



FAS Topic Paper (FTP)		
TITLE	REVISION	REVISION DATE
FTP1034 C17657 DO-178C/ED-12C and DO-278A/ED-109A Annex A <u>Table A-5</u> Objectives #8, 9 Differences	3	21-Sep-2022
ABSTRACT/PURPOSE:		
Industry has requested clarification of the differences between DO-178C/ED-12C and DO-278A/ED-109A Annex A <u>Table A-5</u> Objectives 8 and 9 for both airborne Parameter Data Items (PDI) and ground-based Adaptation Data Items (ADI). This paper provides a summary of the discussion of the FAS Team on this subject.		
RELATED DO/ED DOCUMENTS:		
<input checked="" type="checkbox"/> DO-178C/ED-12C: SW Airborne Sys & Equip <input checked="" type="checkbox"/> DO-278A/ED-109A: SW (CNS/ATM) Systems <input type="checkbox"/> DO-248C/ED-94C: Supporting Information <input type="checkbox"/> DO-330/ED-215: Software Tool Qualification Considerations <input type="checkbox"/> DO-331/ED-218: Model Based Development & Verification Supplement <input type="checkbox"/> DO-332/ED-217: OO Technology and Related Techniques Supplement <input type="checkbox"/> DO-333/ED-216: Formal Methods Supplement <input type="checkbox"/> Other		
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FAS Team Definition and Goals:

The FAS user group monitors and exchanges information on the application of the following “software document suite” that was developed by joint RTCA/EUROCAE committee SC-205/WG-71:

- DO-178C/ED-12C - Software Considerations in Airborne Systems and Equipment Certification
- DO-278A/ED-109A - Software Integrity Assurance Considerations for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems
- DO-248C/ED-94C - Supporting Information
- DO-330/ED-215 - Software Tool Qualification Considerations
- DO-331/ED-218 - Model Based Development & Verification Supplement
- DO-332/ED-217 - Object Oriented Technology and Related Techniques Supplement
- DO-333/ED-216 - Formal Methods Supplement

The goals of the FAS user group are as follows:

1. To share lessons learned in the use of the RTCA/EUROCAE “software document suite” and to encourage good practices and promote the effective use of RTCA’s and EUROCAE’s publications.
2. To develop FAS Topics Papers (FTP) relative to RTCA’s and EUROCAE’s publications or other related aeronautical software industry topics. These FTPs may include clarification to the “software document suite” or a discussion on a new topic.
3. To identify and record any issues or errata showing the need for clarifications or the need for modifications to the “software document suite”.

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Abstract / Purpose of the FAS Topic Paper:

Industry has requested clarification of the differences between DO-178C/ED-12C and DO-278A/ED-109A Annex A Table A-5 Objectives 8 and 9 for both airborne Parameter Data Items (PDI) and ground-based Adaptation Data Items (ADI). This paper provides a summary of the discussion of the FAS Team on this subject.

Note: Only DO-178C/ED-12C PDI is discussed below to simplify the topic; however the information also applies to DO-278A/ED-109A ADI.

FTP Discussion:

Question from Industry:

There are two new objectives in DO-178C/ED-12C that relate to Parameter Data Items.

- Annex A Table A-5 Objective 8 states:

"Parameter Data Item File is correct and complete."

- Annex A Table A-5 Objective 9 states:

"Verification of Parameter Data Item File is achieved."

Objective 8 applies at Level D, but Objective 9 does not. What is the difference between these two objectives?

Response from FAS:

The opinion of FAS is expressed below to distinguish each objective.

DO-178C/ED-12C Annex A Table A-5 Objective 8:

Objective 8 states:

"Parameter Data Item File is correct and complete."

However, DO-178C/ED-12C Annex A contains a summary of the objectives. DO-178C/ED-12C Section 6.6a contains the entire objective as follows:

"The Parameter Data Item File should be verified to comply with its structure as defined by the high-level requirements; this verification includes ensuring that the Parameter Data Item File does not contain any elements not defined by the high-level



requirements. Each data element in the Parameter Data Item File should also be shown to have the correct value, to be consistent with other data elements, and to comply with its attributes as defined by the high-level requirements.”

Given the entire objective context, Objective 8 requires that the contents of the Parameter Data Item File be verified to comply with its structure as defined by the high-level requirements. As indicated in DO-178C/ED-12C, this verification includes ensuring that the Parameter Data File contains all elements defined by the high-level requirements and nothing more. Each data element in the Parameter Data Item File should also be shown to have the correct value, to be consistent with other data elements, and to comply with its attributes as defined by the high-level requirements.

DO-178C/ED-12C Annex A Table A-5 Objective 9:

Objective 9 states:

“Verification of Parameter Data Item File is achieved.”

DO-178C/ED-12C Section 6.6b contains the entire objective as follows:

“All elements of the Parameter Data Item File have been covered during verification.”

Objective 9 was added to provide additional confidence that the verification of the Parameter Data Item File is relevant and complete, considering that a Parameter Data Item File may be large and complex. It is, in some sense, equivalent to the structural coverage objectives for the code (in particular, DO-178C/ED-12C Annex A Table A-7 Objectives 5, 6, and 7) and is consistent with those objectives in applying to Levels A, B, and C (with independence at Levels A and B). To satisfy DO-178C/ED-12C Annex A Table A-5 Objective 9, evidence needs to be provided that every single element of the Parameter Data Item File has been covered during verification. It is up to the applicant to plan a set of activities that satisfy this objective. One possible activity would be to develop trace data showing the association between each element of the Parameter Data Item File and the verification cases, verification procedures and verification results. This activity is only an example and is not intended to be the sole means of complying with the objective.