

Clearance Record

TSO-C63d

DOCUMENT COMMENT LOG

Com ment Num ber	Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
1	AIR-230	Page 1, Para 1 Purpose	Incorrect acronym "TSOA"	Aircraft Certification has discontinued the use of TSOA	Changes all references from TSOA to TSO authorization	Concur. All references to TSOA have been revised as recommended.
2	AIR-230	Page 1, Para 1 Purpose	Last sentence states that "This TSO does not address airborne windshear warning and flight guidance systems..." yet the summary in the clearance record states that it does.	Conflicting statements	Review and update.	Partial concur. While it is too late to resolve conflicts between the TSO draft and the clearance record summary paragraph, we do recognize that some confusion exists between paragraph 1 and paragraph 3. See comment 4.
3	AIR-230	General	Since one of the reasons for the TSO is to minimize deviation requests from TSO-C63c, make reference to this in main TSO text.	It will assist the reader and FAA personnel alike.	Add statement describing the issue of deviations.	Concur. Added "Additionally, this TSO includes updated MPS requirements to address deviation requests against TSO-C63c content." to Paragraph 1 Purpose.

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4	ANM130L Blake Higuchi	Section 1. PURPOSE	<p>The Purpose states: This TSO does not address airborne windshear warning and flight guidance systems, airborne windshear detection and avoidance systems, or a combination of these systems." There appears to be in conflict.</p> <p>Table 1 on page 2 that identifies Windshear Detection capability for Class A equipment. And is in conflict with Section 3. REQUIREMENTS, a. Functionality, "Class A provides forward-looking windshear detection functionality. However, this TSO does not include flight guidance system functionality in support of an approved windshear detection and avoidance system."</p>	There is a conflict between the Section 1 Purpose statement and the information in Table 1 and Section 3 requirements.	<p>Replace "This TSO does not address airborne windshear warning and flight guidance systems, airborne windshear detection and avoidance systems, or a combination of these systems." In Section 1</p> <p>With "This TSO does not include flight guidance system functionality in support of an approved windshear detection and avoidance system."</p>	Concur. Paragraph 1 has been revised per the recommendation to state "While this TSO does address forward looking windshear capability , this TSO does not include flight guidance system functionality in support of an approved windshear detection and avoidance system. ".
5	ANM-130S	Page 5, Paragraph 5 a (3)	<p>"Installation of this article requires separate approvals."</p> <p>Type Certification (TC) of Systems related to installation of TSO Articles: require Airplane and System Level installation requirements must be determined Valid in the context of the TSO Articles selected by the TC applicant. This has become known at SACO as "TC trumps TSO."</p>	Incorporate exiting or under development Advisory material Reference.	<p>Add "Installation of this article requires separate approvals for each make and model airplane in which the TSO Article may be installed."</p> <p>Add "Refer to Advisory Circular XXXX"</p>	Non-concur. Existing paragraph 5.a(3) is per current TSO boilerplate. A revision of the boilerplate is currently being coordinated with all directorates. AIR-130 is not allowed to modify boilerplate language ensuring standardization of TSO content.

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6	ANM-130S	Page 5 Paragraph 7 k	The System Safety Assessment (SSA) links the allocated hardware requirements, hardware design assurance levels (DAL's), software requirements and software DAL's to Failure Condition Classifications (Paragraph 3b) and Hazards (3a1, Appendix 1 3-1c),	Incorporate the substantiating SSA into the Application Data Requirements.	"k. System Safety Assessment (SSA).	Non-concur. Existing paragraph 7 is per current TSO boilerplate. A revision of the boilerplate is currently being coordinated with all directorates. AIR-130 is not allowed to modify boilerplate language ensuring standardization of TSO content.
7	AIR-40 Hal Jensen	Page 3, paragraph e.	Applicants from the EU who have EASA as their technical agent and apply for FAA TSO LODA may use EUROCAE/ ED-12 in lieu of RTCA/DO-178.	The FAA-EASA TIP Appendix B recognizes EUROCAE/ ED-12, <i>Software Considerations in Airborne Systems and Equipment Certification</i> as an equivalent to RTCA/DO-178, <i>Software Considerations in Airborne Systems and Equipment Certification</i>	Add sentence to paragraph "e." to indicate: Applicants from the EU applying for FAA LODA through EASA may use EUROCAE/ ED-12, <i>Software Considerations in Airborne Systems and Equipment Certification in lieu of DO-178.</i>	Non-concur. Existing paragraph 3.e is per current TSO boilerplate. A revision of the boilerplate is currently being coordinated with all directorates. AIR-130 is not allowed to modify boilerplate language ensuring standardization of TSO content.
8	AIR-40 Hal Jensen	Page 4, paragraph f. (Ed. Note – Commenter means paragraph 3.f)	Applicants from the EU who have EASA as their technical agent and apply for FAA TSO LODA may use EUROCAE/ ED-80 in lieu of RTCA/DO-254.	The FAA-EASA TIP Appendix B recognizes EUROCAE/ ED-80, <i>Design Assurance Guidance for Airborne Electronic Hardware</i> as an equivalent to RTCA/DO-254, <i>Design Assurance Guidance for Airborne Electronic Hardware.</i>	Add sentence to paragraph "f." to indicate: Applicants from the EU applying for FAA LODA through EASA may use EUROCAE/ ED-80, <i>Design Assurance Guidance for Airborne Electronic Hardware in lieu of DO-254.</i>	Non-concur. Existing paragraph 3.f is per current TSO boilerplate. A revision of the boilerplate is currently being coordinated with all directorates. AIR-130 is not allowed to modify boilerplate language ensuring standardization of TSO content.

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9	AIR-40 Hal Jensen	Page 7, paragraph 6.g.	Applicants from the EU who have EASA as their technical agent and apply for FAA TSO LODA may use EUROCAE/ ED-12 in lieu of RTCA/DO-178.	The FAA-EASA TIP Appendix B recognizes EUROCAE/ ED-12, <i>Software Considerations in Airborne Systems and Equipment Certification</i> as an equivalent to RTCA/DO-178, <i>Software Considerations in Airborne Systems and Equipment Certification</i>	For applications through EASA from applicants that used ED-12, require equivalent data in EUROCAE/ ED-12 to RTCA/DO-178B <i>Annex A</i> and revise 6.g. appropriately.	Non-concur. Existing paragraph 6.g is per current TSO boilerplate. A revision of the boilerplate is currently being coordinated with all directorates. AIR-130 is not allowed to modify boilerplate language ensuring standardization of TSO content.
10	AIR-40 Hal Jensen	Page 7, paragraph 6.h.	Applicants from the EU who have EASA as their technical agent and apply for FAA TSO LODA may use EUROCAE/ ED-80 in lieu of RTCA/DO-254.	The FAA-EASA TIP Appendix B recognizes EUROCAE/ ED-80, <i>Design Assurance Guidance for Airborne Electronic Hardware</i> as an equivalent to RTCA/DO-254, <i>Design Assurance Guidance for Airborne Electronic Hardware</i> .	For applications through EASA from applicants that used ED-80, require equivalent data in EUROCAE/ ED-80 to RTCA/DO-254, Appendix A, Table A-1 and revise 6.h. appropriately.	Non-concur. Existing paragraph 6.h is per current TSO boilerplate. A revision of the boilerplate is currently being coordinated with all directorates. AIR-130 is not allowed to modify boilerplate language ensuring standardization of TSO content.
11	ASW-111	Page 3, Para 3.e	Suggest dropping revision designation on all referenced documents	DO-178B will soon change to DO-178C	DO-178	Non-concur. Existing paragraph 3.e is per current TSO boilerplate. A revision of the boilerplate is currently being coordinated with all directorates. AIR-130 is not allowed to modify boilerplate language ensuring standardization of TSO content.

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12	ASW-112	Page 2, Para 3.a(1)	Suggest removing “Permit safe...” sentence or change hazard category in 3.b to hazardous	“Permit safe” implies credit for use or a factor of safety is assured.	Possible wording: Provide advanced indication of potentially hazardous weather conditions to assist pilots with weather avoidance decisions	Partial concur. This recommended sentence is focused upon “potentially hazardous weather conditions”, while the intent of the sentence in paragraph 3.a(1) was to address turbulence detection. Paragraph 3.a(1) has been revised to read “Provide advanced indication of potentially hazardous turbulence conditions to assist pilots with turbulence avoidance decisions”.
13	Wichita ACO ACE-119W R. Johnston	Page 3, para 3.b.	The last sentence in the paragraph is unnecessary.	Systems should always be designed with consideration of the highest failure condition. Also, keep in mind that not all of the system components or failure conditions must meet the higher classification.	Delete last sentence of para 3.b.	Non-concur. The last sentence of paragraph 3.b is per current TSO boilerplate. A revision of the boilerplate is currently being coordinated with all directorates. AIR-130 is not allowed to modify boilerplate language ensuring standardization of TSO content.
14	Wichita ACO ACE-119W R. Johnston	Page 5, para 5.a.(1)	The last sentence in the paragraph is unnecessary.	The TSOA holder is not responsible, nor can they control, the characteristics of the installers’ radome. TSOA holder just needs to indicate minimum radome performance (as indicated in the previous sentence of the same paragraph).	Delete last sentence of para 5.a.(1).	Concur. The last sentence of 5.a(1) has been deleted per the recommendation.

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15	ACE-119W, R. Souter	General comment	References to DO-160G, DO-178B, and DO-254 only mention current revision.		References to DO-160G, DO-178B, and DO-254 should indicate those revisions or later.	Non-concur. This section is per current TSO boilerplate. Note also, that FAA may not recognize later revisions.
16	ACE-119W, R. Souter	Page 3, Section 3.d.	DO-160D is referenced.		Use current DO-160G and future revisions as reference.	Non-concur. This section is per current TSO boilerplate. Note also, that FAA may not recognize later revisions.
17	ACE-119W, R. Souter	Page 6, Section 5.f.(5).	Other references in this section mention "5.f.(1)".		Use reference "5.f.(1)" here.	Concur. Paragraph 5.f(1) has been revised per the recommendation
18	ACE-110	Cover Page	The use of all upper-case letters for the word "RADAR" is inappropriate.	In 1940, the U.S. Navy coined the acronym RADAR for "radio detection and ranging". However, the word "radar" has since entered the English and other languages as the common noun "radar", losing all capitalization.	Change the subject of the TSO to be <i>"Subject: Airborne Weather Radar Equipment"</i>	Concur. All references to "RADAR" have been changed to "radar"
19	ACE-110	Entire Document including Appendix 1	The use of all upper-case letters for the word "RADAR" is inappropriate.	In 1940, the U.S. Navy coined the acronym RADAR for "radio detection and ranging". However, the word "radar" has since entered the English and other languages as the common noun "radar", losing all capitalization.	Change all instances of the upper-case presentation of "RADAR" to "radar" or "Radar" where appropriate.	Concur. All references to "RADAR" have been changed to "radar"

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20	ACE-110	Pages 2 & 3, Para 3a. sub-paragraphs (1) through (3).	<p>Sub-paragraph (1) should be split into 3 separate paragraphs and some of the wording should be modified.</p> <p>Current sub-paragraphs (3) concerning windshear detection should be re-written as indicated in my recommended sub-paragraph (5).</p>	<p>Functionality should be described as individual provisions. In current sub-paragraph (1) there are 3 distinct functionalities described as well as some of those being to vague. Also, in current sub-paragraph (3), the last two sentences should be a sub-note instead of included in the sub-paragraph which is intended to state what the equipment is intended to do.</p> <p>In the newly created sub-paragraph (3), using the word “Aid” versus “Permit” is appropriate. Realizing the word “permit” comes directly from DO-173 1.3.a., it should be noted that the radar itself doesn’t give any permission nor allowance, it is a tool to aid or help the aircrew in the safe passage of the aircraft in vicinity of weather-related hazardous conditions.</p>	<p>Change paragraph 3a. sub-paragraphs to read:</p> <ol style="list-style-type: none"> (1) Detect, analyze, and display precipitation information including but not limited to location, intensity, type, and movement (Class A, B, and C). (2) Display detected weather-related hazards on the flight deck (Class A, B, and C). (3) Aid in the safe passage of an aircraft in the vicinity of weather-related hazardous conditions (Class A, B, and C). (4) Maintain contact with geographic features such as international shoreline boundaries as a supplement to navigational orientation (Class A, B, and C) (5) Provide turbulence detection capability (Class A and B). (6) Provide airborne windshear detection capability (Class A). <p>Note: Class A provides forward-looking windshear detection capability. However, this TSO does not</p>	<p>Partial concur. Paragraph 3.a(1) has been split into three separate paragraphs per the recommendation.</p> <p>With respect to the comment on the second sentence regarding “Permit”, see comment (12) above.</p>

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21	ACE-110	Page 3, Paragraph 3b. Failure Condition Classification s.	Believe that both the malfunction and loss of function result in a “major failure condition”	Loss of function of the ability for the RADAR to aide in the safe passage of an aircraft in the vicinity of weather-related hazardous conditions would reduce the capability of the airplane or the ability of the crew to cope with adverse operating conditions to the extent that there would be a significant reduction in safety margins or functional capabilities. In addition, the loss of function as well as the malfunction may result in discomfort to the flight crew or physical distress to passengers or cabin crew, possibly including injuries.	Change paragraph 3b. to state that both a Malfunction of the function defined in paragraph 3a. and the loss of function defined in paragraph 3a. are both major failure conditions.	Concur. Paragraph 3.b will be modified to indicate loss and malfunction are both considered major hazard severity class.
24	ACE-117C John Raspanti	Page 4, para 3.g Deviations	Incorrect reference for part 21 TSO Deviations.	New part 21 effective April 16, 2011 redefined TSO Deviations to be 14 CFR § 21.609	Change reference for TSO Deviations to 14 CFR § 21.609	Non-concur. 21.618 is the appropriate reference in accordance with latest TSO boilerplate and Regulatory Guidance Library.
26	ACE-117C John Raspanti	Page 4, para 5 APPLICATIO N DATA REQUIREME NTS	Incorrect reference for statement of conformance.	There is no 14 CFR § 21.603(a)(1) and 14 CFR § 21.605(a)(1) references the statement of conformance certifying the applicant has met the requirements of the subchapter and the article meets the TSO requirements.	14 CFR § 21.603(a)(1) should be changed to 21.605(a)(1)	Non-concur. 21.603(a)(1) is the appropriate reference in accordance with latest TSO boilerplate and Regulatory Guidance Library.

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28	D. Millam, ACE-180	TSO-C63d page 6, paragraph 5	<u>APPLICATION DATA REQUIREMENTS.</u> says: <i>g. The quality system description required by 14 CFR § 21.607, including functional test specifications. The quality system should ensure that you will detect any change to the approved design that could adversely affect compliance with the TSO MPS, and reject the article accordingly. (Not required for LODA applicants.)</i>	In the TSO documents, use either 14 CFR, subpart O or 14 CFR, §21.607 for consistency in our documents. Documents reviewed recently are inconsistent.		Non-concur. The last sentence of paragraph 3.b is per current TSO boilerplate. A revision of the boilerplate is currently being coordinated with all directorates. AIR-130 is not allowed to modify boilerplate language ensuring standardization of TSO content.
31	ACE-110	Page 7, paragraph 7.a.	No need to capitalize “Airborne Weather”	Throughout the document the term “airborne weather radar” has not included the capitalization of the words “Airborne” or “Weather”	Change “Airborne Weather” to read “airborne weather”	Concur. A consistent use of capitalization and non-capitalization of “airborne weather radar” was performed upon the document.

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32	ACE-117C John Raspanti	Page 10, para 1.3(e)	Possible mismatch between para 3.b and Appendix A para 1.3(e) regarding failure probabilities.	<p>Para 3.b “<u>Malfunction of the function defined in para 3.a of this TSO is a major</u> failure condition.”</p> <p>Para 3.a includes turbulence (1) detect atmospheric hazards ... Permit safe passage of an aircraft ... in vicinity of <u>turbulent weather conditions</u>” (2) <u>Provide turbulence detection capability</u> ...</p> <p>Para 1.3(e) of Appendix A states “The probability of an <u>un-announced failure in the RADAR turbulence function shall be 10⁻³</u>“</p> <p>Failure to display turbulence could result in flight into turbulence but that is no worse than operation without function. For some systems un-announced failures are MINOR and for other systems un-announced failures are MAJOR.</p>	Consider changing un-announced failures in the RADAR turbulence function to be 10 ⁻⁵ or clarifying/rephrasing text.	

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