

**Clearance Record
DOCUMENT COMMENT LOG**

Due Date: July 10, 2013

Originating Office: AIR-110	Document Description: AC20-180 Approved Model List (AML) Supplemental Type Certificate (STC)	Reviewer: A.V	Reviewing Organization: AIR-110	Date of Review: 7/11/13
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Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
L-3 Communications	Pg 5, par 12.	This describes follow-on installations in other models may not require an installation conformity inspection...	For an AML-STC a follow on installation itself may not be needed in other than the initial aircraft, this statement should be removed.	During the AML-STC certification program, an FAA installation conformity inspection per § 21.33 is required to ensure that the component conforms to the proposed type design, and that it meets its intended function. There are instances where the addition of a new model introduces changes that were not part of the initial installation conformity. These changes may require new installation conformity that is assessed on a case-by-case basis.	Adopted. Revised paragraph per suggested text.

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L-3 Communications	Pg 2, par 5b.	Remove the word “should” in the second sentence	“should have its own AML-STC” implies that there is automatically a requirement (or at least highly recommended) for the separate AML-STCs. Depending on the complexity of the device being certified, it may be very obvious that it is not specific to the category of utility, normal, etc. Therefore, by re-wording to either “may” or should be considered, it is less demanding to assume that multiple AML-STCs are required.	Replace “should have its own AML-STC” with “may require its own AML-STC” Or: Consideration should be given if the device being installed is affected by the category that the aircraft is certified in. I.E. normal, utility, etc...	Adopted Rewrote the paragraph for clarity.
L-3 Communications	Pg 2, par 5b.	Remove the word “unless” in the second sentence	Depending on the complexity of the device being certified, it may be very obvious that it is not specific to the category of utility, normal, etc. The use of “unless” implies that a substantiation for each are required no matter how obvious it is that it is not required.	In the same sentence as referenced above, also the word “unless” should be removed. Possible reword to indicate that it can be shown that the modification is not affected by the category (i.e. normal, utility, etc.).	See above disposition.

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UASC		<p>Para. 1-3: AC 20-180 makes no reference to existing AC 23-22 “Guidance for Approved Model List (AML) Supplemental Type Certificated (STC) Approval of Part 23 Airplane Avionics Installations”. How do the two ACs coexist? It seems that a reference to AC 23-22 would be appropriate. Does AC 20-180 supersede AC 23-22? If so, that should be stated.</p>	N/A	N/A	<p>Question Answered: This AC does not cancel AC 23-22. AC 23-22 is used for “avionics installation.” As stated at the beginning of the document. The AC 20-180 is a stand- alone document which is intended for any AML-STC approval. Further, it shares some of the substantive requirements that are listed in AC 23-22. However, the goal is to set the requirements that are inclusive for all types of installations (e.g., structures, systems) that are outside the scope of AC 23-22. Mentioning AC 23-22 gives the impression that this AC is a derivative of AC 23-22, which is not. AC 20-180 addresses part 21 frameworks for AML approvals. AC23-22 gives the guidance for compliance requirements for part 23 avionic installations.</p>

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Garmin	Page 1 Paragraph 3	Paragraph 7 discusses “Electromagnetic Compatibility (EMC), Lightning, and High Intensity Radiated Field (HIRF) Considerations” but the ACs related to this topic are not included in the Reference Documents section.	Add AC references for HIRF and lightning	<p>Suggest changing this paragraph to a list of documents and adding references to:</p> <ul style="list-style-type: none"> • AC 20-158 - The Certification of aircraft Electrical and Electronic Systems for Operation in the High-Intensity Radiated Fields (HIRF) Environment • AC 20-136B - Aircraft Electrical and Electronic System Lightning Protection <p>AC 20-155 - SAE Documents to Support Aircraft Lightning Protection Certification</p>	Adopted Included the suggested material in the reference section

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Garmin	Page 1, Paragraph 5	Suggest rewording the first sentence.	14 CFR 21.111 does not specify requirements	Reword to: The AML-STC must comply with the requirements of 14 CFR Part 21.111, subpart E, for the issuance of STCs.	Adopted Revised accordingly per suggested comment

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Garmin	Page 2, Paragraph 5.b (second sentence)	<p>The second sentence states: “Furthermore, each category of aircraft within FAR part 23 (i.e., normal, utility, acrobatic, and commuter) should have its own separate AML-STC due to differences in the certification requirements, unless it can be shown that the modification to the affected area has the same certification basis.”</p> <p>As written, this sentence implies that additional SHOWING is required specifically to address the issue of whether an aircraft has a different certification basis. Many aircraft have had and will continue to have a different certification basis during the history of their production; e.g., C208B. As written, this sentence would require that early s/n C208B’s would need a different AML STC than later C208B’s (e.g., those equipped with G1000).</p> <p>Similarly, there are numerous Part 23 aircraft models that are certified under multiple categories.</p>	<p>Substantiation can be performed by evaluating the worst case scenario and demonstrating compliance by analysis. Substantiation also can be performed for each aircraft category (i.e., normal, utility, acrobatic, and commuter) on the AML for the small sub-set of affected FARs.</p> <p>As long as the substantiating data provided with the AML STC can be shown to comply with the appropriate certification basis for each model included, there should be no additional burden placed on the applicant.</p> <p>Additionally, the limitation being imposed by this AC on “categories within Part 23” is</p>		<p>Not adopted as suggested. Revised the paragraph to clarify the intent of showing compliance to specific requirements. The requirement for examining cert basis vs the affected areas by the modification to ensure all applicable regulations are met is the “default” that every STC project requires. Whether this is an AML or a normal STC, every change or modification to type design requires the applicant to establish the cert basis and the means of compliance to that particular modification. The applicant can coordinate with their responsible ACO to allow for showing of compliance for worst case scenario and take credit for that particular showing of compliance for other models. But this suggested approach is not correct for every modification. There are distinct differences between categories in certain situations. For example: Subpart B-performance for climb-critical engine inoperative between commuter and the rest of the categories. Simply, testing to worst case scenario for one model aircraft may not have any relevance to the other models on the AML. Continued (Cont) on the next page</p>

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		<p>AML STC than later C208B's (e.g., those equipped with G1000).</p> <p>Similarly, there are numerous Part 23 aircraft models that are certified under multiple categories.</p>	not warranted and provides no improvement to safety.		<p>Cont- In Subpart C-structure There are distinct differences between categories in maneuver load factor in g's.</p> <p>The commentator is considering an avionics installation only. This AC is all inclusive taking into consideration other modifications that are non-avionics.</p>
Garmin	Page 2, Paragraph 5.g	Spell out 'FMS'.	The acronym 'FMS' has several meanings.	<p>Reword to:</p> <p>The flight manual supplement is applicable to each model per § 21.5.</p>	<p>Adopted</p> <p>Revised accordingly per suggested comment</p>

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Garmin	Page 3 Paragraph 7.a	Includes the statement: “An installation that did not require HIRF and lightning consideration on one aircraft model may require further examination on another model.” As worded, this statement does not accurately convey the extent of the issues associated with the HIRF and lightning certification basis.	The aircraft certification basis is what will govern whether the HIRF and lightning will apply or not, and, as noted on Garmin’s paragraph 5.b comment, the certification basis could be different on the same aircraft model.	Reword to: An installation that did not require HIRF and lightning consideration on one an aircraft model due to prior certification basis may require HIRF and lightning compliance due to a later certification basis that includes HIRF and lightning. Similarly, the HIRF and lightning certification basis may be different between aircraft further examination on another models.	Not adopted. The suggested “certification basis” does not add any more to the general requirement than the written paragraph. Section 7 of this advisory circular was coordinated with FAA National Resource Specialist in lightning and HIRF. Certification basis are an integral part of the HIRF and Lightning consideration by default. This document is not meant to be a comprehensive guide to applying HIRF/lightning requirements.
Garmin	Page 3 Paragraph 7.a	Add guidance at the end of the paragraph (including the comment from paragraph 7.b below).	Provides additional guidance on how to determine the requirement.	Suggest adding a statement to the effect that: Further guidance on acceptable means of determining compliance may be found in AC 20-158, AC 20-136B & AC 20-155.	Adopted: Revised and added the suggested references.

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Garmin	Page 3 Paragraph 7.b	The last sentence should moved to paragraph 7.a	The compliance method for the system flows better with paragraph 7.a.	<p>Move the last sentence of paragraph 7.b to the end of paragraph 7.a as follows:</p> <p>Standardized tests and categories, such as those found in RTCA DO-160, performed for an aircraft may not be appropriate without further evaluation of the specific HIRF and lightning qualification levels for another aircraft model. HIRF and lightning compliance for systems with catastrophic failure conditions may need more extensive compliance substantiation....</p>	Adopted Revised accordingly per suggested text.

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Garmin	Page 3 Paragraph 7.c	<p>Includes the statement: “For external equipment installations, it may be necessary for the installation instructions to provide a detail description of the location, and proximity to other components.”</p> <p>Provide clarification and why the equipment list/location/proximity is required.</p>	<p>This paragraph is intended to be help control EMI from transmitting interference and so the recommended text has been re-worded to reflect that more clearly.</p> <p>Also the sentence does not provide guidance on the goal of collecting the equipment list. The permutation of components on every aircraft model and the new antenna installs would be huge and not practical. Critical systems should be the ones that have this rigor.</p>	<p>Reword to:</p> <p>For transmitting antenna external equipment installations, it may be necessary for the installation instructions to provide a detailed description of the antenna transmitting levels, equipment qualification and distance location, and proximity to other critical components that demonstrates interference is minimized.</p>	<p>Adopted</p> <p>Added as a “note” to the section 7.C</p> <p>The intent is not to only focus on Antenna installations. It is only an example of many types of installation. Further, the sentence “ <i>it may be necessary for the installation instructions... other components.</i>” Does not mandate to establish the permutation of every component on every aircraft model. This is dependent on the type of installation and its effect on the rest of the systems. The law enforcement configuration on helicopters is one example that the effects of all the external installations are considered, because of various external equipment and antennas that are in close proximity of each other.</p>

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Garmin	Page 4, Paragraph 8 Substantiating AML-STC Approval using Third Party STC	This section is not specifically related to AML STC's and provides no additional benefit to the applicant for an AML STC.	The section is attempting to address an applicant's use of pre-existing STC data. This guidance should be moved to an AC more appropriate for that audience.	Remove Paragraph 8.	<p>Not adopted</p> <p>This section is not attempting to address applicant's use of pre-existing STC data. It is emphasizing what some Manufacturers (MFG) of components are attempting to do without having any type design data for " installation."</p> <p>This section is aimed specifically to address the common misconception that when an Original Manufacturer Equipment (OEM) produces and sells their components, it does not entitle the OEM to receive an AML-STC approval solely because their components are installed on different aircraft through third party certification.</p>

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Garmin	Page 5, Paragraph 13.a	Suggest changing this checklist item to be consistent with Garmin's comment and recommendation on paragraph 5.b.	<p>Substantiation can be performed by evaluating the worst case scenario and demonstrating compliance by analysis. Substantiation also can be performed for each aircraft category (i.e., normal, utility, acrobatic, and commuter) on the AML for the small sub-set of affected FARs.</p> <p>As long as the substantiating data provided with the AML STC can be shown to comply with the appropriate certification basis for each model included, there should be no additional burden placed on the applicant.</p> <p>Additionally, the "part 23 exception 6.b" proposed by this AC is not warranted and provides no improvement to safety.</p>	<p>Replace 13.a with:</p> <p>Compliance must be shown for the modification to the affected area for each certificated category of aircraft listed on the AML.</p>	<p>Adopted</p> <p>Revised accordingly to the suggested text. Also re-wrote the 5b. Section to be in agreement with 13a.</p>
Garmin	Page 5, Paragraph 13.d	Spell out 'FMS'.	The acronym 'FMS' has several meanings.	<p>Reword to:</p> <p>Flight manual supplements are pertinent to each specific model.</p>	<p>Adopted</p> <p>Revised accordingly to the suggested text.</p>

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Carlislel T d.b.a Electronic Cable Specialist, Inc.		Statement reads, "Furthermore, each category of aircraft within FAR part 23..." We believed "FAR" should be "CFR."	"FAR" is not defined or used elsewhere in the draft document.	Replace "FAR" with "CFR."	Adopted

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		<p>This item states that people seeking an AML-STC should “discuss their plan early with their respective aircraft certification office (ACO)” but does not provide guidance for the appropriate method of following through on that coordination</p>	<p>Experience has shown that not every ACO/project engineer has the same standards and expectations when wanting to discuss upcoming project work “early.”</p> <p>In some cases, a coordination meeting can be scheduled in advance of a Project Specific Certification Plan (PSCP) and associated FAA Form 8110-12 being submitted. In others, a PSCP submittal is required before the dialog and project planning can start.</p> <p>Standardizing the when and how is important for having a predictable process for an applicant to following.</p> <p>Additionally, the content needed in a PSCP when seeking an AML-STC is not clear in this AC. Including guidance on the PSCP contents would help applicants better plan the projects and should help with standardization across the different FAA Project Engineers and ACOs.</p>	<p>Revised FAA Form 8110-12 to include a check box for “AML” type of STC in existing box 2.</p> <p>Provide clarification in AC on how an applicant can discuss their plan early with the responsible ACO.</p> <p>Provide a list of items or questions that would need to be addressed in a PSCP when an applicant is requesting an AML STC.</p>	<p>Not adopted</p> <p>The recommended suggestions are outside the scope of this AC.</p>

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		Statement reads, "It is recommended that changes be captured in some tabulated form in order to accurately maintain the configuration control of an AML." The use of "changes" in this context is confusing.	The way the sentence reads, it could be interpreted that "changes" means something akin to a revision log. With the following reference to the Appendix example in the next sentence, this does not appear to be the intent of the first sentence.	Replace "changes" with "current configurations" so that the statement reads as follows: "It is recommended that current configurations be captured in some tabulated form in order to accurately maintain the configuration control of an AML."	Adopted Revised per recommended text

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		<p>There is a clear statement that splitting models from an AML-STC is not permitted.</p> <p>Is it permitted to take established and issued STC and combine them into a AML-STC?</p>	<p>Without prior and clear guidance on how to obtain AML-STC, many applicants pursued separate STCs that, if the project were started after the AML AC is published, would be perfect candidates for AML-STCs.</p> <p>In looking for ways to be more efficient with STC updates, amendments, and maintenance, applicants may look to combine past STCs into AML-STCs if allowed.</p> <p>It would be helpful to have clear language that identified whether or not this is permissible.</p>	<p>Clearly identify whether or not combining STCs into an AML-STC is allowed and, if so, provide guidance on how to do that.</p>	<p>Not adopted</p> <p>Combining individual STCs into a AML-STC is not permitted. There is no FAA policy that suggests combining STCs is permitted. Individual STCs are independently assessed without consideration for commonality with other STCs.</p> <p>Combining individual STCs requires extensive effort in re-assessing all of the submitted STCs compliance data to determine what similarities exist between them. Then, a baseline data must be established in order to proceed with the AML approval. This is counterintuitive to the whole AML concept. The basis for AML is to reduce redundancy, re-submittal of data, effort by both the FAA and the applicant.</p> <p>The suggestion increases the FAA burden for administrative and compliance review and slows down the certification process.</p>