

**Clearance Record**  
**DOCUMENT COMMENT LOG**

<b>Originating Office:</b> AIR-130	<b>Document Description:</b> TSO-C118a	<b>Project Lead:</b> Steve Plummer, 650-756-0227 x166	<b>Reviewing Office:</b>	<b>Date of Review:</b>
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<b>Index No.</b>	<b>Name of Reviewer</b>	<b>Page &amp; Paragraph</b>	<b>Comment</b>	<b>Suggested Change &amp; Rationale</b>	<b>Disposition</b>
1	Ruth Hirt	Page 1 Paragraph 3 Requirements	Only section 2 of RTCA/DO-197A is cited as the requirements. Change 1 to RTCA/DO-197A, July 29, 1997 has a few revisions to various subsections in section 2 of RTCA/DO-197A that may need to be considered.	Recommend adding Change 1 to RTCA/DO-197A in the paragraph 3 Requirements. The revisions contained in the Change 1 document may affect the qualifications required for the equipment.	<b>Accepted.</b>
2	Ruth Hirt	Page 2 Paragraph 3.d	Consider DO-160 versions - The Note in the paragraph 3.d states that “The use of RTCA/DO-160D...or earlier versions is generally <b>not</b> considered appropriate...”. But, the test conditions specified in RTCA/DO-197A section 2.3, only reference RTCA/DO-160C version. AC 21-16G provides a summary of changes made into all sections of DO-160 documents, from version DO-160C, D,E,F and G. The environmental tests required by RTCA/DO-197A, Table 2-1, are affected by the revisions made to different versions of DO-160s.	The <b>Note</b> paragraph and specified requirements don’t seem to be consistent regarding RTCA/DO-160 version. Recommend specifying an appropriate version of RTCA/DO-160 for TCAS I environmental test conditions.	<b>Not accepted.</b> The language in this section is dictated by the TSO template in FAA Order 8150.1C CHG 2 dated 12/17/13. However, it should be noted that while the template language nominally directs use of the environmental standard specified in the MOPS, it also allows use of later appropriate versions of DO-160 without the need for deviation request. The practical effect of the template language for this TSO will be to <i>require</i> use of a later appropriate version of DO-160 than the MOPS specifies.
3	Ruth Hirt	Page 4 Paragraph 5.a.(6)	It references RTCA/DO-160G for a summary of test conditions, whereas paragraph 3.d seems to specify version DO-160C.	Clarify and/or correct the RTCA/DO-160 version to be used.	<b>Not accepted.</b> See index #2.

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4	Ruth Hirt	Page 4 Paragraph 5.a.(5)(6)(7)(8)	Editorial – 5.a.(4) is omitted/skipped.	Re-number the aforementioned paragraphs to 5.a.(4) (5) (6) (7)	<b>Accepted.</b>
5	Jay Yi	Page 1 paragraph 1	Last sentence “remove “first”	It should read “.....collision avoidance system (TCAS) must <del>first</del> meet for approval.....”	<b>Accepted.</b>
6	Jay Yi	Page 1 paragraph 3.b.(1)	Hazardously misleading information in airborne aircraft needs to be changed from “Major” to “Catastrophic” classification	Misleading information can lead to many consequences during heavy aircraft traffic. I do agree that when there are no airplanes around the suspect aircraft, the hazardously misleading information can be Minor or Major classification. During high aircraft traffic and during Traffic Advisory (TA), hazardously misleading information can be Catastrophic classification. During Resolution Advisory (RA) it can be Major but can lead to Hazardous to Catastrophic situation. Since the TCAS is designed as system that does not distinguish between high traffic or no traffic when designing the system, this failure condition needs to be addressed to highest failure classification which is “Catastrophic” for hazardously misleading information.	<b>Not accepted.</b> TSO-C118 equipment does not provide resolution advisory alerts to the pilot; the equipment only provides traffic advisory alerts to the pilot. Failure conditions for malfunctions causing the display or annunciation of hazardously misleading information in airborne aircraft has been deemed to be major.

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7	Jay Yi	Page 2 paragraph 3.d	The note section RTCA/DO-160D is the wrong reference.	Change the RTCA/DO-160D to RTCA/DO-160G.	<b>Not accepted.</b> The commenter appears to want to require use of the most current version of DO-160. We have determined that use of DO-160D (with Changes 1 and 2 only, incorporated) is generally not appropriate, but that any version subsequent to this is generally acceptable. The intent of the standardized note is to require substantiation via the deviation process for use of environmental standards of DO-160D (with Changes 1 and 2 only, incorporated) or older, while allowing newer DO-160 versions to be used. The reference is correct as-is; no change required.
8	Jay Yi	Page 5 paragraph 6.g.	RTCA/DO-178 is the wrong reference.	Change the RTCA/DO-178 to RTCA/DO-178C.	<b>Not accepted.</b> The intent of this current standardized language is to require applicants to have available applicable software life cycle data to support the version of DO-178 used, in accordance with paragraph 3.e of the TSO. Paragraph 3.e, in turn, specifies use of either DO-178C, or subject to certain conditions in AC 20-115C, DO-178B. The generic reference to DO-178 here (with version as specified by paragraph 3.e of the TSO) is correct; no change needed.
9	Steve O'Neal	Page 1 Para 3.b.(1)	How can a failure that is <b>HAZARDOUSLY</b> misleading (as stated in the paragraph) be considered only major? Since by definition, it uses the term "hazardous," shouldn't it be classified as hazardous? In reality, depending on target proximity, a misleading display or annunciation can range from no operational impact to catastrophic. Incorrect RA resolution guidance for close traffic can very well result in catastrophic consequences, while a TA for distant target can have minor or no effect.	<b>b. Failure Condition Classifications.</b> <b>(1)</b> Failure of the function defined in paragraph 3.a of this TSO has been determined to be a <del>major</del> <b>hazardous</b> failure condition for malfunctions causing the display or annunciation of hazardously misleading information in airborne aircraft.	<b>Not accepted.</b> See index #6.

Index No.	Name of Reviewer	Page & Paragraph	Comment	Suggested Change & Rationale	Disposition
10	Johnathan Kim	Page 1 1	<u>Purpose.</u> “.... Minimum performance standards (MPS) your traffic alert and collision avoidance system (TCAS) ....” Should be provided as TCAS I, to be consistent as subject title.	“.... Minimum performance standards (MPS) your traffic alert and collision avoidance system 1 (TCAS 1) ....”	<b>Not accepted.</b> TCAS is the generic acronym for the family of collision avoidance equipment and is made up of TCAS I, TAS and TCAS II. Use of that generic term here is appropriate.
11	Jonathan Kim	Page 4 (8) d	d. ”.....a plan for hardware aspects of certification (PHAC), hardware verification plan, top-level drawing, and hardware accomplishment summary (or similar document. as applicable). Best practice to submit the PHAC early in the development process.	d. “.....a plan for hardware aspects of certification (PHAC), hardware verification plan, top-level drawing, and hardware accomplishment summary (or similar document, as applicable). We recommend that you submit the PHAC early in the hardware development process. Early submitted allows us to quickly resolve any issues”	<b>Not accepted.</b> The language in this section is dictated by the TSO template in FAA Order 8150.1C CHG 2 dated 12/17/13.