

DOCUMENT REVIEW LOG

1. Document No.:		2. Project Lead:		3. Reviewing Office (Name and Phone Number):		4. Date of Review:		5. Date of AIR-100 Disposition:	
Item No:	Reviewer	Page and Paragraph No:	Comment:	Reason:	Recommendation:	AIR-100 Disposition:			
1.	ACSS	2, Table 1	Application 7 (ATAS) in TSO does not match the name (TSAA) in DO-317B.	Application name mis-match.	Change to TSAA.	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.			
2.	ACSS	4, 3. a. (7)	ATAS should be TSAA	Application name mis-match	Change to TSAA.	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.			

DOCUMENT REVIEW LOG

3.	ACSS	2, Table 1	Missing Equipment Class TSAA Annunciator Panel (D7)	Missing equipment class.	Add D7 to Table 1.	Accept. An additional column for the Annunciator Panel was added.
4.	ACSS	3, 3. a. (3)	The current DO-317B applications do not require TCAS Hybrid Surveillance functionality per TSO-C119d/DO-300A. It should also be acceptable to integrate with a TCAS system per TSO-C119c which does not require TCAS Hybrid Surveillance.	Hybrid not required.	Add TSO-C119c.	Accept. Removed version number from TSO-C119.
5.	ACSS	4, Table 2	Missing D7 in the table	Missing equipment class.	Add D7 to Table 2.	Accept.
6.	ACSS	General	Using and validating ADS-R sources for CAVS should not be a minimum requirement since CAVS operations will be impracticable with UAT equipped aircraft that are limited below 18,000ft. ADS-R and TIS-B is also impracticable for ITP operations	Sources not required for CAVS and ITP.	Add a statement that ADS-R is optional for CAVS; and ADS-R and TIS-B are optional for ITP. Also add that relevant limitations must be stated in the airplane flight manual.	Amended text to address ADS-R and TIS-B for CAVS and ITP.

DOCUMENT REVIEW LOG

7.	Airbus Helicopters	Page 2 § 3.a(1)	Although pre-existing in TSO-C195a, these considerations are of operational nature and should not appear in a TSO specification.	This paragraph is descriptive of the function at aircraft and operational level and specifies duties for the operators (training and operational approval) and for the TCH (flight manual). This is out of the scope of TSO applicants.	Delete § 3.a(1).	Submittal of operating instruction and equipment limitations is required before applying for a TSOA, as can be found in section 5 of the TSO. Therefore, the information in Page 2 § 3.a(1) is relevant.
8.	Airbus Helicopters	Page 3 § 3.a(3)	<p><i>"If the ASSAP equipment does not support this functionality, the installation manual must prohibit installation on an aircraft equipped with TAS or TCAS."</i></p> <p>This consideration should be better grouped with the installation manual limitations considerations in § 5.a(3).</p>	Improve document legibility and usability.	Move this consideration to § 5.a(3) and structure this paragraph to indicate all typical potential limitations inherent to ADS-B installations.	Submittal of operating instruction and equipment limitations is required for TSO submittal, as can be seen in section 5 of the TSO. Therefore, the information in Page 3 § 3.a(3) is relevant. Interface support for TCAS equipment is a TSO function and discussion in this section is acceptable.

DOCUMENT REVIEW LOG

9.	Airbus Helicopters	Page 3 § 3.a(3)	TSO-C119d is requested. In order to allow any easy retrofitting on existing A/C it is expected to allow compatibility with either TSO-C119c or TSO-C119d.	Allow easy fitting to existing fleet. Current mandates are still requesting TSO-C119c units, while TSO-C119d is optional. Also, according to TSO-C199d, applications to TSO-C119c are still acceptable till March 23, 2015.	Add TSO-C119c to the list of permissible standards	Accept. Removed TSO-C119 version letter.
10.	Airbus Helicopters	Page 4 § 3.a(7)	The statement is not a requirement	The statement is a functional description	Add the limitation regarding display availability to the limitation section	Text reworded to clarify functional uniqueness of ATAS application.
11.	Airbus Helicopters	Page 5 § 3.e	The text asks for developing software according to DO-178C and states that DO-178B can also be used if guidance in AC 20-115C is followed.	A more direct solution should be to ask developing software according to AC 20-115C. This would ensure that DO-178C is normally used and, if not, guidance is provided for the use of DO-178B.	Suggestion is to directly refer to AC 20-115C as the applicable standard, instead of DO-178C.	This language is per the new standard FAA TSO template to specifically address DO-178B and C.

DOCUMENT REVIEW LOG

12.	Airbus Helicopters	Page 6 § 5.a(3)	<p><i>"ATAS cannot be installed in aircraft that have a TCAS II system. It can be installed in an aircraft with TAS or TCAS I."</i></p> <p>This statement is just a fact. It does not explicitly ask for inserting such limitation in the installation manual.</p>	This does not appear as a requirement to state this incompatibility in the list of limitations.	<p>Suggestion is to make prescriptive that the incompatibility of ATAS and TCAS II shall be explicitly mentioned in the installation manual.</p> <p>Suggestion is also to list (and group) all potential incompatibilities / restrictions relevant to ADS-B installations, like the one mentioned in a comment above.</p>	<p>Revisions have been made in the TSO and will also be reflected in AC 20-172B to accommodate the existence of TCAS II with ATAS.</p>
13.	Airbus Helicopters	Page 6 § 5.a	<p>Major comment</p> <p>§ 3.a requests interfaces to be provided to other units fulfilling the functions which are not included in the unit.</p> <p>Therefore, it should be explicit in § 5.a that the manual needs to specify the interfaces or the list of compatible units.</p>	Information necessary to the system integrator.	<p>Add in § 5.a that the manual shall specify the interfaces to external units or give the list of compatible units.</p> <p>This stands for ADS-B receiver, TAS/TCAS, Digital Map, display, GNSS.</p>	<p>This comment is already true for existing installation manuals whether they are ADS-B or not. The interfaces listed in this TSO are called out specifically to address issues unique to ADS-B In applications.</p>

DOCUMENT REVIEW LOG

14.	Airbus Helicopters	Appendix 1	The guidance for ADS-R and TIS-B testing is not precise concerning traffic density and mixture in the test area	Performance of the receiver can be significantly impacted by traffic density.	Add guidance regarding the expected traffic density.	Not clear what the commenter wants added to this appendix. This appendix is meant for manufacturers who want to test their units with antennas on the ground to prevent interference with ATC operations. It is unclear what the frequency density of the airspace has to do with this.
15.	Airbus Helicopters	All	Some abbreviations used in this document seem out of date (e.g. ASA, ASSAP, ATAS) when comparing to RTCA/DO standards.	Consistency of wording.	Check abbreviations and correct as needed.	ASA and ASSAP are currently found in latest version of the MOPS, DO-317B. ATAS was created by FAA for this TSO.
16.	Mitre	2	The use of the term ATAS is new and not reflected in the RTCA standard.	Avoid confusion	In the TSO, explicitly make the connection between the TSAA requirements in the MOPS to ATAS in the TSO.	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.

DOCUMENT REVIEW LOG

17.	Astronautics Corporation of America	Page 2, Paragraph 3, Table 1	Replace ATAS with TSAA	Consistency with MOPS	Replace with "Traffic Situation Awareness with Alerts (TSAA)"	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.
18.	Astronautics Corporation of America	Page 4, Paragraph 3a.(7)	Replace ATAS with TSAA	Consistency with MOPS	Replace with "Traffic Situation Awareness with Alerts (TSAA)"	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.

DOCUMENT REVIEW LOG

19.	Aeronautics Corporation of America	Page 6, Paragraph 5a.(3)	Replace ATAS with TSAA	Consistency with MOPS	Replace with "TSAA"	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.
20.	Aeronautics Corporation of America	Page 4, Paragraph 3b.(3), Table 2	Add missing space to "Class 1,2,and 3"	Readability	Replace with "Class 1,2, and 3"	Accept.
21.	Aeronautics Corporation of America	Page 4, Paragraph 3b.(c)	Remove extra space from "FAA Automatic Dependent Surveillance-Rebroadcast (ADS-R)"	Readability	Replace with "FAA Automatic Dependent Surveillance-Rebroadcast (ADS-R)"	Accept.
22.	Aeronautics Corporation of America	Page 9, Paragraph 6f.	Modify text alignment	Readability	Align text of item 7 ("The results...") with other points in this paragraph	Accept.

DOCUMENT REVIEW LOG

23.	Boeing	<p>Page 2: Table 1 – ASA Functional Equipment Classes (per DO-317B) Page 4: Paragraph 3.a.(7) Page 6: Paragraph 5.a.(3)</p>	<p>Page 2, Table 1, has the following new ADS-B In application added as part of Rev. B of this TSO:</p> <table border="1" data-bbox="711 435 999 532"> <tr> <td style="text-align: center;">7</td> <td>ADS-B Traffic Awareness System (ATAS)</td> </tr> </table> <p>“ATAS” is also called out on Pages 4 and 6 as noted above.</p>	7	ADS-B Traffic Awareness System (ATAS)	<p>The application’s name -- “ADS-B Traffic Awareness System (ATAS)” -- used within the draft TSO-C119b is not the same as the application name of “Traffic Situation Awareness with Alerts (TSAA),” used in the industry standard Minimum Operational Performance Standards (MOPS), DO-317B, that this draft TSO-C195b is based upon. The “TSAA” name is also used for this application in the recently issued draft FAA Advisory Circular (AC) 90-114A, “ADS-B Operations.”</p>	<p>Boeing recommends that the application’s name within TSO-C195b be changed to “Traffic Situation Awareness with Alerts (TSAA)” to be consistent with DO-317B and draft AC 90-114A.</p>	<p>The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.</p>
7	ADS-B Traffic Awareness System (ATAS)							

DOCUMENT REVIEW LOG

24.	Boeing	<p>Page: 3 Paragraph: 3.a.(3)</p>	<p>The proposed text states: “(3) If intended for installation on aircraft with Traffic Advisory System (TAS) or Traffic alert and Collision Avoidance System (TCAS) equipment, ASSAP equipment authorized under this TSO must contain or support an interface to equipment complying with TSO-C147, <i>Traffic Advisory System (TAS) Airborne Equipment</i>, TSO-C118, <i>Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I</i>, or TSO-C119d, <i>Traffic Alert and Collision Avoidance System, (TCAS) Airborne Equipment, TCAS II with Optional Hybrid Surveillance. ...</i>”</p>	<p>We suggest changing the text to read as follows: “(3) If intended for installation on aircraft with Traffic Advisory System (TAS) or Traffic alert and Collision Avoidance System (TCAS) equipment, ASSAP equipment authorized under this TSO must contain or support an interface to equipment complying with TSO-C147, <i>Traffic Advisory System (TAS) Airborne Equipment</i>, TSO-C118, <i>Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I</i>, or TSO-C119d, <i>Traffic Alert and Collision Avoidance System, (TCAS) Airborne Equipment, TCAS II with Optional Hybrid Surveillance. ...</i>”.</p>	<p>Correct the title of TSO-C119d.</p>	<p>Comments accepted.</p>
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DOCUMENT REVIEW LOG

25.	Embraer	Page 2, paragraph 3 (Requirements), Table 1 (ASA functional Equipment Classes), row 7	TSO-C195b references an application named ATAS, whose functionality is not explained in either DO-317B or in the body of the TSO itself.	If one reads RTCA DO-317B, one will find table 2-1, on page 21, which is equivalent to Table 1 of TSO-C195b. On row 7, one will also find the application TSAA (Traffic Situational Awareness with Alerts) instead of the ATAS (ADS-B Traffic Awareness System) application. And throughout DO-317B, there is not a single mention to the ATAS application, but instead to the TSSA. Therefore, Embraer is wondering whether the ATAS application is another designation of the TSSA application. If this is indeed correct, TSO-C195b should be explicit about that. Otherwise, TSO-C195b should define or at least explain what the ATAS application is.	If Embraer's assumption is indeed correct, after row 7, Table 1, the following footnote should be added: <i>"ATAS (ADS-B Traffic Awareness System) is another way to refer to the TSAA (Traffic Situational Awareness with Alerts) application."</i>	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.
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DOCUMENT REVIEW LOG

26.	Embraer	Page 4, paragraph 3 (Requirements), item a.(7)	If the ATAS application is indeed another denomination for the TSAA, then one might be led to believe that the TSAA is an aural-only application, which may not be true, since, depending on the implementation, it may be installed with a Traffic Display.	Section 1.2.2.3 from DO-317B clearly states that a TSAA may be installed with or without a Traffic Display. However, if one reads paragraph 3.a.(7) from the draft version of TSO-C195b, one might be led to believe that the TSAA is solely an aural implementation, with just an annunciator panel, which might be inaccurate depending on the TSAA implementation.	<p>If Embraer's assumption about the ATAS application being another designation for the TSAA is indeed correct, then the following text passage:</p> <p><i>"7) ADS-B Traffic Awareness System (ATAS) is the only ADS-B application with an aural-only implementation (via an annunciator panel). All other applications require a traffic display as defined by the CDTI requirements."</i></p> <p>should be changed to:</p> <p><i>"7) ADS-B Traffic Awareness System (ATAS) is the only ADS-B application with that may have an aural-only implementation (via an annunciator panel). All other applications require a traffic display as defined by the CDTI requirements."</i></p>	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.
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DOCUMENT REVIEW LOG

27.	Embraer	Pages 6 and 7, paragraph 5 (Application Data Requirements), item a.(3)	The way the ATAS requirements is written on this paragraph might lead one to believe that the ATAS could be installed in an aircraft equipped with TAS or TCAS I without supporting or containing an interface to it.	When one reads paragraph 3 (Requirements), item a.(3), one understands that if the ASSAP equipment is installed in aircraft with TAS or TCAS I, then it must contain or support an interface to TAS or TCAS I. However, when one reads paragraph 5 (Application Data Requirements), item a.(3), one might be led to believe that ATAS could be installed in aircraft with TAS or TCAS I, without supporting/containing an interface to the ATAS/ASSAP equipment, what contradicts paragraph 3.a.(3).	<p>The text passage:</p> <p><i>“(3) Installation procedures and limitations sufficient to ensure that the ADS-B ASA equipment, when installed according to the installation or operational procedures, still meets this TSO’s requirements. ATAS cannot be installed in aircraft that have a TCAS II system. It can be installed in an aircraft with TAS or TCAS I. (...)”</i></p> <p>should be changed to:</p> <p><i>“(3) Installation procedures and limitations sufficient to ensure that the ADS-B ASA equipment, when installed according to the installation or operational procedures, still meets this TSO’s requirements. ATAS cannot be installed in aircraft that have a TCAS II system. It can be installed in an aircraft with TAS or TCAS I, provided that it supports an interface with ASSAP equipment, as described in section 3.a.(3). (...)”</i></p>	Accept. Deleted text from 5.a.3
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DOCUMENT REVIEW LOG

28.	L3 Communications	2, Table 1	Application 7 (ATAS) in TSO does not match the name (TSAA) in DO-317B.	Application name mismatch.	Change to TSAA.	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.
29.	L3 Communications	4, §3. a. (7)	ATAS should be TSAA	Application name mismatch	Change to TSAA.	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.
30.	L3 Communications	2, Table 1	Missing Equipment Class TSAA Annunciator Panel (D7)	Missing equipment class.	Add D7 to Table 1.	Accept.

DOCUMENT REVIEW LOG

31.	L3 Communications	3, §3. a. (3)	The current DO-317B applications do not require TCAS Hybrid Surveillance functionality per TSO-C119d/DO-300A. It should also be acceptable to integrate with a TCAS system per TSO-C119c which does not require TCAS Hybrid Surveillance.	Hybrid not required.	Add TSO-C119c.	We will remove the TSO-C119 version letter.
32.	L3 communications	4, Table 2	Missing D7 in the table	Missing equipment class.	Add D7 to Table 2.	Accept.
33.	L3 Communications	General	Using and validating ADS-R sources for CAVS should not be a minimum requirement since CAVS operations will be impracticable with UAT equipped aircraft that are limited below 18,000ft. ADS-R and TIS-B is also impracticable for ITP operations	Sources not required for CAVS and ITP.	Add a statement that ADS-R is optional for CAVS; and ADS-R and TIS-B are optional for ITP. Also add that relevant limitations must be stated in the airplane flight manual.	Amended text to address ADS-R and TIS-B for CAVS and ITP.
34.	L3 Communications	12, Appendix 1 §1.2	Update document link.	The linked document is not current.	Update link to point to the November 2013 release of the document.	Accept.

DOCUMENT REVIEW LOG

35.	Rockwell Collins	Page 3 Section 3.a. (3)	The document states that a TCAS II system that interfaces with a TSO-C195b system must meet the requirements of TSO-C119d. This seems to stretch the requirements discussed in the industry meetings.	The discussions held in SC-186 WG4 indicated that the functionality being discussed would be acceptable with a non-Hybrid TCAS II system. Evidence of this is in the MOPS. Section 2.2.3.1.3.5 states, "For systems that are performing validation based on TCAS reply data solicited from standard TCAS surveillance interrogations, ASSAP shall revalidate the ... position data of traffic at the revalidation intervals defined in DO-300 Section 2.2.7.4 or DO-300A Section 2.2.7.5." This language was added specifically to provide guidance for non-Hybrid TCAS II systems. There is other language within this same section that gives recommendations for systems integrated with a Hybrid TCAS II system, but no requirement was added or even hinted	Remove the requirement for a Hybrid TCAS II system. Allow for TSO-C195b functionality to be enabled in a TSO-C119c system.	Accept. Removed version number from TSO-C119.
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DOCUMENT REVIEW LOG

				<p>at for the applications being discussed that it was necessary to be a Hybrid TCAS II system. If such a requirement had been proposed it would have been a "non-concur" item. The addition of this requirement in the TSO seems to circumvent some of the understanding that was obtained in developing the MOPS.</p>		
36.	Doug Arbuckle	Page 2, Table 1	<p>The draft TSO renames Application 7 (known in DO-317B as TSAA) to "ADS-B Traffic Awareness System (ATAS)". This is not an improvement.</p>	<p>It is unclear why AIR-130 proposes to rename an ADS-B-In application as part of the TSO process. AIR-130 has not done this for any other ADS-B-In application. TSAA has been used by the community for over 3 years to describe Application 7 in the TSO-C195b draft.</p> <p>The draft TSO-C195b makes no reference to "TSAA" (as it's known in DO-317B), so the applicant has no clear way to know that ATAS=TSAA.</p>	<p>First choice: Use "TSAA" in referring to Application 7, matching DO-317B.</p> <p>OR</p> <p>Second choice: Use a common meaning for the acronym "TAS" among TSO-C147a and TSO-C195b. If this approach is taken, then also add a sentence or paragraph explaining that "ATAS" as defined in the draft TSO-C195b is really "TSAA" as described in DO-317B and why AIR-130 felt that it had to rename the application in the TSO.</p>	<p>AIR-130 favors the second suggestion you have provided.</p> <p>The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.</p>

DOCUMENT REVIEW LOG

				TSO-C147a refers to a TAS as a "Traffic Advisory System" and TSO-C195b refers to a 'TAS' as a "Traffic Awareness System", so use of the acronym "TAS" across related TSOs is not consistent.		
37.	Doug Arbuckle	Page 3, 3.a.(1)	Reference is made to "AC 90-114, Change 2"	This document does not exist as of the review date. A draft of AC 90-114A has been released for public comment.	Refer to "the latest revision of AC 90-114" instead.	Accept. AC 90-114, Change 2 was expected to be published before the release of TSO-C195b. However, delays to AC 90-114, Change 2 have put the publication date past the date of this TSO. AC 90-114, <i>Change 1</i> will be referenced instead.
38.	Doug Arbuckle	Page 3, 3.a.(3)	Reference is made to "TSO-C147, Traffic Advisory System (TAS) Airborne Equipment"	The draft for TSO-C147a is simultaneously out for review. The relationships between TSO-C195b and TSO-C147a are unclear.	Clarify whether TSO-C195b is intended to refer to "the latest revision of TSO-C147" or not.	Even though TSO-C147a is very close to being published. However, it will not be published before the publication of TSO-C195b. Therefore, we are required to reference the current version, which is TSO-C147

DOCUMENT REVIEW LOG

39.	Garmin	Page 2, Paragraph 3.	The paragraph calls out DO-317B without any modifications. In the time period since approval of DO-317B, RTCA Special Committee 147 has continued to debate whether TSAA (ATAS) alerting can be used with TCAS II for ADS-B/ADS-R/TIS-B targets that are not tracked with TCAS. Depending on the outcome of that debate, this TSO may need to revise MOPS requirement DO-317B 2.2.4.5.3.3 (requirement # 2223)	As noted in the comment, the issue of integrating TSAA (ATAS) alerting with TCAS II is not settled. There is a significant contingent within SC-147 that believes that it is a safety enhancement to use TSAA (ATAS) alerting on ADS-B/ADS-R/TIS-B targets that are not tracked by TCAS II. It is premature to release this TSO before that committee has reached a conclusive recommendation.	If SC-147 determines that TSAA (ATAS) integration with TCAS II is acceptable, this paragraph should be updated to reference a modification to DO-317B 2.2.4.5.3.3.	SC-147 has determined that ATAS can be integrated with TCAS. Language to reflect this was included in the TSO.
40.	Garmin	Page 2, Table 1	<p>“Criticality Level” column.</p> <p>The Criticality Level defined in Table 1 is inconsistent with SPRs.</p>	<p>Table 1’s title is “ASA Functional Equipment Classes”. It is more appropriate to include the “Criticality Level” in paragraph 3.b, which discusses Failure Condition Classifications.</p> <p>See additional comments on paragraph 3.b with respect to the “Criticality Level” column classifications not being supported by the SPR’s for the EVAcq, AIRB, SURF or VSA applications.</p>	<p>Remove the “Criticality Level” column.</p> <p>See additional suggestions on paragraph 3.b.</p>	<p>Putting these columns into TSO-C195 original draft was a compromise with SC-186. It is not open for debate with this revision of the TSO.</p>

DOCUMENT REVIEW LOG

41.	Garmin	Page 2 Line 7 of Table 1	ATAS is not the name used in DO-317.	It would be confusing to read the TSO with one name and the MOPS with a different one.	"ATAS" should be globally replaced in TSO-C195b with "TSAA" to correspond with DO-317B. (e.g., additional instances of "ATAS" appear on page 4, paragraph 3.1.(7) and page 6-7, paragraph 5.a.(3))	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the equivalent of TSAA.
42.	Garmin	Page 3, Paragraph 3.a.(3)	The paragraph states that ASSAP equipment must contain or support and interface to functions defined by specific TSO versions. There is no reason to call out specific versions of these TSOs.	The specific versions of TAS/TCAS I/TCAS II TSOs are not required to meet the functional requirements for TSO-C195b. Specifying a single version of these TSOs will result in industry requesting deviations.	Revise the paragraph to allow any version of TSO-C147, TSO-C118, and TSO-C119 (i.e. use open brackets in a manner similar to paragraph 3.a.(6)).	Accept.
43.	Garmin	Page 3, Paragraph 3.a.(4)	The paragraph states that Class A and B equipment (CDTI) must comply with the latest version of TSO-C165. There is no reason to call out a specific revision of this TSO.	The specific version of TSO-C165 is not required to meet the functional requirements for TSO-C195b. Specifying a single version of this TSO will result in industry requesting deviations.	Revise the paragraph to allow any version of TSO-C165 (i.e. use open brackets in a manner similar to paragraph 3.a.(6)).	FAA believes that new implementations of the Surface application should meet TSO-C165A. Legacy TSO-C165 implementation may also be acceptable with further review. Usage of the deviation process will ensure this review occurs.

DOCUMENT REVIEW LOG

44.	Garmin	Page 3, Paragraph 3.a.(5)	The paragraph states that equipment may include or interface with multipurpose electronic display equipment complying with a specific version of TSO-C113. There is no reason to call out a specific revision of this TSO.	The specific version of TSO-C113 is not required to meet the functional requirements for TSO-C195b. Specifying a single version of this TSO will result in industry requesting deviations.	Revise the paragraph to allow any version of TSO-C113 (i.e. use open brackets in a manner similar to paragraph 3.a.(6)).	Accept.
45.	Garmin	Page 3, Paragraph 3.a.(5)	The paragraph states that equipment may include or interface with multipurpose electronic display equipment complying with a specific version of TSO-C113. There is no reason to call out a specific revision of this TSO.	The specific version of TSO-C113 is not required to meet the functional requirements for TSO-C195b. Specifying a single version of this TSO will result in industry requesting deviations.	Revise the paragraph to allow any version of TSO-C113 (i.e. use open brackets in a manner similar to paragraph 3.a.(6)).	Accept.
46.	Garmin	Page 3, Paragraph 3.a.(5)	The paragraph states that equipment may include or interface with multipurpose electronic display equipment complying with a specific version of TSO-C113. There is no reason to call out a specific revision of this TSO.	The specific version of TSO-C113 is not required to meet the functional requirements for TSO-C195b. Specifying a single version of this TSO will result in industry requesting deviations.	Revise the paragraph to allow any version of TSO-C113 (i.e. use open brackets in a manner similar to paragraph 3.a.(6)).	Accept.
47.	Garmin	Page 2, Paragraph 3.	The paragraph calls out DO-317B without any modifications. In the time period since approval of DO-317B, RTCA Special Committee 147 has continued to debate whether TSAA (ATAS) alerting can be used with TCAS II for ADS-B/ADS-R/TIS-B targets that are not tracked with TCAS.	As noted in the comment, the issue of integrating TSAA (ATAS) alerting with TCAS II is not settled. There is a significant contingent within SC-147 that believes that it is a safety enhancement to use TSAA (ATAS) alerting on ADS-B/ADS-R/TIS-B targets that are	If SC-147 determines that TSAA (ATAS) integration with TCAS II is acceptable, this paragraph should be updated to reference a modification to DO-317B 2.2.4.5.3.3.	SC-147 has determined that ATAS can be integrated with TCAS. Language to reflect this was included in the TSO.

DOCUMENT REVIEW LOG

			Depending on the outcome of that debate, this TSO may need to revise MOPS requirement DO-317B 2.2.4.5.3.3 (requirement # 2223)	not tracked by TCAS II. It is premature to release this TSO before that committee has reached a conclusive recommendation.		
48.	Garmin	Page 2, Table 1	<p>"Criticality Level" column.</p> <p>The Criticality Level defined in Table 1 is inconsistent with SPRs.</p>	<p>Table 1's title is "ASA Functional Equipment Classes". It is more appropriate to include the "Criticality Level" in paragraph 3.b, which discusses Failure Condition Classifications.</p> <p>See additional comments on paragraph 3.b with respect to the "Criticality Level" column classifications not being supported by the SPR's for the EVAcq, AIRB, SURF or VSA applications.</p>	<p>Remove the "Criticality Level" column.</p> <p>See additional suggestions on paragraph 3.b.</p>	<p>Putting these columns into TSO-C195 original draft was a compromise with SC-186. It is not open for debate with this revision of the TSO.</p>
49.	Garmin	Page 2 Line 7 of Table 1	ATAS is not the name used in DO-317.	It would be confusing to read the TSO with one name and the MOPS with a different one.	"ATAS" should be globally replaced in TSO-C195b with "TSAA" to correspond with DO-317B. (e.g., additional instances of "ATAS" appear on page 4, paragraph 3.1.(7) and page 6-7, paragraph 5.a.(3))	The name TSAA was kept in DO-317B since it was also the title of an SPR document and referenced in various traffic advisory sources. However, the FAA would like to change the name to maintain consistency with our existing traffic advisory equipment terminology. A note was added to explain that ATAS is the

DOCUMENT REVIEW LOG

						equivalent of TSAA.
50.	Garmin	Page 3, Paragraph 3.a.(3)	The paragraph states that ASSAP equipment must contain or support and interface to functions defined by specific TSO versions. There is no reason to call out specific versions of these TSOs.	The specific versions of TAS/TCAS I/TCAS II TSOs are not required to meet the functional requirements for TSO-C195b. Specifying a single version of these TSOs will result in industry requesting deviations.	Revise the paragraph to allow any version of TSO-C147, TSO-C118, and TSO-C119 (i.e. use open brackets in a manner similar to paragraph 3.a.(6)).	Accept.
51.	Garmin	Page 3, Paragraph 3.a.(4)	The paragraph states that Class A and B equipment (CDTI) must comply with the latest version of TSO-C165. There is no reason to call out a specific revision of this TSO.	The specific version of TSO-C165 is not required to meet the functional requirements for TSO-C195b. Specifying a single version of this TSO will result in industry requesting deviations.	Revise the paragraph to allow any version of TSO-C165 (i.e. use open brackets in a manner similar to paragraph 3.a.(6)).	FAA believes that new implementations of the Surface application should meet TSO-C165A. Legacy TSO-C165 implementation may also be acceptable with further review. Usage of the deviation process will ensure this review occurs.
52.	Garmin	Page 3, Paragraph 3.a.(5)	The paragraph states that equipment may include or interface with multipurpose electronic display equipment complying with a specific version of TSO-C113. There is no reason to call out a specific revision of this TSO.	The specific version of TSO-C113 is not required to meet the functional requirements for TSO-C195b. Specifying a single version of this TSO will result in industry requesting deviations.	Revise the paragraph to allow any version of TSO-C113 (i.e. use open brackets in a manner similar to paragraph 3.a.(6)).	Accept.
53.	Garmin	Page 4, Paragraph 3.b.	Includes the statements Failure of the function defined in paragraph 3.a of this TSO has been determined to be a major failure condition for	The Major failure condition/classification for hazardously misleading information in the quoted statements and Table 1's "Criticality Level"	Suggest: 1. Delete Paragraphs 3.b.(1) and 3.b.(2) 2. Adjust the text of Paragraph 3.b.(3) as follows:	FAA deliberately set the baseline hazard levels and DALs for these applications after thorough policy review among FAA directorate policies for existing traffic

DOCUMENT REVIEW LOG

			<p>malfunctions causing the display of hazardously misleading information in airborne aircraft and aircraft on the ground with groundspeed greater than 80 knots. Failure of the function defined in paragraph 3.a of this TSO has been determined to be a minor failure condition for malfunctions causing the display of hazardously misleading information in aircraft on the ground with a groundspeed of 80 knots or less</p> <p>and</p> <p>Loss of function defined in paragraph 3.a has been determined to be a minor failure condition.</p>	<p>column are not supported by the SPR's for the EVAcq, AIRB, SURF, TSAA (ATAS) or VSA applications. The EVAcq, AIRB, SURF, TSAA (ATAS) and VSA applications were assigned a "criticality level" of Minor in their respective SPRs (DO-289 for EVAcq, DO-319 for AIRB, DO-322 for SURF, DO-348 for TSAA, and DO-314 for VSA). Ignoring the SPRs and requiring higher failure classifications with the consequent higher design assurance levels will inappropriately stifle the installation of the safety-enhancing ASA functionality, which is in direct contradiction to the FAA's charter.</p> <p>It should also be noted that RTCA DO-317B section 2.2.4.1.2 allows traffic with SDA ≥ 1 (probability of transmitting misleading information less than or equal to $1e-3$) to be marked valid for the EVAcq and AIRB applications. This is in conflict with the stated</p>	<p>"Table 2 defines the failure classifications for the function defined in paragraph 3.a of this TSO. Develop the system to, at least, the design assurance level required by the anticipated installation for the functionality defined in paragraph 3.a."</p> <ol style="list-style-type: none"> 3. Revise Table 2 to be like Table 1 with the Application and Equipment Class columns. 4. Remove the "Criticality Level" column from Table 1. 5. Create "Loss of Function" and "Misleading Information" columns in Table 2. See AC 20-138D Table 8 as an example; the AC 20-138D columns would be the ASA applications rows. 6. Revise the failure classifications for the EVAcq, AIRB, SURF, TSAA (ATAS) and VSA applications to be Minor for both loss of function and 	<p>advisory equipment and the expected usage for future applications using this equipment. These requirements are believed to be consistent with existing policy and will prevent manufacturers from rework when adding applications to the base equipment.</p>
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DOCUMENT REVIEW LOG

				<p>criticality requirement of Major (probability of displaying misleading information less than or equal to 1e-5). RTCA DO-317B section 2.2.4.2.2 allows traffic with SDA ≥ 1 to be marked valid for SURF, and RTCA DO-317B section 2.2.4.3.2 allows traffic with SDA ≥ 1 to be marked valid for VSA. These all conflict with the stated criticality requirement of Major.</p> <p>Additionally, none of these SPRs recognized a speed threshold at which the "criticality level" of the application increased. This is particularly troublesome because Table 1 indicates class A2 and A3 equipment is "Major (> 80 Knots)" yet Table 2 indicates class A2 and A3 equipment requires Minor design assurance even for Part 23 Class 4, Part 25, 27, 29.</p> <p>Additionally, the FAA typically does not reference Advisory Circulars in TSOs and Garmin recommends</p>	<p>misleading information to be consistent with their respective SPRs.</p> <ol style="list-style-type: none"> 7. Eliminate the 80 Knots threshold on the SURF application rows to be consistent with its SPR. 8. Revise the title of Table 2 to "ASA Application Failure Classifications". 9. Add the following Note after Table 2 to address the issue that future applications may require a higher failure classification: <p style="padding-left: 40px;">"Note: Systems developed to the minimum design assurance level for Table 2 ASA Applications Failure Classifications may require design assurance level upgrades for use with future ASA applications envisioned to require higher failure classifications."</p> <p>See the suggested changes to paragraph 3.b and Table 2 at the end of this document.</p>	
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DOCUMENT REVIEW LOG

				<p>against doing so as any of the referenced ACs may change the design assurance level guidance, which will necessitate TSO deviations and/or a revision to the TSO. For example, the current Part 23 Reorganization ARC appears to be headed in the direction of further reducing certification requirements, including design assurance level for low end Part 23 aircraft. Furthermore, the Part 23 Reorg ARC is likely to recommend that means of compliance for regulations be placed in industry standards that can be recognized by certification authorities worldwide, not just the FAA ACs.</p>		
54.	Garmin	Page 4, Paragraph 3.b.(3)	<p>Includes the statement:</p> <p style="padding-left: 40px;">Develop the system to, at least, the design assurance level applicable to these failure condition classifications.</p> <p>Wording needs to change to allow failure condition to</p>	<p>This statement implies the failure condition classification of an appliance is determined by the TSO regardless of mitigations employed to meet aircraft level safety requirements such as redundant appliances/systems. Unless the DAL cannot</p>	<p>Suggest changing to the following wording:</p> <p style="padding-left: 40px;">Develop the system to, at least, the design assurance level required by the anticipated installation for the functionality defined in paragraph 3a.</p>	<p>It is unclear what mitigation at the aircraft level would be for a hazard to the NAS caused by the surveillance system malfunction. This argument may be valid for other avionics systems but is not valid for surveillance</p>

DOCUMENT REVIEW LOG

			<p>be determined at the aircraft level.</p>	<p>be affected by the installation, the aircraft System Safety Assessment should determine the failure classification and by extension, the design assurance level (DAL) requirement. The aircraft FHA/SSA ultimately determines the DAL requirement for a particular installation. Specifying the DAL at the appliance level without the benefit of the specific aircraft level FHA/SSA means that in some cases the DAL will undoubtedly be higher and more costly than necessary. This will have a chilling effect on the installation of new, safety enhancing technologies since the cost will be greater than necessary. It is possible to build and certify a TSOA appliance that cannot be approved for installation in one or more aircraft types because it does not have the required DAL. Similarly, just because the appliance meets a TSO DAL does not mean it can be approved for</p>	<p>See the suggested changes to paragraph 3.b and Table 2 at the end of this document.</p>	<p>appliances that affect other aircraft in the NAS.</p>
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DOCUMENT REVIEW LOG

				<p>installation. We recommend that no failure classification/DAL requirement be included in a TSO when the installation can affect or mitigate the hazard level and therefore consideration should be given to revising paragraph 3.b in this TSO to the general guidance in the Recommendation column. (Note that TSO-C112d is an example where a classification/DAL may be appropriate as a transponder output is used by the national airspace system and the installation has no ability to mitigate the safety risk.)</p>		
55.	Garmin	Page 4, Table 2, Row 1, Column 4	If previously suggested revisions are not made to Table 2, DO-178B should be referenced along with DO-178C.	Paragraph 3.e allows RTCA/DO-178B as the standard for software qualification.	Replace "DO-178C" with "DO-178B/C"	This language is per the new standard FAA TSO template to specifically address DO-178B and C.
56.	Garmin	Page 6, Paragraph 4.a	<p>Includes the statement:</p> <p>The marking must include the serial number and functional equipment class(es) in accordance with Table 1 of Section 3.</p>	Garmin is routinely granted deviations from TSO requirements to mark the "applicable equipment class(es)" as the equipment does not have sufficient space to include this as well as all other required markings	<p>Remove "and functional equipment class(es) in accordance with Table 1 of Section 3" from the quoted text.</p> <p>Add a new paragraph under 5.a requiring the equipment class(es) to be</p>	Accept

DOCUMENT REVIEW LOG

			The Order 8150.1C TSO template does not include the "functional equipment class(es)" phrase.	(e.g., multiple TSOs and SW level, etc. that appear in other TSOs). This deviation is granted through use of a marking similar to the example in Order 8150.1C ¶ 7-4.e.(4).(b) "See Inst Mnl for Addtl TSO approvals and/or markings.")	included in the "Manual(s)".	
57.	Garmin	Page 6, Paragraph 4.b.(2)	Paragraph 4.b.(2) states: Each subassembly of the article that you determined may be interchangeable. This language is confusing.	The language for this requirement is confusing. This could mean that a stuffed printed circuit board needs the TSO number.	Suggest removing the statement or if removing causes problems, work with industry to establish wording that is better understood.	This language is per FAA TSO standard template language.
58.	Garmin	Page 6-7, Paragraph 5.a.(3)	As noted in Garmin's comment on Paragraph 3, it is not settled that TSAA (ATAS) should not be integrated with TCAS II.	As noted in the comment on Paragraph 3, the issue of integrating TSAA (ATAS) alerting with TCAS II is not settled. There is a significant contingent within SC-147 that believes that it is a safety enhancement to use TSAA (ATAS) alerting on ADS-B/ADS-R/TIS-B targets that are not tracked by TCAS II. It is premature to release this TSO before that committee has reached a conclusive recommendation.	If SC-147 determines that TSAA (ATAS) integration with TCAS II is acceptable, this paragraph should be updated to remove the following: "ATAS cannot be installed in aircraft that have a TCAS II system. It can be installed in an aircraft with TAS or TCAS I."	Text was modified to allow integration with TCAS II.
59.	Garmin	Page 7,	TSO paragraph 5.f and its	TSO paragraph 5.f	Adjust the wording in the	This language is per FAA

DOCUMENT REVIEW LOG

		Paragraph 5.f	<p>subparagraphs include definition of non-TSO functions and the data to be submitted to the ACO for non-TSO functions. This guidance is inconsistent with Order 8110.4C CHG 4.</p>	<p>states "Identify functionality or performance contained in the article not evaluated under paragraph 3 of this TSO (that is, non-TSO functions)." Use of the term "performance" in the definition of a non-TSO function is inconsistent with the Order 8110.4C CHG 4 paragraph 6-9.b.(1) and 6-9.b.(3)(a) guidance regarding how to define a non-TSO function. The issue is non-TSO should not be defined as "performance". It will create difficulty if these criteria are used. For example, if a TSO requires a minimum 10 watt transmitter and a company makes equipment that is robust at 11 watts, the performance exceeding the TSO is not called out under the TSO; consequently, by the paragraph 5.f "performance" definition, the 11 watt transmitter has a non-TSO 1 watt capability. The distinction of a "function that can be</p>	<p>TSO (and template) to be consistent with the 8110.4C CHG 4 intent.</p>	<p>TSO standard template language.</p>
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DOCUMENT REVIEW LOG

				accomplished outside the TSO box” as is specified in Order 8110.4C CHG 4 paragraph 6-9 is critical to making non-TSO function work long term.		
60.	Garmin	Page 9, Paragraph 7.b	TSO paragraph 7.b contains wording that is inconsistent with Order 8110.4C CHG 4.	TSO paragraph 7.b includes additional guidance about what furnished data should be provided to an operator or repair station when the equipment includes a non-TSO function. The problematic guidance states “include one copy of the data in paragraphs 5.f.(1) through 5.f.(4).” This guidance is inconsistent with Order 8110.4C CHG 4. Order 8110.4C CHG 4 paragraph 6-9.b.(6) defines the FAA-industry agreed data that must be provided to an installer when equipment includes a non-TSO function.	Adjust the wording in the TSO (and template) to be consistent with the 8110.4C CHG 4 intent.	This language is per FAA TSO standard template language.

Suggested changes to paragraph 3.b.(3) and Table 2:

b. Failure Condition Classifications. Table 2 defines the failure classifications for the function defined in paragraph **3.a** of this TSO. Develop the system to, at least, the design assurance level required by the anticipated installation for the functionality defined in paragraph **3.a**.

DOCUMENT REVIEW LOG

				Equipment Classes		
	Application	Loss of Function	Misleading Information	CDTI (Surface Only) (A)	CDTI (B)	ASSAP (C)
1	Enhanced Visual Acquisition (EVAcq)	Minor	Minor	Not Permitted	B1	C1
2	Basic Surface (Runways)	Minor	Minor	A2	B2	C2
3	Basic Surface (Runways + Taxiways)	Minor	Minor	A3	B3	C3
4	Visual Separation on Approach (VSA)	Minor	Minor	Not Permitted	B4	C4
5	Basic Airborne (AIRB)	Minor	Minor	Not Permitted	B5	C5
6	In-Trail Procedures (ITP)	Minor	Major	Not Permitted	B6	C6
7	ADS-B Traffic Awareness System (ATAS)	Minor	Minor	Not Permitted	B7	C7
8	CDTI Assisted Visual Separation (CAVS)	Minor	Major	Not Permitted	B8	C8

Table 2 – ASA Application Failure Classifications

DOCUMENT REVIEW LOG

Note: Systems developed to the minimum design assurance level for Table 2 ASA applications failure classifications may require design assurance level upgrades for use with future ASA applications envisioned to require higher failure classifications.