	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Objective	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Partitioning	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Previously Developed Software	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Reverification	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Safety Monitoring	**Added:** separated out from monitoring definition that appeared in DO-178B	**1**	**Lim**	None	
Annex B	N/A		Service Experience	**Added:** move definition from text to glossary.	**1**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Annex B	N/A		Service History Data	**Added:** distinguish the supporting data used to make a service history argument from the argument itself	**1**	**Lim**	None	
Annex B	N/A		Software Assurance	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Software Conformity Review	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Software Development Standards	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Software Level	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Structural Coverage Analysis	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Type Design	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		Unbounded Recursive Algorithm	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	N/A		User-Modifiable Software	**Added:** move definition from text to glossary.	**1**	**Lim**	None	

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5.0. Changes listed by DO-178C Section number

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
1.0 (Summary)	INTRODUCTION			***Section Summary:*** *Introduced explicit recognition of outsourcing and associated oversight. Provided additional emphasis on activities and associated assurance. Included references to supplements to support specific techniques.*	**1**	**N/A**	N/A	
1.0	INTRODUCTION		No Change	**No Change**	**0**	**N/A**	None	
1.1	Purpose		No Change	**Added Bullet Points:** Expanded the purpose description to be more comprehensive--Variations in the objectives, independence, software cycle data, and control categories by software level --Additional considerations (for example, previously developed software) that are applicable to certain applications --Definition of terms provided in the glossary --In addition to guidance, supporting information is provided to assist the reader's understanding. Beyond the inconsistent usage of the term guidance throughout the document, the real meaning of these terms was confusing. (They were not part of the DO-178B/ED-12B glossary. They are still not defined in the new glossary but, as will be seen below, the revisions to the text have cleared up the confusion.) Since "guidance" conveys a slightly stronger sense of obligation than "guidelines", the SCWG decided to use the term "guidance" for all the pieces of text that are considered as actual "recommendations" .To avoid confusion, it was also decided to replace the term "guidelines" (widely used in DO-178B/ED-12B) with "supporting information", whenever the text was more "information" oriented than "recommendation" oriented. These were cases where the primary intent was to help the reader to understand the context or the text itself. Hence, all the "notes" included in the text are not guidance. Also the complete DO-248/ED-94 document falls into the "supporting information" category, and not guidance. In summary, most of the occurrences of "guidelines" were replaced by "guidance", and the others by "supporting information". Though the glossary does not include definitions for the terms "guidance" and "supporting information"	**2**	**Lim**	None	
1.2	Scope		No Change	**Clarification:** Extended the applicability to propellers and auxiliary power units. The decision for the classification of firmware into hardware or software was made a part of the systems allocation activity and not part of the DO-178C process.	**1**	**Lim**	The ASE needs to examine the systems allocation activity to determine if there is evidence and justification for the allocation of requirements between software and firmware. However it is no longer a software process responsibility.	
1.3	Relationship to Other Documents		No Change	**Added:** Any project specific standards need to be an input to decisions when planning for supplier oversight	**1**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
1.4	How to Use This Document		No Change	**Added Bullet Points:** --Using this document requires that the applicant should satisfy all applicable objectives and providing oversight of all of its suppliers. --The applicant should plan a set of activities that satisfy the objectives and . --The applicant should address any additional considerations in its software plans and standards. --The applicant should perform the planned activities and provide evidence as indicated in section 11 to substantiate that the objectives have been satisfied. --discussion on when and how the supplements are to be used. As an example, one of the bullet points above that was added to this section, reinforces the point that activities are a major part of the overall guidance. Hence, while the Annex A tables in DO-178B/ED-12B refer only to the objectives, they now also include references to each activity. Accordingly, a specific review of DO-178B/ED-12B was performed in order to assess the completeness and consistency of the objectives and activities identification. The above added bullet points explain the main resulting modifications. ***Take away:*** These modifications address the increased focus on demonstrating satisfaction of activities as well as objectives (including submitting any alternative activities to the FAA), increased focus supplier ovrsight, and use of external supplements.	**2**	**Sig**	The ASE needs to examine the planning documents against the activities listed for the objectives to ensure that all the activities described in 178C are planned. If there are activities proposed that are different than in 178C, documentation requesting approval of these alternate activities from the FAA needs to exist. The impact of other changes to this section are addressed elsewhere in this tool.	
1.5	Document Overview		No Change	**Edited:** Rearranged and Edited Figure 1-1.	**1**	**Lim**	None	
2.0 (Summary)	SYSTEM ASPECTS RELATING TO SOFTWARE DEVELOPMENT			***Section Summary:*** *Section substantially redone. Added more feedback paths between systems and software processes and clarified existing paths. Clarified the interaction between the systems and software processes. Paragraphs reorganized and moved to improve clarity and consistency. Introduced the concept of Parameter Data item. Definition of partitioning was expanded and clarified*	**2**	**N/A**	N/A	
2.0	SYSTEM ASPECTS RELATING TO SOFTWARE DEVELOPMENT		No Change	**Added:** The term "system" in the context of this document refers to the airborne system and equipment only, not to the wider definition of a system that might include operators, operational procedures, etc.	**2**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.1	Information Flow Between System and Software Life Cycle Processes	**Moved to Section 2.2**	System Requirements Allocation to Software	**Added:** Entire section >> This section describes how system requirements are developed and where safety-related requirements result from. It also describes the system safety assessment process and requirements. Lastly, it lists the system requirements allocated to software (8 bullet points).	**3**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation.	
2.1.1	Information Flow from System Processes to Software Processes	**Moved to Section 2.2.1**	N/A	N/A	**N/A**	**N/A**		
2.1.2	Information Flow from Software Processes to System Processes	**Moved to Section 2.2.2**	N/A	N/A	**N/A**	**N/A**		
2.2	Failure Condition and Software Level	**Moved to Section 2.3**	Information Flow Between System and Software Life Cycle Processes	**[Formerly Section 2.1]** **Edited:** Made Changes and Reformatted Figure 2-1 **Added:** This information flow includes the system safety aspects.	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to watch for are explicit feedback from the systems process on derived requirements, verification activities for HW and SW requiring coordination.	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.2.1	Failure Condition Categorization	**Moved to Section 2.3.2**	Information Flow from System Processes to Software Processes	**[Formerly Section 2.1.1]** **Deleted:** first two paragraphs and last paragraph. **Deleted:** Bullet Points: --Certification Requirements --Software level(s) and data substantiating --If the system is a component of another system **Added:** Bullet Points detailing the data passed to the software life cycle processes by the system processes: **Added:** Any evidence provided by the system processes should be considered by the software processes to be Software Verification Results (e.g. System Level Tests used to meet DO-178C Table A6 testing objectives or A7 coverage objectives) ***Take away:*** DO-178C recognizes that verification data from systems processes can be used to satisfy DO-178C objectives and activities. Added the requirement for evidence of the systems processes review of software data (e.g. derived requirements).	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to watch for are explicit feedback from the systems process on derived requirements, verification activities for HW and SW requiring coordination.	
2.2.2	Software Level Definitions	**Moved to Section 2.3.3**	Information Flow from Software Processes to System Processes	[Formerly Section 2.1.2] Deleted: Previous information in DO-178B Added: 2 paragraphs describing the software life cycle processes, what it analyzes, how it resolves issues, and how it makes data available to the system processes. Added: bullet points describing data that will facilitate analyses/evaluations: --Details of derived requirements --description of the software architecture --Evidence of system activities --Problem or change documentation --Any limitations of use --Configuration identification and any configuration status constraints -- Performance, timing, and accuracy characteristics -- Data to facilitate integration of the software into the system --Details of software verification activities proposed to be performed during system verification Take away: The specific data and associated content that should be passed to the system processes from the software processes were expanded and clarified.	**2**	**Mod**	The ASE needs to ensure that the explicit communication of artifacts between the software and systems processes as summarized in Figure 2.1 and detailed in sections 2.2.1 and 2.2.2 has been accomplished and is part of the planning documentation. Any inputs from the system process should be tied to associated activities in the planning documents. Within DO-178B some of the documentation that needed to be communicated between the systems and software processes was explicitly described. However most of the necessary communication of documents was implicit and therefore what was actually required was open to interpretation. Some key items to assess is that there is explicit feedback from the systems process in response to SW process provided derived requirements, verification activities for HW and SW requiring coordination.	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.2.3	Software Level Determination	**Moved to Section 2.3.4**	Information Flow between Software Processes and Hardware Processes	**Added:** Entire Section. Describes how data is passed between the software and hardware life cycle process. **Added:** Bullet Points describing the type of data that is passed --All requirements, including derived requirements, needed for hardware/software integration --Instances where hardware and software verification activities require coordination --Identified incompatibilities between the hardware and the software. ***Take away:*** The specific data and associated content that should be passed between the software and hardware processes was added as well as consolidating the information from other sections of DO-178B related to hardware processes.	**3**	**Mod**	The ASE needs to evaluate the planning documents for planned interfaces and activities regarding the data flows specified in section 2.2.3. The ASE will also need to follow up during SOI reviews to ensure that the flows did occur and be alert to any changes that could require this to be re-evaluated.	
2.3	System Architectural Considerations	**Moved to Section 2.4**	System Safety Assessment Process and Software Level	**Added:** Entire Section >> This section provides a brief introduction to how the software level for software components is determined and how architectural considerations may influence the allocation of a software level.	**3**	**Lim**	None	
2.3.1	Partitioning	**Moved to Section 2.4.1**	Relationship between Software Errors and Failure Conditions	**Added:** Entire Section >> **Added:** Figure 2-2 which shows a sequence of events for software error leading to a failure condition at aircraft level **Added:** paragraphs describing figure 2-2	**3**	**Lim**	None	
2.3.2	Multiple -Version Dissimilar Software	**Moved to Section 2.4.2**	Failure Condition Categorization	**[Formerly Section 2.2.1]** **Reformatted:** Took the Information from DO-178B and converted it into an easy to read chart adapting the defintions of the failure conditions categories of catastrophic, hazardous/severe major, major, and minor from other published guidance material.	**1**	**Lim**	NOTE: This section does not supersede the external guidance on failure condition definition and should not be relied up for interpretation of the different categories of failure codition. Consider the information within as only summary information only included as a convenience.	
2.3.3	Safety Monitoring	**Moved to Section 2.4.3**	Software Level Definition	**[Formerly Section 2.2.2]** **Added:** The applicant should always consider the appropriate certification guidance and system development considerations for categorizing the failure condition severity and the software level.	**1**	**Lim**	None	
2.3.4	N/A		Software Level Determination	**[Formerly Section 2.2.3]** **Deleted:** Last 4 paragraphs describing parallel implementation, serial implementation, software levels, and strategies that depart from the guidelines.	**1**	**Lim**	None	
2.4	System Considerations for User -Modifiable Software, Option-Selectable Software and Commercial Off-The-Shelf Software	**Moved to section 2.5**	Architectural Considerations	**Added:** Entire Section >> This section provides information on several architectural strategies that may limit the impact of failures, or detect failures and provide acceptable system responses to contain them. It also describes serial implementation.	**1**	**Mod**	None	

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2.4.1	N/A		Partitioning	[Formerly Section 2.3.1] Reworded: Most of DO-178B's text. Clarified: Information on Partitioning between software components by consolidating the all of the issues into bullet points and removing ambiguous wording as needed. Extended the notion of partitioning to software components executing on different hardware platforms which extends the partitioning analysis to implementations such as multicore processors. ***Take away:*** While this doesn't add any new requirements for partitioning the guidance is now clearer and more detailed	**3**	**Lim**	None	
2.4.2	N/A		Multiple-Version Dissimilar Software	**[Formerly Section 2.3.2]**	**0**	**N/A**	None	
2.4.3	N/A		Safety Monitoring	**[Formerly Section 2.3.3]**	**0**	**N/A**	None	
2.5	System Design Considerations for Field - Loadable Software	**Moved to Section 2.5.5**	Software Considerations in System Life Cycle Processes	**Added:** Entire Section >> This section provides an overview of those software-related issues (not necessarily mutually exclusive) that should be considered, as appropriate, by the system life cycle processes	**2**	**Lim**	None	
2.5.1	N/A		Parameter Data Items	**Added:** Entire Section >> Describes what a parameter data item comprises, what it contains, and what should be addressed.	**3**	**Sig**	ASE should read and understand this section as the information in this section forms the basis for the activities and objectives related to Parameter Data Items (PDI) in later section. This provides the technical basis for evaluating developer implementations of PDI.	
2.5.2	N/A		User-Modifiable Software	**[Foremerly part of section 2.4, FAA order 8110.49 chapter 7]** **Modified:** Consolidated the information from section 2.4 and chapter 7 of FAA order 8110.49. Tied the classification of User-Modifiable software to the systems requirements.	**2**	**Lim**	While there was consolidation of information from order 8110.49 and other sections in DO-178B, the ASE will be performing identical to what was done in DO-178B and 8110.49	
2.5.3	N/A	**Moved from section 2.4.f and 2.4.g**	Commercial-Off-The-Shelf Software	Formerly section 2.4.e and 2.4.f	**0**	**N/A**	None	
2.5.4	N/A	**Extracted from section 2.4**	Option-Selectable Software	**Inserted:** Collected sections from 2.4 relative to Option Selectable software and modified the references to be consistent with DO-178C.	**1**	**Lim**	None	4.2.h, 5.2.4, 6.4.4.3.d.2, Glossary (deactivated code)
2.5.5	N/A	**Moved from section 2.5**	Field-Loadable Software	**[Formerly Section 2.5]** Very minor wording changes - essentially no change	**1**	**Lim**	None	
2.5.6	N/A	**Moved from section 2.7**	Software Considerations in System Verification	**[Formerly Section 2.7]** **Deleted:** Last paragraph about coverage of code structure by system verification tests as it is addressed more generally in 2.2.1 and 2.6	**1**	**Lim**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
2.6	System Requirements Considerations for Software Verification	**Renamed**	System Considerations in Software Life Cycle Processes	**Added:** Credit may be taken from system life cycle processes for the satisfaction, or partial satisfaction, of the software objectives as defined in this document. In such cases, the system activities for which credit is being sought should be shown to meet the applicable objectives of this document with evidence of the completion of planned activities and their outputs identified as part of the software life cycle data.	**3**	**Sig**	The ASE may be required to examine system lifecycle that could be proposed to provide satisfaction of the activities and objectives in DO-178C. Even if the system data has been approved under ARP-4754, it will have to be evaluated against the criteria in DO-178C.	2.2.1
2.7	Software Considerations in System Verification	**Merged with: Section 2.6**	N/A	**N/A**	**N/A**	**N/A**		
3.0 (Summary)	SOFTWARE LIFE CYCLE			***Section Summary:*** *Very minor editorial changes - nothing of significance*	**0**	**N/A**		
3.0	SOFTWARE LIFE CYCLE		No Change	Minor editorial changes	**1**	**Lim**	None	
3.1	Software Life Cycle Processes		No Change	**No Change**	**0**	**N/A**	None	
3.2	Software Life Cycle Definition		No Change	**No Change**	**0**	**N/A**	None	
3.3	Transition Criteria Between Processes		No Change	**No Change**	**0**	**N/A**	None	
4.0 (Summary)				***Section Summary:*** *PDI, supplier oversight, and known tool problems/limitations added to planning activities. Robustness to be included in standards.*	**2**	**N/A**	N/A	
4.0	SOFTWARE PLANNING PROCESS		No Change	**No Change**	**0**	**N/A**	None	
4.1	Software Planning Process Objectives		No Change	**No Change**	**0**	**N/A**	None	
4.2	Software Planning Process Activities		No Change	**Added:** Bullet Points --4.2.j. and 4.2.j.1.-4., --When parameter data items are planned, the following should be addressed: --The way that parameter data items are used --The software level of the parameter data items -- The processes to develop, verify, and modify parameter data items, and any associated tool qualification -- Software load control and compatibility **Added:** Bullet Points --Bullet Points: 4.2.k., --The software planning process should address any additional considerations that are applicable, and 4.2.l., --If software development activities will be performed by a supplier, planning should address supplier oversight.	**2**	**Sig**	The ASE will have to ensure that the planning documentation provides for the activities and satisfaction of objectives related to PDI as well as provisions for supplier oversight as applicable.	
4.3	Software Plans		No Change	**No Change**	**0**	**N/A**	None	
4.4	Software Life Cycle Environment Planning		No Change	**No Change**	**0**	**N/A**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
4.4.1	Software Development Environment		No Change	**Added:** Bullet Point: --Known tool problems and limitations should be assessed and those issues which can adversely affect airborne software should be addressed. **Modified:** Bullet point e regarding the examination of option features to include autocode generators	**1**	**Mod**	The ASE will have to make sure the developer has identified known tool problems and limitations. The ASE must then assess whether the developer has mitigation strategies for these.	
4.4.2	Language and Compiler Consideration		No Change	**No Change**	**0**	**N/A**	None	
4.4.3	Software Test Environment		No Change	**No Change**	**0**	**N/A**	None	
4.5	Software Development Standards		No Change	**Added Bullet Point:** --4.5.d --Robustness should be considered in the software development standards. **Added Note:** If allocated to software by system requirements, practices to detect and control errors in stored data, and refresh and monitor hardware status and configuration may be used to mitigate single event upsets.	**2**	**Mod**	When reviewing the standards the ASE will have to establish that they address robustness. While it is obvious this will affect standards associated with verification, it may also affect requirements and coding.	
4.6	Review and Assurance of the Software Planning Process		Review of the Software Planning Process	**Modifed:** Changed Guidance to Activities for consistent terminology usage.	**1**	**Lim**	None	
5.0 (Summary)				***Section Summary:*** *Using same requirements for HLR and LLR needs justification. More detail provided for the use of code generators, user modifiable software, and ensuring consistent data and control flow between components. The systems/software process interfaces covered in section have related sections here ensuring their implementation, Expanded to include PDI, explicit recognition of trace data and activities for deactivated code.*	**2**	**N/A**	N/A	
5.0	SOFTWARE DEVELOPMENT PROCESSES		No Change	**Added:** Bullet Point --Software coding process. **Added:** Note - The applicant may be required to justify software development processes that produce a single level of requirements. Reformatted: Took the paragraph and broke it into easy to read bullet points. **Added:** Bullet Points --The specification of a periodic monitor's iteration rate when not specified by the system requirements allocated to software. --The addition of scaling limits when using fixed point arithmetic.	**1**	**Mod**	If the developer is proposing merging of high level and low level requirements, the ASE will find the justification and determine whether the reasoning supports a smooth transition between abstraction layers of system and the single level of requirements. Some indications where this may not be appropriate would be single system requirements tracing to an inordinately large number of merged high/low level requirements.	
5.1	Software Requirements Process		No Change	**No Change**	**0**	**N/A**	None	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
5.1.1	Software Requirements Process Objectives		No Change	Small wording change in 5.2.1 b. Derived high level requirements are to be supplied to the system process as well as the safety analysis process	**1**	**Mod**	The ASE should ensure that the planning includes explicit transmittal of derived high level requirements to the system process in addition to the safety analysis process. During SOI reviews there should be reviewable evidence that this has occurred.	
5.1.2	Software Requirements Process Activities		No Change	**Added:** Bullet Points --Derived high-level requirements and the reason for their existence should be defined -- Derived high-level requirements should be provided to the system processes, including the system safety assessment process --If parameter data items are planned, the high-level requirements should describe how any parameter data item is used by the software. The high-level requirements should also specify their structure, the attributes for each of their data elements, and, when applicable, the value of each element. The values of the parameter data item elements should be consistent with the structure of the parameter data item and the attributes of its data elements Deleted: bullet point for traceability between system requirements and HLR (separate section added for all traceability)	**2**	**Sig**	The planning documentation should be examined to ensure that there are verification activities for any PDI to ensure that the HLRs specify how they are used, their structure, attributes of each data elements, values, and consistency between the structure of the PDI and its data elements. For example, do the review checklists have reviews for these items? The ASE should examine the standards for HLRs to ensure that derived HLRs have the attributes listed in this section (e.g. justification) and the planning documentation ensures that there is an activity for the delivery to the system processes. Likewise during the SOI reviews, the results of these activities will have to be examined.	
5.2	Software Design Process		No Change	**No Change**	**0**	**N/A**	None	
5.2.1	Software Design Process Objectives		No Change	Small wording change in 5.2.1 b. Derived low level requirements are to be supplied to the system process as well as the safety analysis process	**1**	**Mod**	The ASE should ensure that the planning includes explicit transmittal of derived high level requirements to the system process in addition to the safety analysis process. During SOI reviews there should be reviewable evidence that this has occurred.	
5.2.2	Software Design Process Activities		No Change	**Added Bullet Point:** --Interfaces between software components, in the form of data flow and control flow, should be defined to be consistent between the components.	**1**	**Mod**	The planning documentation should be examined to ensure that there is a verification activity to ensure that data and control flow between components is consistent	
5.2.3	Designing for User-Modifiable Software		No Change	**Added: --T**he software level of the protection between the user modifiable software and the non modifiable software should be the same level as non modifiable software. If protection is provided by a tool the tool is categorized and qualified as defined in section 12.2.	**2**	**Mod**	If software protection is used, the ASE should examine the plans to verify that the software level of the protection is the same level as the non modifiable software. Or if or if a tool is used for the protection that the tool is qualified to the appropriate TQL.	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
5.2.4	N/A		Designing for Deactivated Code	**Clarified:** Most of the material came from section 5.4.3 but was rearranged and clarified. Generalized the requirements on the deactivation mechanism to insure that deactivated items have no adverse effect on the other software. **Added:** The development of deactivated code should comply with DO-178B.	**3**	**Lim**	ASE must ensure that deactivated code complies with DO-178C. This was not clear in DO-178B where some developers only were concerned with the development assurance of the deactivation mechanism. While there were substantial changes in the text, the remaining information mainly consolidated what was already in DO-178B.	
5.3	Software Coding Process		No Change	**Added:** Note - for the purpose of this document, compiling, linking, and loading are dealt with under the Integration Process (see 5.4)	**1**	**Lim**	None	
5.3.1	Software Coding Process Objectives		No Change	**Deleted:** part of a sentence- that is traceable, verifiable, consistent, and correctly implements to make the obejctive consistent with the Annex A tables.	**1**	**Lim**	None	
5.3.2	Software Coding Process Activities		No Change	**Deleted** Bullet Point: --The Source Code should be traceable to the Design Description (separate section added for all traceability); Also the wording implying that compilation is part of the coding process was removed. Added Bullet Point: --Use of autocode generators should conform to the constraints defined in the planning process	**2**	**Mod**	The ASE should ensure that the planning has verification activities and data that ensure that use of autocode generators comply with any constraints identified in the process governing use of these autocode generators. If the autocode generator is qualified, the constraints should come from the tool qualification data	
5.4	Integration Process		No Change	**No Change**	**0**	**N/A**	None	
5.4.1	Integration Process Objectives		No Change	**Added:** The integration process now includes parameter data item files as described in 5.4.1a.	**2**	**Sig**	The ASE will have to ensure that PDI files are part of the integration processes in the plans and in the actual integration process will satisfy this objective.	
5.4.2	Integration Process Activities		No Change	**Added:** Bullet Points: --Any Parameter Data Item File should be generated --The software should be loaded into the target computer for hardware/software integration **Moved:** Merged handling of patches frome DO-178B section 5.4.3 into this section.	**2**	**Sig**	The ASE will have to ensure that PDI files are part of the integration processes in the plans and in the actual integration process. The lifecycle data should show explicit integration of PDI files.	
5.4.3	Integration Considerations	**Deleted section heading:** Merged contents with section 5.4.2 and 5.2.4 (deactivated code content)	N/A	N/A	**N/A**	**N/A**	N/A	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
5.5	Traceability		Software Development Process Traceability	**Extensively revised** Entire Section >> Describes what software development process traceability activities include as well as clarifying that traceability is bidirectional; introduced trace data as a new life cycle data item.	**2**	**Mod**	While this section was extensively revised, the actual impact on the ASE activities is quite small and limited to ensuring that trace data is captured as a separate lifecycle data item. Bidirectional traceability was already part of DO-178B but obscured and in practice was always evaluated in both directions.	
6.0 (Summary)	SOFTWARE VERIFICATION PROCESS			***Section Summary:*** ***Traceability has its own section and most of the traceability in DO-178B has been moved into this section and clarified. The verification activities and objectives (including testing) for PDI was added. Robustness testing is now a direct product of robustness specifications in requirements. Attention was focused on communication between software components of different software levels. Clarified that all testing is to be requirements based. Added two categories of deactivated code with regards and associated test criteria.***	**2**	**N/A**		
6.0	SOFTWARE VERIFICATION PROCESS		No Change	**Added:** a Reference for the verification of the outputs of the planning process **Added:** Bullet Point - Verification of Source Code	**1**	**Lim**	None	
6.1	Software Verification Process Objectives		Purpose of Software Verification	**Added:** Bullet Point - e. The Executable Object Code is robust with respect to the software requirements such that it can respond correctly to abnormal inputs and conditions. This makes it consistent with robustness tests being related to robust requirements. **Clarified:** related absence of unintended function to having the executable object code satisfying the the software requirements.	**1**	**Lim**	None	
6.2	Software Verification Process Activities		Overview of Software Verification Process Activities	**Deleted:** Bullet Points: for requirements and verification of software requirements related to traceability (separate section added for all traceability) and the bullet points for guidance for the software verification activities related to traceability (separate section added for all traceability). **Added:** new bullet points for software verification considerations including reverification considerations (extracted from DO-0248B) and clarification of verification independence	**2**	**Mod**	The ASE will have to ensure that the DO-178C clarifications of verification independence Is being used by the developer. This is especially important when looking at low level requirements (LLR) based test cases. The LLR test cases cannot be developed by the same person who coded those LLRs.	
6.3	Software Reviews and Analyses		No Change	**Added:** A paragraph that describes what to do when the verification objectives described in the section cannot be completely satisfied via reviews and analyses alone.	**1**	**Lim**	None	
6.3.1	Reviews and Analyses of the High-Level Requirements		No Change	**No Change**	**0**	**N/A**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.3.2	Reviews and Analyses of the Low -Level Requirements		No Change	**Modified:** Incorporated errata into 6.3.2.c by changing software requirements to low-level requirements. Also made some editing changes to provide consistent terminology	**1**	**Lim**	None	
6.3.3	Reviews and Analyses of the Software Architecture		No Change	**Added:** information to a bullet: If the interface is to a component of a lower software level, it should also be confirmed that the higher software level component has appropriate protection mechanisms in place to protect itself from potential erroneous inputs from the lower software level component. **Clarified:** Incorporated errata in the description of partitioning to eliminate confusion over whether DO-178B implied that breaches were tolerated.	**1**	**Mod**	The ASE will have to ensure that the developer has included in their review process of software architecture verification activities (e.g. via checklists or analysis) to ensure that there are protection mechanisms in place if the developers design incorporates communication between components of different software levels. During SOI reviews, the adequacy of this mechanism should also be evaluated.	
6.3.4	Reviews and Analyses of the Source Code		No Change	**Added:** information to bullet for accuracy and consistency of source code: The compiler (including its options), the linker (including its options), and some hardware features may have an impact on the worst-case execution timing and this impact should be assessed. Also added floating-point arithmetic as a consideration.	**1**	**Mod**	The ASE will have to evaluate the developers worst case execution analysis to determine if the effects of compiler, linker, and hardware have been included. The effects of developer selection of options should also be included in the analysis. (Note: while this might have been implicitly done under DO-178B (i.e. the design already incorporates these choices), now there will need to be explicit identification of the impacts). The ASE should evaluate whether the developers have accounted for inaccuracies due to floating point arithmetic errors.	
6.3.5	Reviews and Analyses of the Outputs of the Integration Process		No Change	**Added:** line and bullet: These review and analysis activities detect and report errors that may have been introduced during the integration process. The objective is to: a. Ensure that the outputs of the integration process are complete and correct. **Added:** Compiler warnings	**1**	**Mod**	The ASE will examine the outputs of the integration process to see how the developer addressed compiler warnings if there were any generated in the compilation of the delivered product.	
6.3.6	Reviews and Analyses of the Test Cases, Procedures and Results	**Moved to 6.4.5**	N/A	N/A	**N/A**	**N/A**	N/A	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.4	Software Testing Process		Software Testing	**Edited:** Paragraph substantially reorganized: Content mostly the same - just easier to find stuff. **Added:** paragraph and bullet points: new 6.4.a.-6.4.e. Describes what software testing is used for and what the objectives are. Deleted bullet points: original 6.4.a.-6.4.d. about satisfying software testing objectives. **Deleted:** bullet points: about satisfying software testing objectives **Edited:** Reformatted Figure 6-1 and included missing items such as structural coverage resolution and annotated the drawing with the appropriate section references.	**3**	**Mod**	The changes to this section make the ASEs job easier than in DO-178B. The objectives are clearly identified and in one section instead of disguised in other sections of the document. Figure 6-1 now more clearly shows the relationship between the different test activities. The ASEs should use this section as an index into the rest of the testing guidance.	
6.4.1	Test Environment		-	**Edited:** Improved the wording in the introductory paragraph to more strongly favor the target computer. "Guidance for the.." was changed to "Activities related to.." to ensure consistent use of the term "guidance".	**1**	**Lim**	None	
6.4.2	Requirements-Based Test Case Selection		Requirements-Based Test Selection	**Added:** Note: Robustness test cases are requirements-based. The robustness testing criteria cannot be fully satisfied if the software requirements do not specify the correct software response to abnormal conditions and inputs. The test cases may reveal inadequacies in the software requirements, in which case the software requirements should be modified. Conversely, if a complete set of requirements exists that covers all abnormal conditions and inputs, the robustness test cases will follow from those software requirements **Added:** Bullet Point: To section 6.4.2.3 - Test procedures are generated from the test cases	**2**	**Mod**	The ASE will need to ensure that the developer of high and low level requirements now includes responses to abnormal conditions. Additionally, tests written against those abnormal conditions are now considered robustness requirements tests. In DO-178B some interpretations would consider requirements that specified behavior under all conditions complete requirements and the associated test cases would have been considered normal range tests. DO-178C removes this ambiguity.	
6.4.2.1	Normal Range Test Cases		No Change	**Deleted:** Note - The note in DO-178B suggested that the developer could use MC/DC as a criterion for selecting a complete set of Logic tests.	**1**	**Mod**	The ASE needs to be aware that it is up to the developer to determine when adequate logic coverage of requirements is obtained and the ASE must determine if their approach is adequate. Unless another approach is provided by the developer and justified, the ASE will need to establish that all logic conditions and combination of those conditions have been tested.	
6.4.2.2	Robustness Test Cases		No Change	**No Change**	**0**	**N/A**	None	
6.4.3	Requirements-Based Testing Methods		No Change	**No Change**	**0**	**N/A**	None	

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6.4.4	Test Coverage Analysis		No Change	**Reorganized:** This entire section and its sub paragraphs were substantially reorganized to explicitly identify the objectives as separate from the activities. The basic content has not changed. **Added Bullet Points:** with 6.4.4.a.-d. discussing objectives for test coverage	**2**	**Lim**	None	
6.4.4.1	Requirements-Based Test Coverage Analysis		No Change	**Added:** Bullet Points: with 6.4.4.1.c and 6.4.4.1.d, Any test cases and procedures used to establish structural coverage must be traceable to requirements.	**1**	**Lim**	None, the ASEs were already requiring that structural coverage analysis be the result of requirements based tests cases. It is now explicitly defined in DO-178C	
6.4.4.2	Structural Coverage Analysis		No Change	**Added:** Note: Describes what "Additional code that is not directly traceable to Source Code Statements" entails. The interfaces between compoents as part of what must be exercised by the requirements based test. **Added:** Bullet Point: 6.4.4.2.d for Structural coverage analysis resolution but the guidance is deferred to section 6.4.4.3	**1**	**Mod**	The ASE can now accept structural coverage analysis that is based on the source code, object code, or executable object code. The text relating to test coverage of unexpected code generated by the compiler is now linked to objective 9 in table A-7 (previously incorrectly referred to as source to object code traceability). The ASE is now directed to look for test coverage of the data and control coupling between components - while this was a clarification, it was not consistently applied under DO-178B.	
6.4.4.3	Structural Coverage Analysis Resolution		No Change	**Edited:** Renamed a bullet point (6.4.4.3.c) and added additional information about extraneous code to it. **Added:** Expansion on the discussion of the two different categories of deactivated code. Added the term extraneous code which is a superset of dead code. Dead code is there due to design errors. Extraneous is any code that is not traceable to a system or software requirement and includes dead code. **Added:** Also extended the structural coverage analysis resolution to the interfaces between components (data and control coupling) that was not exercised as part of the testing activity.	**2**	**Mod**	The ASE must ensure that the developer has properly categorized code detected by structural coverage analysis into the proper categories defined in this section and the glossary. The ASE must also ensure that the structural coverage analysis resolution includes an deficiencies found as part of the data and control coupling coverage results.	Glossary (dead code, extraneous code, deactivated code)
6.4.5	N/A		Reviews and Analyses of Test Cases, Procedures, and Results	**Moved from 6.3.6 in DO-178B**	**0**	**N/A**	None	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
6.5	N/A		Software Verification Process Traceability	**Added:** Entire Section >> New section. Describes what software verification process traceability activities include	**3**	**Mod**	The actual impact on the ASE activities is quite small and limited to ensuring that trace data is captured as a separate lifecycle data item. Trace data existed before but was not formally defined nor captured as a separate life cycle data item. It was part of verification data under DO-178B. Bidirectional traceability was already part of DO-178B but obscured and in practice was always evaluated in both directions.	
6.6	N/A		Verification of Parameter Data Items	**Added:** Entire Section >> Explains that if all of the following conditions are met, verification of a PDI can be conducted separately from the verification of the executable Object Code. Provides the criteria and activities needed to verify PDI files.	**3**	**Sig**	The ASE will have to determine if the PDI is intended to be verified independent of the operational software. If so, they will have to confirm that the developer can show that they met all the conditions in this section. Additionally the ASE will need to confirm that the developer has fulfilled all of the objectives listed for PDI in this section. The ASE should also ensure that the developer can show that they have processes that determine when changes to the PDI require reverification/modification of the executable object code.	
7.0 (Summary)	SOFTWARE CONFIGURATION MANAGEMENT PROCESS			***Section Summary:*** *The main changes were adding clarification for extending the SCM processes and oversight to supplier and recognizing PDI as a configuration item. Also added the effect on the system process to the change impact analysis.*	**2**	**N/A**		
7.0	SOFTWARE CONFIGURATION MANAGEMENT PROCESS		No Change	**Added:** Bullet Points: 7.0.a.-h. which came from the original 7.1.a.-h. and describes what the SCM process assists in while working in cooperation with other software life cycle processes.	**2**	**Lim**	None, sections 7.0 and 7.1 have been reorganized to make the presentation of objectives clearer but there is no change to the ASE activities.	
7.1	Software Configuration Management Process Objectives		No Change	**Moved:** Bullet Points: Moved the description of what the SCM process assists in, into section 7.0.a.-h. **Added:** Bullet Points: 7.1.a.-i. which describes what are the SCM process objectives .	**2**	**Lim**	None, sections 7.0 and 7.1 have been reorganized to make the presentation of objectives and activities clearer but there is no change to the ASE activities.	
7.2	Software Configuration Management Process Activities		No Change	**Added:** If software life cycle activities will be performed by a supplier, then configuration management activities should be applied to the supplier	**1**	**Lim**	The ASE will have to evaluate whether the developer has ensured that the objectives and activities for SCM have been satisfied by all of their suppliers as well.	

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7.2.1	Configuration Identification		No Change	**Modified:** Extended the identification requirements in 7.2.1.e to include PDI files since they can be separate from the executable object code data item..	**1**	**Lim**	The ASE will have to ensure that the developer has CM records demonstrating that Separate PDI Files have configuration identification	
7.2.2	Baselines and Traceability		No Change	**No Change**	**0**	**N/A**	None	
7.2.3	Problem Reporting, Tracking and Corrective Action		No Change	**Deleted Note:** The problem reporting and change control activities are related	**1**	**Lim**	none	
7.2.4	Change Control		No Change	**Editorial:** Moved objective related material to 7.1, constrained the recording, approval and tracking of changes only to those involved in creating a derivative baseline.	**1**	**Lim**	The ASE does not have to evaluate changes not related to those needed to create a derivative baseline. In other words, temporary or exploratory baselines are not under the purview of DO-178C	
7.2.5	Change Review		No Change	**Editorial:** Moved objective related material to 7.1 Added: change impact assessment must include the impact on the system requirements and feedback is required to be provided to the system processes. Any responses to this feedback needs to be assessed by the software process.	**2**	**Mod**	The ASE must ensure that the developer has a process that evaluates all software changes for impact on the system requirements and the means for ensuring two way information flow between the systems process and the software process for any changes impacting the system requirements. Additionally the ASE should look for data to support that the process is being implemented.	
7.2.6	Configuration Status Accounting		No Change	**Editorial:** Moved objective related material to 7.1,	**1**	**Lim**	None	
7.2.7	Archive, Retrieval and Release		No Change	**Extended:** the identification requirements in in 7.2.7.d and 7.2.7.e to include PDI files since they can be separate from the executable object code data item..	**1**	**Lim**	The ASE will have to ensure that the developer has CM records demonstrating that separate PDI Files have configuration identification	
7.2.8	Software Load Control	**Moved to Section 7.4**	N/A	N/A	**N/A**	**N/A**	N/A	
7.2.9	Software Life Cycle Environment Control	**Moved to Section 7.5**	N/A	N/A	**N/A**	**N/A**	N/A	
7.3	Data Control Categories		No Change	**Reformatted:** Table 7-1 is reformatted in a more user friendly way and corrected errors in references.	**1**	**Lim**	None	
7.4	N/A		Software Load Control	**[Formerly Section 7.2.8]** **Deleted Note:** about where to find additional guidance	**1**	**Lim**	None	
7.5	N/A		Software Life Cycle Environment Control	**[Formerly Section 7.2.9]** **No Change**	**0**	**N/A**	None	
8.0 (Summary)	SOFTWARE QUALITY ASSURANCE PROCESS			***Section Summary:*** *Clarified SQA's responsibility for supplier oversight, added PDI as part of the regeneration review process,*	**1**	**N/A**		
8.0	SOFTWARE QUALITY ASSURANCE PROCESS		No Change	**No Change**	**0**	**N/A**	None	

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8.1	Software Quality Assurance Process Objectives		No Change	**Added:** Bullet: Software plans and standards are developed and reviewed for compliance with this document and for consistency	**1**	**Lim**	While this was a requirement under DO-178B it was vague as to what was required of the SQA person. The ASE should examine SQA records to determine that this objective has been satisfied. The SQA records may consist of a matrix mapping the plans and standards to DO-178C activities and objectives or it may just be a record stating the review has been accomplished. If it is the latter, the ASE should check the planning documents against a sample of the planning data identified herein and compare that with the conclusion provided in the SQA records.	
8.2	Software Quality Assurance Process Activities		No Change	**Added:** Bullet: The SQA process should provide assurance that supplier processes and outputs comply with approved software plans and standards.	**1**	**Mod**	The ASE will have to evaluate whether the developer SQA has ensured that the supplier has complied with all of the SQA objectives and activities. This may be done by the developer providing the SQA process or delegated to the supplier SQA organization. In either case the processes used by the supplier need to be authorized by the developer and the developer SQA must have evidence of evaluating the SQA of the supplier.	
8.3	Software Conformity Review		No Change	**Modified bullet:** in 8.3.e, the PDI files in addition to the executable object code must be able to be regenerated from the archived source code.	**1**	**Lim**	The ASE needs to examine the conformity review records to determine if SQA did establish that the PDI files can be regenerated. Typically the ASE would also choose witness this activity.	
9.0 (Summary)	CERTIFICATION LIAISON PROCESS			***Section Summary:*** *Mostly minor changes and reorganization*	**1**	**N/A**		
9.0	CERTIFICATION LIAISON PROCESS		No Change	**Rearranged:** Rearranged paragraph into easy to read bullets. **Added:** Bullets to the objectives of the certification liaison process: --Gain agreement on the means of compliance through approval of the Plan for Software Aspects of Certification --Provide compliance substantiation	**2**	**Mod**	The ASE already uses the PSAC as a means of establishing agreement. In cases where the PSAC is being reviewed by the ASE, they will need to ensure that the changes identified within this document are captured by the PSAC as applicable to a specific applicant/developer.	
9.1	Means of Compliance and Planning		No Change	**No Change**	**0**	**N/A**	None	
9.2	Compliance Substantiation		No Change	**No Change**	**0**	**N/A**	None	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
9.3	Minimum Software Life Cycle Data That Is Submitted to Certification Authority		No Change	No Change	0	N/A	None	
9.4	Software Life Cycle Data Related to Type Design		No Change	No Change	0	N/A	None	
10.0 (Summary)	OVERVIEW OF AIRCRAFT AND ENGINE CERTIFICATION			***Section Summary:*** *The title was changed and expanded descriptions of terminology.*	1	N/A		
10.0	OVERVIEW OF AIRCRAFT AND ENGINE CERTIFICATION		OVERVIEW OF CERTIFICATION PROCESS	**Added:** Describes the terms related to aircraft approval for flight with its associated equipment (i.e. Certification, approval, and qualification).	1	Lim	None	
10.1	Certification Basis		No Change	No Change	0	N/A	None	
10.2	Software Aspects of Certification		No Change	No Change	0	N/A	None	
10.3	Compliance Determination		No Change	No Change	0	N/A	None	
11.0 (Summary)	SOFTWARE LIFE CYCLE DATA			***Section Summary:*** *Trace data and PDI files were added to the list of software lifecycle data. Changes to other life cycle data descriptions were made to accommodate the changes in the interaction between the system process and the software process, autocode generation, and supplier oversight. Also the problem reporting was clarified and enhanced.*	1	N/A		
11.0	SOFTWARE LIFE CYCLE DATA		No Change	**Added:** Notes: --The applicant may package software life cycle data items in any manner the applicant finds convenient (for example, as individual data items or as a combined data item). --The term "data" refers to evidence and other information and does not imply the format such data should take.	2	Lim	None	
11.1	Plan for Software Aspects of Certification		No Change	**Added:** Bullet: --Supplier oversight: This section describes the means of ensuring that supplier processes and outputs will comply with approved software plans and standards	1	Sig	The ASE will need to review the PSAC for the differences related to DO-178C identified above. This document can be used as a checklist or the ASE can create their own abbreviated checklist.	
11.2	Software Development Plan		No Change	**Modified:** bullet: --One bullet regarding programming languages, tools, compliers, linkers and loaders to be used became two separate bullets. Additionally, "coding method(s)" were added as well as, when applicable, options and constraints of autocode generators.	1	Sig	The ASE will need to review the PSAC for the differences related to DO-178C identified above.	
11.3	Software Verification Plan		No Change	**Clarification:** Changed reverification guidelines to reverification methods to be consistent with the use of guidance and guidelines elsewhere in the document.	1	Lim	None	
11.4	Software Configuration Management Plan		No Change	No Change	0	N/A	None	

All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
11.5	Software Quality Assurance Plan		No Change	No Change	0	N/A	None	
11.6	Software Requirements Standards		No Change	No Change	0	N/A	None	
11.7	Software Design Standards		No Change	No Change	0	N/A	None	
11.8	Software Code Standards		No Change	No Change	0	N/A	None	
11.9	Software Requirements Data		No Change	No Change	0	N/A	None	
11.10	Design Description		No Change	No Change	0	N/A	None	
11.11	Source Code		No Change	**Clarified:** The description was changed to separate the data and activities that generate the object code from the description for the source code itself.	1	Lim	None	
11.12	Executable Object Code		No Change	No Change	0	N/A	None	
11.13	Software Verification Cases and Procedures		No Change	No Change	0	N/A	None	
11.14	Software Verification Results		No Change	**Added:** Any discrepancies found should be recorded and tracked via problem reporting. Additionally, evidence provided in support of the system processes' assessment of information provided by the software processes (see 2.2.1.f and 2.2.1.g) should be considered to be Software Verification Results.	1	Mod	The ASE should ensure that any discrepancies identified in verification results should have corresponding problem reports. The ASE will have to look for evidence, if appropriate to the project, for any information provided to the system processes as par of the software verification results.	
11.15	Software Life Cycle Environment Configuration Index		No Change	No Change	0	N/A	None	
11.16	Software Configuration Index		No Change	**Added and modified:** Bullets describing what the SCI should Identify: --Procedures, methods, and tools for making modifications to the user-modifiable software, if any --Procedures and methods for loading the software into the target hardware. Added PDI to build instructions as well as requiring explicit identification of any PDI files used for the software project. Takeaway: SCI description now includes PDI information, User-modifiable software changes, loading instructions.	2	Lim	The ASE just needs to ensure that the SCI contains the addition items listed for 178C (11.16g PDI, 11.16j user modifiable related, 11.16k procedures for loading)	
11.17	Problem Reports		No Change	**Added:** more information under the problem description bullet: The problem description should contain sufficient detail to facilitate the assessment of the potential safety or functional effects of the problem.	1	Lim	ASE will need to scrutinize problem reports to ensure that sufficient details are included to analyze if there is any system impact.	
11.18	Software Configuration Management Records		No Change	No Change	0	N/A	None	
11.19	Software Quality Assurance Records		No Change	No Change	0	N/A	None	

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11.20	Software Accomplishment Summary		No Change	**Added:** Bullet Points: --This section now needs to describe how supplier processes and outputs comply with plans and standards. **Modified:**F153The software status bullet has been modified to include a problem report summary which should includes a description of each problem and any associated errors, functional limitations, operational restrictions, potential adverse effect(s) on safety together with a justification for allowing the Problem Report to remain open, and details of any mitigating action that has been or needs to be carried out.	**2**	**Mod**	The ASE will need to examine the software status against the additional details listed in 11.20k (PDI, function limitations, justification for leaving problem reports open, etc.). Since this is basically a completed version of the PSAC, with the exception of 11.20k, the information unique to 178C should already be included. This leaves the ASE with only the task of assuring that all of the relevant PSAC material is in the SAS and any differences since the PSAC approval/acceptance have been included. This assumes that the PSAC, SAS, and SCI are being provided to the ASE.	
11.21	N/A		Trace Data	**Added:** Entire Section >> Explains what trace data is and that it should demonstrate bi-directional associations between the 6 bullet point items listed in that section.	**3**	**Lim**	Other than assuring that the developer has made all trace data as an identifiable software life cycle data item, the evaluation of the data hasn't changed from DO-178B	
11.22	N/A		Parameter Data Item File	**Added:** Entire Section >> Explains what a parameter data item file consists of	**3**	**Lim**	There is little actionable information in this section other than ensuring that the developer has identified each PDI file.	
12.0 (Summary)	ADDITIONAL CONSIDERATIONS			***Section Summary:*** *With the publication of DO-330 the tool qualification section was drastically changed. Its main purpose is to establish tool qualification levels and invoke DO-330. The section on service history was drastically revised as well as the section change application development environment.*	**2**	**N/A**		
12.0	ADDITIONAL CONSIDERATIONS		No Change	**Added:** The use of additional considerations and the proposed impact on the guidance provided in the other sections of this document should be agreed on a case-by-case basis with the certification authorities. **Deleted:** Removed formal methods as an additional consideration as formal methods now has its own supplement.	**2**	**Lim**	None, the section just makes explicit what already exists. And the removal of formal methods reduces the scope of additional considerations.	
12.1	Use of Previously Developed Software		No Change	**Added:** Unresolved Problem Reports associated with the previously developed software (PDS) should be evaluated for impact	**1**	**Lim**	IF PDS is used, the ASE should ensure that the developer has evaluated the impact of unresolved problem reports in the proposed environment.	
12.1.1	Modifications to Previously Developed Software		No Change	**No Change**	**0**	**N/A**	None	
12.1.2	Change of Aircraft Installation		No Change	**No Change**	**0**	**N/A**	None	

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12.1.3	Change of Application or Development Environment		No Change	**Added:** Bullet Point to what activities include: --Using a different autocode generator or a different set of autocode generator options may change the Source Code or object code generated. The impact of any changes should be analyzed. **Added:** Bullet Points about when a different processor is used: --Software components that are new or will need to be modified as a result of changing the processor, including any modification for hardware/software integration. --Previous hardware/software integration tests that should be executed for the new application. It is expected that there will always be a minimal set of tests to be run. **Added:**F162Determine the software modules or interfaces that are new or will be modified to accommodate the changed hardware component -- Determine the extent of reverification required.	**2**	**Mod**	The ASE needs to look for evidence that the developer has evaluated the effect on autocode generators especially the associated options that were used. The ASE will need to examine the effects of any processor or other hardware changes related to the impact on objectives, activities, and lifecycle data. Specifically, determine whether the applicant/developer has properly established which tests and analysis will have to be redone. The ASE will need to examine applicant data to ensure that they have analyzed any modules and interfaces that are either new or modified as a result of a hardware change.	
12.1.4	Upgrading A Development Baseline		No Change	**No Change**	**0**	**N/A**	None	
12.1.5	Software Configuration Management Considerations		No Change	**No Change**	**0**	**N/A**	None	
12.1.6	Software Quality Assurance Considerations		No Change	**No Change**	**0**	**N/A**	None	
12.2	Tool Qualification	**Moved to section 12.2.1**	No Change	N/A	**N/A**	**N/A**	N/A	
12.2.1	Qualification Criteria for Software Development Tools	**Deleted:** Entire Section in Version C	Determining if Tool Qualification is Needed	**Added:** information about tool qualification and the purpose of tool qualification (originally from section 12.2) Reworded and edited to improve clarity and be consistent with the use of DO-330 as the means of performing tool qualification. **Deleted:** Verification and Development tool categories were replaced with Tool Criteria of 12.2.2 and tool qualification levels in DO-330.	**3**	**Lim**	None, most of the impact has been moved to other sections.	
12.2.2	Qualification Criteria for Software Verification Tools	**Deleted:** Entire Section in Version C	Determining the Tool Qualification Level	**Added:** Entire Section >> Describes what criteria needs to be met if a tool qualification is needed. **Added:** Table 12-1	**3**	**Sig**	The ASE will have to use the information in this section to validate that the developer has assigned the correct tool qualification level (TQL) to the tool based on its usage and the software level of the associated operational software.	
12.2.3	Tool Qualification Data	**Deleted:** Entire Section in Version C	Tool Qualification Process	**Added:** Entire Section >> The objectives, activities, guidance, and life cycle data required for each Tool Qualification Level are described in DO-330, "Software Tool Qualification Considerations."	**3**	**Sig**	The ASE will have to ensure that the developer has satisfied the objectives and activities related to tool qualification in DO-330 as well as verifying that all of the tool life cycle data has been produced per DO-330.	

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12.2.3.1	Tool Qualification Plan	**Deleted:** Entire Section in Version C	N/A	N/A	**N/A**	**N/A**	N/A	
12.2.3.2	Tool Operational Requirements	**Deleted:** Entire Section in Version C	N/A	N/A	**N/A**	**N/A**	N/A	
12.2.4	Tool Qualification Agreement	**Deleted:** Entire Section in Version C	N/A	N/A	**N/A**	**N/A**	N/A	
12.3	Alternative Methods		No Change	**Added:** information to bullet points about guidance for using alternative methods: --or the applicable supplement --One technique for presenting the rationale for using an alternative method is an assurance case, in which arguments are explicitly given to link the evidence to the claims of compliance with the system safety objectives.	**2**	**Mod**	The ASE will have to evaluate the developer rationale for using alternative methods. The use of an assurance case is recognized as a means of presenting this justification. This is a technique new to DO-178C and will generally require assistance from technical specialists to perform the evaluation.	
12.3.1	Formal Methods	**Deleted:** Entire Section in Version C	Exhaustive Input Testing	**[Formerly Section 12.3.2] No Change**	**0**	**N/A**	None	
12.3.2	Exhaustive Input Testing	**Moved to Section 12.3.1**	Considerations for Multiple-Version Dissimilar Software Verification	**[Formerly Section 12.3.3] No Change**	**0**	**N/A**	None	
12.3.2.1	N/A		Independence of Multiple-Version Dissimilar Software	**[Formerly Section 12.3.3.1] Added:** Note: Section 12.3.2.1 only addresses the subject of independence. Reduction of software levels is not discussed or intended.	**1**	**Lim**	None	
12.3.2.2	N/A		Multiple Processor-Related Verification	**[Formerly Section 12.3.3.2] No Change**	**0**	**N/A**	None	
12.3.2.3	N/A		Multiple-Version Source Code Verification	**[Formerly Section 12.3.3.3] No Change**	**0**	**N/A**	None	
12.3.2.4	Tool Qualification for Multiple-Version Dissimilar Software		No Change	**[Former Section 12.3.3.4] No Change**	**0**	**N/A**	None	
12.3.2.5	Multiple Simulators and Verification		No Change	**[Former Section 12.3.3.5]** Minor editorial changes	**1**	**Lim**	None	
12.3.3	Considerations for Multiple -Version Dissimilar Software Verification		Software Reliability Models	**[Formerly Section 12.3.4] No Change**	**0**	**N/A**	None	
12.3.3.1	Independence of Multiple -Version Dissimilar Software	**Moved to Section 12.3.2.1**	N/A	N/A	**N/A**	**N/A**	N/A	
12.3.3.2	Multiple Processor-Related Verification	**Moved to Section 12.3.2.2**	N/A	N/A	**N/A**	**N/A**	N/A	
12.3.3.3	Multiple -Version Source Code Verification	**Moved to Section 12.3.2.3**	N/A	N/A	**N/A**	**N/A**	N/A	
12.3.3.4	Tool Qualification for Multiple -Version Dissimilar Software	**Moved to section 12.3.2.4**	N/A	N/A	**N/A**	**N/A**	N/A	

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12.3.3.5	Multiple Simulators and Verification	**Deleted:** Entire Section in Version C	N/A	N/A	**N/A**	**N/A**	N/A	
12.3.4	Software Reliability Models	**Moved to Section 12.3.3**	Product Service history	**[Formerly Section 12.3.5]** **Deleted:** Bullet points about guidance for the use of product service history **Added:** paragraph to discuss that the use of service history data for certification credit is predicated upon sufficiency, relevance, and types of problems occurring during the service history period. The use, conditions of use, and results of software service history should be defined, assessed by the system processes, including the system safety assessment process, and submitted to the appropriate certification authority. Guidance for determining applicability of service history and the length of service history needed is presented below	**3**	**Sig**	There are some technical challenges in using product service history. This section was heavily modified to recognize some research done by the FAA. In addition to the technical disciplines involved, the revisions to this section are considerable. If an applicant chooses to make use of product service history, technical specialist should be involved.	
12.3.4.1	N/A		Relevance of Service History	**Added:** Entire Section >> Describes the steps in establishing the relevance of service history	**3**	**Sig**	See 12.3.4	
12.3.4.2	N/A		Sufficiency of Accumulated Service History	**Added:** Entire Section >> Describes what the required amount of service history is determined by	**3**	**Sig**	See 12.3.4	
12.3.4.3	N/A		Collection, Reporting, and Analysis of Problems Found During Service History	**Added:** Entire Section >> Describes the specific data to be collected from each recorded problem and how to address the completeness of the software's error history.	**3**	**Sig**	See 12.3.4	
12.3.4.4	N/A		Service History Information to be Included in the Plan for Software Aspects of Certification	**Added:** Entire Section >> Explains what items should be specified and agreed upon when seeking certification credit for service history.	**3**	**Sig**	See 12.3.4	
12.3.5	Product Service History	**Moved to Section 12.3.4**	N/A	N/A	**N/A**	**N/A**	N/A	
Appendix A	BACKGROUND OF DOCUMENT DO-178		BACKGROUND OF DO-178/ED-12 DOCUMENT	Completely revised	**2**	**Lim**	None	
Annex A (Summary)	PROCESS OBJECTIVES AND OUTPUTS BY SOFTWARE LEVEL			***Section Summary:*** *Activities were added as a separate column to the objective tables. Additional objectives were added for PDI, verification of executable object code not traceable to source code, and to recognize the interaction between the systems and software processes. The SQA table was rearranged and objectives split out to provide better clarity.*	**1**	**N/A**		
Annex A	PROCESS OBJECTIVES AND OUTPUTS BY SOFTWARE LEVEL		No Change	***Revised:*** (Completely revised.) Emphasized that tables not be used as a checklist and the full body of the document should be used to interpret the table	**2**	**Lim**	None, ASEs already used the paragraph references in the tables to understand the objectives. The references to activities for a specific objective are now included	

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All Section #s	DO-178B Title	Section number Changes	Version C Title	Changes Made to Version C	Amt of change	ASE Impact	ASE added activities	Related sections
Table A-1	Software Planning Process		No Change	**Added:** Activity references Deleted: SQA records from the outputs of objectives 6 (plans compliance to 178C) and 7 (coordination of plans)	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-2	Software Development Processes		No Change	**Added:** The objectives now includes supplying the derived HLR to the system and system safety process. PDI was added to the objective relating to being loaded into the target computer. Trace data was also added as an output. **Deleted:** Satisfaction of Objectives 4, 5, and 6 (LLR developed, Derived LLR developed, and source code developed, respectively) is no longer required for level D. The corresponding circles in the objective table were deleted. **Modified:** To be consistent with the rest of the document, corrected the CC categories for software architecture, Derived High level requirements, Low level requirements, and derived low level requirements from CC2 to CC1.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, that the derived HLR and LLR were provided to the System and system safety processes. Assessment that Trace Data was produced and PDI file(s), if any, was produced as an output and loaded into the target computer.	
Table A-3	Verification of Outputs of Software Requirements Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-4	Verification of Outputs of Software Design Process		No Change	**Added:** Activity references **Modified:** Corrected paragraph references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-5	Verification of Outputs of Software Coding & Integration Processes		No Change	**Added:** Activity references, two additional objectives for verification of PDI file and PDI file is correct and complete.	**2**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the **new** objective associated with PDI files.	
Table A-6	Testing of Outputs of Integration Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Table A-7	Verification of Verification Process Results		No Change	**Added:** Activity references, extra objective for verification of additional executable object code that is not related directly to the source code. **Modified:** Output for objective 1 was corrected to read SW verification results.	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed, and compliance with the objective associated verification of additional executable object code that is not related directly to the source code.	
Table A-8	Software Configuration Management Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	

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Table A-9	Software Quality Assurance Process		No Change	Added: Activity references, additional objective for assurance that software plans and standards are developed and reviewed for compliance with DO-178C and reviewed for consistency between plans, Split the DO-178B objective stating software life cycle processes comply with plans and standards into a separate objective related to plans and another objective devoted to standards.	**2**	**Mod**	The ASEs will have to assess whether: 1. the developer has evidence showing compliance with all the activities listed, 2: The SQA organization has evidence of compliance with the objectives associated with plans and standards compliance with 178C.	
Table A-10	Certification Liaison Process		No Change	**Added:** Activity references	**1**	**Mod**	The ASEs will have to assess whether the developer has evidence showing compliance with all the activities listed.	
Annex B (Summary)	Acronyms and Glossary of Terms (summary)		No Change	Updates to the glossary were made to move definitions from the text to a central glossary, as well as provide definitions for new or modified terms.	**1**	**N/A**	N/A	
Annex B	Acronyms and Glossary of Terms		No Change	Title only - no change	**0**	**N/A**	None	
Annex B	Acronyms		No Change	**Modified:** Acronym list modified to reflect usage within DO-178C	**2**	**Mod**	None	
Annex B	Glossary		No Change	Title only - no change	**0**	**N/A**	None	
Annex B	N/A		Activity	**Added:** Key aspect of DO-178C's structure including new reference columns in Annex A	**1**	**Lim**	None	
Annex B	N/A		Aeronautical Data	**Added:** Clarifies data covered by other guidance (e.g., DO-200A) from the data discussed internal to DO-178C (e.g., parameter data)	**1**	**Lim**	ASE should exclude data covered by other guidance from their DO-178C specific review.	
Annex B	N/A		Airborne	**Added:** provides clarity on domain being discussed.	**1**	**Lim**	None	
Annex B	Algorithm		No Change	N/A	**0**	N/A	N/A	
Annex B	N/A		Alternative Method	**Added:** moved definition from text to glossary.	**1**	**Lim**	None	
Annex B	Anomalous Behavior		No Change	N/A	**0**	N/A	N/A	
Annex B	Applicant		No Change	N/A	**0**	N/A	N/A	
Annex B	Approval		No Change	N/A	**0**	N/A	N/A	
Annex B	N/A		Approved Source	**Added:** Provides clarity on where the data that is actually being approved can be found.	**1**	**Lim**	ASE should ensure the associated location is clearly identified in the project data.	
Annex B	Assurance		No Change	N/A	**0**	N/A	N/A	
Annex B	Audit		No Change	N/A	**0**	N/A	N/A	
Annex B	N/A		Autocode Generator	**Added:** defines a specific type of tool for which explicit guidance is given.	**1**	**Lim**	ASE should ensure the use of an autocode generator is discussed along with the associated qualification effort in the Applicant's plans	
Annex B	Baseline		No Change	N/A	**0**	N/A	N/A	
Annex B	N/A		Boolean Expression	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Boolean Operator	**Added:** move definition from text to glossary.	**1**	**Lim**	None	

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Annex B	Certification		No Change	N/A	0	N/A	N/A	
Annex B	Certification Authority		No Change	**Modified:** Note 1 change: addition of APU type certification to ensure consistency with EASA Certification Specifications Note 2 addition: ensure consistency with regimen of delegated organizations and/or individuals	2	Lim	None	
Annex B	Certification Credit		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Certification Liaison Process	**Added:** move definition from text to glossary.	1	Lim	None	
Annex B	Change Control		No Change	N/A	0	N/A	N/A	
Annex B	Code		No Change	N/A	0	N/A	N/A	
Annex B	Commercial-Off-The-Shelf (COTS) Software		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Compacted Expressions	**Added:** Missing in DO-178B; added to clarify meaning	1	Lim	None	
Annex B	Compiler		No Change	N/A	0	N/A	N/A	
Annex B	Component		No Change	N/A	0	N/A	N/A	
Annex B	Condition		No Change	**Modified:** Makes definition more precise by explicitly allowing for the unary operator.	1	Lim	None	
Annex B	Configuration Identification		No Change	N/A	0	N/A	N/A	
Annex B	Configuration Item		No Change	N/A	0	N/A	N/A	
Annex B	Configuration Management		No Change	**Modified:** reformatted only	1	Lim	None	
Annex B	Configuration Status Accounting		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Control Category	**Added:** Missing in DO-178B; added to clarify meaning	1	Lim	None	
Annex B	Control Coupling		No Change	N/A	0	N/A	N/A	
Annex B	Control Program		No Change	N/A	0	N/A	N/A	
Annex B	Coverage Analysis		No Change	N/A	0	N/A	N/A	
Annex B	Data Coupling		No Change	N/A	0	N/A	N/A	
Annex B	Data Dictionary		No Change	N/A	0	N/A	N/A	
Annex B	Database		No Change	N/A	0	N/A	N/A	
Annex B	Deactivated Code		No Change	**Modified:** correct numerous misconceptions concerning what constitutes deactivate code	2	Mod	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	

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Annex B	Dead Code		No Change	**Modified:** added a list of exceptions often mistaken for dead code	2	Mod	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	Decision		No Change	N/A	0	N/A	N/A	
Annex B	Decision Coverage		No Change	N/A	0	N/A	N/A	
Annex B	Derived Requirements		No Change	**Modified:** Makes the definition more precise by addressing functionality that goes beyond that specified in the higher-level requirements	2	Mod	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	N/A		Embedded Identifier	**Added:** Missing in DO-178B; added to clarify meaning	1	Lim	None	
Annex B	Emulator		No Change	N/A	0	N/A	N/A	
Annex B	N/A		End-to-end Numerical Resolution	**Added:** Missing in DO-178B; added to clarify meaning	1	Lim	None	
Annex B	Equivalence Class		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Equivalent Safety	**Added:** Missing in DO-178B; added to clarify meaning	1	Lim	None	
Annex B	Error		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Executable Object Code	**Added:** move definition from text to glossary.	1	Lim	None	
Annex B	N/A		Extraneous Code	**Added:** Missing in DO-178B; added to clarify meaning	2	Mod	ASE will need to ensure that the applicant has processes to properly characterize the different types of dead and deactivated code and has properly done so.	
Annex B	Failure		No Change	N/A	0	N/A	N/A	
Annex B	Failure Condition		No Change	**Modified:** Removed regulatory references unique to regulatory authorities	1	Lim	None	
Annex B	Fault		No Change	N/A	0	N/A	N/A	
Annex B	Fault Tolerance		No Change	N/A	0	N/A	N/A	
Annex B	Formal Methods		No Change	**Modified:** Added connection to a formal model	2	Lim	None - clarification to support supplements	
Annex B	Hardware/Software Integration		No Change	N/A	0	N/A	N/A	
Annex B	High-Level Requirements		No Change	N/A	0	N/A	N/A	
Annex B	Host Computer		No Change	N/A	0	N/A	N/A	
Annex B	Independence		No Change	N/A	0	N/A	N/A	
Annex B	Integral Process		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Integrity	**Added:** Missing in DO-178B; added to clarify meaning	1	Lim	None	
Annex B	Interrupt		No Change	N/A	0	N/A	N/A	
Annex B	Low-Level Requirements		No Change	N/A	0	N/A	N/A	

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Annex B	Means of Compliance		No Change	N/A	0	N/A	N/A	
Annex B	Media		No Change	N/A	0	N/A	N/A	
Annex B	Memory Device		No Change	N/A	0	N/A	N/A	
Annex B	Modified Condition/Decision Coverage		No Change	**Modified:** Added second form of condition independence (e.g. allows masking of logic as input to the MD/DC coverage)	2	Lim	The ASE is no able to except masking MC/DC in addition to unique MC/DC coverage.	
Annex B	Monitoring		No Change	**Modified:** Deleted definition associated with safety context; separate term added to address this - see safety monitoring	2	Lim	None	
Annex B	Multiple-Version Dissimilar Software		No Change	**Modified:** Clarified definition and added example	2	Lim	ASE should ensure the Applicant's use of this term is correct and that any such code will be assured as required by the guidance.	
Annex B	Object Code		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Objective	**Added:** move definition from text to glossary.	1	Lim	None	
Annex B	N/A		Parameter Data Item	**Added:** Define new term in DO-178C	3	Sig	ASE should ensure Applicant has properly identified any such data as part of their system/software.	
Annex B	N/A		Parameter Data Item File	**Added:** Define new term in DO-178C	3	Sig	ASE should ensure data compliance tables clearly identify this new data item	
Annex B	Part Number		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Partitioning	**Added:** move definition from text to glossary.	1	Lim	None	
Annex B	Patch		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Previously Developed Software	**Added:** move definition from text to glossary.	1	Lim	None	
Annex B	Process		No Change	N/A	0	N/A	N/A	
Annex B	Product Service History		No Change	N/A	0	N/A	N/A	
Annex B	Release		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Reverification	**Added:** move definition from text to glossary.	1	Lim	None	
Annex B	Reverse Engineering		No Change	N/A	0	N/A	N/A	
Annex B	Robustness		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Safety Monitoring	**Added:** separated out from monitoring definition that appeared in DO-178B	1	Lim	None	
Annex B	N/A		Service Experience	**Added:** move definition from text to glossary.	1	Lim	None	
Annex B	N/A		Service History Data	**Added:** distinguish the supporting data used to make a service history argument from the argument itself	1	Lim	None	
Annex B	Simulator		No Change	N/A	0	N/A	N/A	

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Annex B	N/A		Single Event Upset	**Added:** missing in DO-178B; needed to support discussion of emergent safety issue not directly considered in DO-178B	**3**	**Sig**	ASE should ensure SEU is considered by the Applicant; note that this consideration may be part of the hardware design.	
Annex B	Software		No Change	N/A	**0**	N/A	N/A	
Annex B	Software Architecture		No Change	N/A	**0**	N/A	N/A	
Annex B	N/A		Software Assurance	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	Software Change		No Change	N/A	**0**	N/A	N/A	
Annex B	N/A		Software Conformity Review	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	N/A		Software Development Standards	**Added:** Missing in DO-178B; added to clarify meaning	**1**	**Lim**	None	
Annex B	Software Integration		No Change	N/A	**0**	N/A	N/A	
Annex B	N/A		Software Level	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	Software Library		No Change	N/A	**0**	N/A	N/A	
Annex B	Software Life Cycle		No Change	N/A	**0**	N/A	N/A	
Annex B	Software Partitioning		No Change	N/A	**0**	N/A	N/A	
Annex B	Software Product		No Change	N/A	**0**	N/A	N/A	
Annex B	Software Requirement		No Change	N/A	**0**	N/A	N/A	
Annex B	Software Tool		No Change	N/A	**0**	N/A	N/A	
Annex B	Source Code		No Change	N/A	**0**	N/A	N/A	
Annex B	Standard		No Change	N/A	**0**	N/A	N/A	
Annex B	Statement Coverage		No Change	N/A	**0**	N/A	N/A	
Annex B	N/A		Structural Coverage Analysis	**Added:** move definition from text to glossary.	**1**	**Lim**	None	
Annex B	Structure		No Change	N/A	**0**	N/A	N/A	
Annex B	N/A		Supplement	**Added:** Defines the new adjunct guidance introduced for a specific technology or method	**3**	**Sig**	ASE should ensure that an Applicant using a technology or method that is covered by a supplement is aware of the additional guidance in the supplement.	
Annex B	System		No Change	N/A	**0**	N/A	N/A	
Annex B	System Architecture		No Change	N/A	**0**	N/A	N/A	
Annex B	System Safety Assessment Process		No Change	N/A	**0**	N/A	N/A	
Annex B	Task		No Change	N/A	**0**	N/A	N/A	
Annex B	Test Case		No Change	N/A	**0**	N/A	N/A	
Annex B	Test Procedure		No Change	N/A	**0**	N/A	N/A	

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Annex B	Testing		No Change	N/A	0	N/A	N/A	
Annex B	Tool Qualification		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Trace Data	**Added:** Addresses a new data item introduced in DO-178C	2	Mod	ASE should ensure data compliance tables clearly identify this new data item	
Annex B	Traceability		No Change	N/A	0	N/A	N/A	
Annex B	Transition Criteria		No Change	N/A	0	N/A	N/A	
Annex B	N/A		Type Design	**Added:** Missing in DO-178B; added to clarify meaning	1	Lim	None	
Annex B	N/A		Unbounded Recursive Algorithm	**Added:** Missing in DO-178B; added to clarify meaning	1	Lim	None	
Annex B	N/A		User-Modifiable Software	**Added:** move definition from text to glossary.	1	Lim	None	
Annex B	Validation		No Change	N/A	0	N/A	N/A	
Annex B	Verification		No Change	N/A	0	N/A	N/A	

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