

DOCUMENT COMMENT LOG

Originating Office:	Document Description:	Project Lead:	Reviewing Office:	Date of Review:
AIR-130	Public Comments TSO-126b	Charisse Green		

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
ACK Technologies	General	The 6 orthogonal axis shock tests required by DO-204A did not address the cross axis forces which are present in almost all aircraft accidents.	This force can lift the ELT from its tray while still subjecting the ELT to strong fore or aft force along the orthogonal axis.	I would recommend that you incorporate two additional axes' to be tested in either DO-204A as a change or in the TSO itself.	Accepted. The following language is added to the TSO-C126b functional qualification paragraph. "The shock and crash safety tests in RTCA/DO-204A sections 2.3.4.1 and 2.6.3.2 require testing coincident with each orthogonal axes individually. Additionally, to better simulate more realistic aircraft crash scenarios, we recommend shock and crash safety testing be accomplished with simultaneous longitudinal and vertical cross-axis forces."
Emerging Lifesaving Technologies	General	Upon review of the proposed change to eliminate hook and loop straps there are certainly some valid concerns regarding proper tensioning and degradation of these fasteners. We feel that most, if not all of them can be addressed by updating the inspection requirements in addition to putting a life limit on the hook		We recommend that the inspection requirements be updated to include detailed instruction to aircraft maintenance personnel to ensure that the hook and loop strap is properly tensioned, clear of all debris and had not reached its life-limit as established by the manufacturer or	Not Accepted. Improving the installation procedures and requiring life limits on hook and loop fasteners have potential to reduce probability of the ELT retention system failure. However, installation repeatability is still variable and there is no

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
		and loop straps.		FAA regulation. Placing a life limit on the strap will ensure that it will not degrade beyond serviceability through the repeated fastening and unfastening required to accomplish annual certification. We recommend that the straps be replaced in conjunction with battery replacement.	method to evaluate fastener tension during installation. New designs can be accomplished with alternatives to hook and loop fasteners and the FAA finds this appropriate for TSO-C126b.
Emerging Lifesaving Technologies	General	The replacement of a hook and loop strap with a metal one brings further questions that we feel should be considered before issuing the new guidance.	Will the change to a metal strap be considered a minor change, or a major one? How will this modification affect a manufacturer's Cospas-Sarsat Type Approval Certificate? Will Cospas-Sarsat allow the change without complete environmental testing to the standards outlined in C/S T.007? The proposed TSO, like its predecessor, requires Cospas-Sarsat approval before the Administration will issue TSOA. This could create an unforeseen challenge to ELT manufacturers and their customers if equipment is unavailable due to re-testing requirements.		Acknowledged. Each applicant must determine if the design change is minor or major based on 14 CFR § 21.619. The FAA will review the design changes in accordance with FAA Order 8150.1C, <i>Technical Standard Order Program</i> . Additionally, in accordance with Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard C/S T.007 paragraph 6.8, if the change might affect the beacon electrical performance a change notice form must be submitted to Cospas-Sarsat. The scope of the testing and reporting requirements

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
					<p>will be determined by Cospas-Sarsat after a review of the modifications. Depending on the modifications, Cospas-Sarsat could make three determinations. 1) No additional tests or analyses are required and only the documentation needs to be amended. 2) Limited testing is required. Depending on the test(s) needed, testing may be required in a test lab or could be allowed at the manufacturer facility. 3) Full retest of the beacon (in a test laboratory) is required.</p> <p>The FAA will continue to engage Cospas-Sarsat to try and determine ways to reduce the time it takes for manufacturers to obtain the needed type approval certificate.</p>
Emerging Lifesaving Technologies	General	Emerging Lifesaving Technologies is opposed to the provision to reintroduce the 121.5 MHz homer frequency into the TSO. While it is true that there needs to be a way to	<ol style="list-style-type: none"> 1. Latency in the current SAR system. Currently there is no active, continuous, or even managed detection of the 121.5 MHz homers system. 2. Problems with 121.5 MHz. The 		<p>Not Accepted.</p> <p>Per TSO-C126a and RTCA/DO-204A, the 121.5 MHz homing device has always been required.</p>

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
		<p>narrow in on the crash site we feel the FAA is reverting to a technology that is not the best means for increasing the safety of the flying public or adding to the SAR process.</p>	<p>battery life is greatly reduced sending out continuous low-power AM signals. The units are larger and heavier increasing the possibility of damage due to g-forces. It requires a much larger antenna profile.</p> <p>3. Addition of 121.5 MHz homers gives a false sense of security. As long as the FAA promotes 121.5 MHz homing devices the flying public feels that the system is still valuable as a primary source to locate their aircraft should the need arise. Without some outside notification the SAR system will never be alerted to an aircraft in distress.</p> <p>4. New internal technologies. Emerging Lifesaving Technologies has incorporated a 12 channel GNSS receiver inside the ELT and does not rely on an outside receiver to give an accurate location.</p> <p>5. Next Generation Detection. C/S just released its JC-26 report to the committee suggesting the latest technological upgrades to the system. The new generation will allow for aircraft in distress to send out position</p>		<p>Additionally, the National Search and Rescue Committee (NSARC) continues to require the 121.5 homing capabilities and does not deem single frequency ELTs acceptable at this time. There are limits on existing 406 homing receiver capability and there is limited availability of search and rescue 406 homing assets.</p> <p>The NSARC has shown interest in removing the 121.5 homing requirement for the future second generation 406 MHz beacon.</p>

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
			<p>data (if equipped with GNSS data) during flight.</p> <p>6. Specific changes to C/S G.008. 3.14.1.2 states that all next generation units must have the capabilities to transmit GNSS data.</p> <p>7. Financial Viability. The cost to design, produce, test, and certify a new ELT simply to put antiquated and nearly obsolete technology in it would be a waste. Those resources should be spent focusing ahead on new technology.</p>		
ACR Electronics	Page 1, Paragraph 2	<p>TSO-C126a contained an additional paragraph 'c' that stated "major design changes to 406 MHz ELTs approved under this TSO will require a new authorization. See Title 14 of the Code of Federal Regulations (4 CFR §21.611(b))"</p> <p>In TSO-C126b this section is removed, we are assuming that this statement is still valid even though it was deleted in TSO-C126b.</p>			<p>Acknowledged.</p> <p>The assumption is correct. Though the statement has been removed from the TSO, it is indeed valid. Reference 14 CFR § 21.619.</p>
Kannad	Page 1, Paragraph 2.b	<p>This requirement seems to show discrepancies with the proposed action (2) of Federal Register, Volume 77 Issue 135</p>	<ul style="list-style-type: none"> Can the hook and loop straps be maintained in the fleets of operators after June 2014 by being subject to the improved maintenance procedure and regular replacement as 		<p>Acknowledged.</p> <p>Issuance of TSO-C126b in itself is not withdrawing any TSO-C126 or TSO-C126a TSO authorizations. The</p>

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
			<p>suggested in the Proposed Action?</p> <ul style="list-style-type: none"> Does this mean a retrofit campaign has to happen to replace currently installed hook and loop straps after June 2014. 		<p>FAA generally only withdraws all TSO authorizations as part of a new TSO revision when the FAA is requiring all new production to move to the new TSO standard. Because not all TSO-C126 and TSO-C126a equipment utilized hook and loop fasteners, it is not necessary to withdraw all TSO-C126 and TSO-C126a authorizations as part of the TSO revision. Withdrawal of TSO-C126 and TSO-C126a authorizations will be accomplished sparingly via separate action, and only when appropriate. The release of TSO-C126b does not impact existing installations nor does it require retrofit.</p>
ACR Electronics	Page 1, Paragraph 3	Section 3 also requires that a manufacturer obtain a Cospas-Sarsat type approval certification before applying for TSO-C126b. ACR's interpretation of this section is that we must have a Cospas-Sarsat Certification in hand	We see no reason that Cospas-Sarsat test results should be treated differently than other test data.	Request that the FAA change TSO-C126b to allow a manufacturer to submit a Cospas-Sarsat test report rather than the certification.	Not Accepted. The Cospas-Sarsat Type Approval certificate is an assurance that the ELT manufacturer has satisfied all Cospas-Sarsat technical and testing requirements as

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
		before we are able to apply for the TSO. Unfortunately this stretches out the ELT development timeline. In today's ELT market this is not desirable. It also treats Cospas-Sarsat data differently than other TSO-C126b test data.			detailed in Cospas-Sarsat documents C/S T.001 (406 MHz beacon specification) and T.007 (406 MHz beacon type approval standard). The FAA will continue to engage Cospas-Sarsat to try and determine ways to reduce the time it takes for manufacturers to obtain the needed type approval certificate.
ACR Electronics	Page 1, Paragraph 3	Our understanding of the TSO text is that the use of hook and loop retention system is allowed for survival (S) and automatic deployable (AD) ELTs.		Could you clarify this point?	Acknowledged. Within the RTCA/DO-204A the requirement for crash safety, section 2.2.5 states that the requirement is not applicable for survival and automatic deployable ELTs. The sections specify the requirements for proper attachment of the ELT in order for the ELT to meet the test requirements specified in paragraph 2.6.3.2. Thus, hook and loop fasteners may be used for survival (S) and automatic deployable (AD) ELTs.

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
Transport Canada	Page 1, Paragraph 3	In the draft TSO it states: " <i>We also require that you obtain a Cospas-Sarsat type approval certificate <u>before applying</u> for this TSO.</i> "		Transport Canada suggests that this sentence is changed to read: " <i>We also require that you obtain a Cospas-Sarsat type approval certificate <u>before the TSOA can be issued.</u></i> "	Not Accepted. The Cospas-Sarsat Type Approval certificate is an assurance that the ELT manufacturer has satisfied all Cospas-Sarsat technical and testing requirements as detailed in Cospas-Sarsat documents C/S T.001 (406 MHz beacon specification) and T.007 (406 MHz beacon type approval standard).
ELTA (F6614) (France)	Page 1, Paragraph 3	We understand FAA point about hook & loop for which control of tension is not correctly made	We are using Hook and Loop in some of our ELT mounting bracket, but they are use alone. They are installed on "seat belt" type strap. The position and the correct strap tension is guaranty by an additional metallic snap fastener present on the strap. It avoids any "loose" installation and keeps tension in time (no relaxation of the tension). In addition, the strap using Hook & Loop is not use directly, there is metallic part used to create a "loop" with the strap ensuring that the Hook & Loop of will remain perfectly in contact avoiding any input of dust or contamination between Hook & Loop. Application of G-loads during crash will increase the tension of the strap. See attached strap drawing (Proprietary) and picture of installation. During qualification high level of shock	Keep authorization of hook & Loop I when additional means to guaranty the correct position and tension are kept after de-installation/installation	Not Accepted. This TSO will restrict the use of hook and loop fasteners as a mounting option for the equipment. However, if a manufacturer wants to continue using hook and loop fasteners as part of its ELT design, they will have to apply for a deviation showing that their design, which includes hook and loop fasteners, provides an equivalent level of safety.

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
			impulses were made, 100 G/11ms and 500 G/4ms in all direction, so a total of 12 "crash shock conditions" were applied and result was fully successful no transmitter removed from its mounting bracket		
Garmin	Page 1 and 2, Paragraph 3.b	<p>Includes the statements that define the failure conditions and failure classification.</p> <p>Wording needs to change to recognize the fact that failure condition classification is ultimately determined by aircraft level analysis.</p>	<p>It is reasonable to clarify the wording to ensure aircraft level analysis is the driver for determining failure classifications. EASA has recognized this using the following wording in ED Decision 2010/010/R 14/12/2010 Annex I Subpart A - General 2.4 Failure condition classification:</p> <p>"Develop the system to, at least, the design assurance level equal to the failure condition classifications provided in the ETSO. Development to a lower Design Assurance Level may be justified for certain cases and accepted during the ETSO process but will lead to installation restrictions."</p>	Re-work this section to match the EASA wording. Or work with industry to develop an agreed to wording.	<p>Not Accepted.</p> <p>When appropriate, the TSO defines the minimum failure condition classification in the TSO. The FAA has determined that for the installation of this particular article, the article is classified as having a minor failure condition classification.</p>
ACR Electronics	Page 2, Paragraph 3.d.	In TSO-C126a RTCA/DO-160F was required. In TSO-C126b RTCA/DO-160E is required. RTCA/DO-160G is also reference as well. Normally I would expect that the latest version or one revision back would be required.		Can you clarify the revision of DO-160 that is to be used?	<p>Acknowledged.</p> <p>The TSO wording seeks to do the following:</p> <ol style="list-style-type: none"> 1. Clarifies that even though RTCA DO-204A requires use of DO-160E, that the FAA will accept any appropriate environmental standard. 2. Any appropriate

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
					<p>environmental standard is acceptable.</p> <p>3. Older versions of DO-160 (DO-160D Change 2 and previous) may be acceptable, but must be approved via deviation.</p>
ACR Electronics	Page, 2 Paragraph 3.e.	This section contains a note that states: "The certification liaison process objectives will be satisfied after a FAA review of the applicable life cycle data."	This note appears to add a requirement for a review of life cycle data which is not defined.	Would a PSCP be sufficient to satisfy the Life Cycle data? Please clarify this note?	<p>Acknowledged.</p> <p>This note is a clarification, versus an additional requirement. RTCA DO-178B Section 9 describes a certification liaison process. The note in the TSO clarifies the liaison process objectives in DO-178B Section 9 are considered satisfied after the FAA reviews the life cycle data.</p>
Garmin	Page 3, Paragraph 4.b.(2)	<p>Paragraph 4.b.(2) states:</p> <p>Each subassembly of the article that you determined may be interchangeable.</p> <p>This language is confusing.</p>	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.	<p>Not Accepted.</p> <p>Paragraph 4.b.(2) does not require TSO marking of circuit boards. This language is part of Order 8150.1C and was not changed in this TSO.</p>

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
Transport Canada	Page 3, Paragraph 5	The "APPLICATION DATA REQUIREMENTS" should also require a copy of the applicant's Cospas-Sarsat certificate.		TCCA recommends application data requirements also require a copy of the applicant's Cospas-Sarsat certificate.	Accepted. Paragraph 5.j. is changed to read as follows: "Cospas-Sarsat type approval certificate."
Transport Canada	Page 3, Paragraph 5	The last sentence in the first paragraph states: " <i>LODA applicants must submit the same data (excluding paragraph 5.f) through their civil aviation authority.</i> " This sentence infers that, for a LODA, all of the data submitted to the CAA will then be passed to the FAA/ACO.		TCCA recommends this sentence is changed to read: " <i>Unless otherwise provided by a Bilateral Agreement between the FAA and the specific CAA, LODA applicants must submit the same data (excluding paragraph 5.f) to their civil aviation authority.</i> "	Not Accepted. The language in paragraph 5 is consistent with Order 8150.1C. Additionally, the TSO language is in line with 14 CFR§21.621(2)(ii), which requires the manufacturer to provide the FAA one copy of the technical data required in the applicable performance standard through its State of Design.
ACR Electronics	Page 3, Paragraph 5.a.(3).	Subsection requires that the Manual contain the statement, "This article meets the minimum performance and quality control standards required by a technical standard order (TSO). Installation of this article requires separate approval."	The last sentence has changed. In TSO-C126a a second sentence stating that "The article may be installed only according to 14 CFR part 43 or applicable airworthiness requirements" was part of this section.	For TSO-C126b on what basis is an ELT installation approval to be based on? Will an STC be required?	Acknowledged. The FAA policy has not changed. Articles can still be installed through a 14 CFR § 43 field approval when appropriate.
Garmin	Page 4, Paragraph 5.e	TSO paragraph 5.e and its subparagraphs define required information to be supplied to the ACO for a non-TSO function. This guidance is inconsistent with Order 8110.4C CHG 4.	TSO paragraph 5.e indicates that "you must ... include one copy each of the following technical data to support your design and production approval." but the TSO 5.e subparagraphs which specify the required information to be supplied to the ACO for a non-TSO	Reword to point to Order 8110.4C CHG 4 paragraph 6-9.b.(3). Or if pointing to Order 8110.4C CHG 4 causes problems, adjust the wording in the TSO (template) to be consistent	Not Accepted. This comment has been reviewed and discussed, but after careful deliberation the FAA has determined that the language in

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
			<p>function are inconsistent with the Order 8110.4C CHG 4 paragraph 6-9.b.(3) "Manufacturer Data Submittal" requirements. For example, TSO paragraphs 5.e.(5) and 5.e.(6) require submittal of "Results of test/analysis" while Order 8110.4C CHG 4 paragraph 6-9.b.(3) requires submittal of "proposed test procedures"; while both sets of guidance use the word "test", otherwise there is no similarity.</p>	<p>with the 8110.4C CHG 4 intent.</p>	<p>paragraph 5.e. is consistent with Order 8150.1C and represents current FAA policy on non TSO functions.</p> <p>Additionally, the FAA does not reference Orders in Technical Standard Orders.</p>
Garmin	Page 4, Paragraph 5.e	<p>TSO paragraph 5.e and its 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>TSO paragraph 5.e 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.e "performance" definition, the 11 watt transmitter has a non-TSO 1 watt capability. The distinction of a "function that can be accomplished</p>	<p>Reword to point to Order 8110.4C CHG 4 paragraph 6-9.b.(1) and 6-9.b.(3).(a) for the definition of non-TSO function. Or if pointing to Order 8110.4C CHG 4 causes problems, adjust the wording in the TSO (template) to be consistent with the 8110.4C CHG 4 intent.</p>	<p>Not Accepted.</p> <p>This comment has been reviewed and discussed, but after careful deliberation the FAA has determined that the language in paragraph 5.e. is consistent with Order 8150.1C and represents current FAA policy on non TSO functions.</p> <p>Additionally, the FAA does not reference Orders in Technical Standard Orders.</p>

Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
			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.		
Garmin	Page 5, 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.e.(1) through 5.e.(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 and it would be better if the TSO simply pointed to Order 8110.4C CHG 4 paragraph 6-9.b.(6).	Reword to point to Order 8110.4C CHG 4 paragraph 6-9.b.(6). Or if pointing to Order 8110.4C CHG 4 causes problems, adjust the wording in the TSO (template) to be consistent with the 8110.4C CHG 4 intent.	Not Accepted. This comment has been reviewed and discussed, but after careful deliberation the FAA has determined that the language in paragraph 7.b. is consistent with Order 8150.1C and represents current FAA policy on non TSO functions. Additionally, the FAA does not reference Orders in Technical Standard Orders.