

**Clearance Record
DOCUMENT COMMENT LOG**

Originating Office: AIR-110	Document Description: AML-STC Advisory Circular AC 20-180	Project Lead/Reviewer A.V	Reviewing Office: ANM-110	Date of Review: 4/8/2013
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Commenter	Page & Paragraph	Comment	Reason for Comment	Suggested Change	Comment Resolution
E. Smith ANM-140L (562) 627-5260	General	This AC is directed at applicants for their guidance. It would appear we need guidance for FAA employees - is there an associate document for AML-STCs for FAA employee guidance? This FAA guidance would normally be in the form of an order that gives specific instructions on how to administer or process AML-STCs and could be a separate order for this specific purpose, or combined with Order 8110.4. The latest DRAFT revision to Order 8110.4 didn't contain this though.	See comment.	Create a separate order that addresses how we administer or process AML-STCs; or incorporate instructions for how we administrate or process AML-STCs into the existing Order 8110.4.	Answer to the question: The current order 8110.4 revision xx is under rework to incorporate AML policy memo AIR-100_2012-09-14 released on September- 14-2012 which provides further guidance, and clarification to the existing order 8110.4C for AML-STC applications.
ANM-120L	Page 1. Par 1.	This AC should be applicable for Electrical Systems and Equipment installations only. It is not appropriate to other disciplines. (Paragraph 7 to 9	AML-STCs, as applied in other than electrical systems and avionics, require the applicant to submit a complete set of substantiating data and	Add a statement explaining this AC is targeted at avionics installations or similar installations where the specific configuration of the model of aircraft is not completely	Partially adopted Revised and removed avionic example to avoid further confusion. This AC is not used for avionics installation only,

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		<p>on page 2 shows the reasons this is electrical/avionics AC.)</p> <p>This AC appears to be an attempt to resolve misunderstandings that occurred when certain avionics STCs were issued to models that were not directly substantiated at the time of certification.</p>	<p>installation instructions for each aircraft model. In this respect, approval follows the regular STC process. The AML is used in these instances as a tracking document both because the data will not fit on the STC form, and also as a convenience to the ACO in that there is no need to reissue the face of the STC each time a new model is approved. The restrictions of this AC do not apply in these approvals, the following of this AC will remove a work saving tool from other disciplines that are using it in its originally intended function. The ACO's will need to issue a new STC each time conditions exist outside of this restrictive AC.</p>	<p>known to the STC approval holder and FAA at the time of certification, and in these cases adjustments to the installation instructions need to be made at the time of installation. For installations where each model is completely substantiated and instructions are complete at the time of certification, the limitations of this AC do not apply.</p> <p>Also, perhaps a title other than AML-STC can be used like "Avionics AML-STC"</p>	<p>even though it contains avionic examples. This AC is intended for any AML-STC that allows installation of an article in a multi-model aircraft. Furthermore, the use of AML is more than a tool to track multi model configuration. It allows for identical or similar installation to be captured under one STC number as long as the baseline data remains common for all the models.</p> <p>The specific examples that are included are addressing issues that have been overlooked, or completely missed in the past. The commentator is correct in stating that in the past models were added to the list that was not properly substantiated and compliance data did not adequately cover all the models listed. This deficiency was discovered during an audit of various AML-STC approvals.</p>

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ANM-120L	Page 1, par 1	The AC describes procedures for the creation of an AML-STC and does not describe a means to find compliance to regulations.	An AML-STC is a specific version of an STC certificate, and not governed by any specific regulation.	Remove the word compliance from the sentence “You may use an alternate method if you establish that it adequately meets the compliance requirements.”	Adopted Revised the word means to method, and removed compliance for clarity. General note: Part 21, outlines the frame work for certification of products and part 23, 25, 27, etc, set the requirements to find compliance to the regulations. Ultimately, the applicant must comply with the rule to receive their AML-approval, therefore can “use an alternate method to meet their compliance requirements. The existing sentence is correct in its intent but for clarity the word compliance is removed.
ES (ANM-140L)	Pg 1, para 1	The document addresses aircraft and not engines or propellers. The <i>Purpose</i> section could specifically address this.	AML-STC’s could be applied to an engine or propeller. Neither of these products is specifically addressed in this document.	Suggest revising the purpose section to specify this, or consider adding a note that AML-STCs could be used for engine and propellers using the same basic philosophy as that discussed in this document, but with a number of things omitted.	Adopted AML-STC method of approval remains the same for propellers and engines. The applicant is still required to comply with the requirements in this AC in order to obtain approval for multi-model installation. For further clarification, under “applicability” the suggested

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					note by the commentator will be included.
E. Kolano ANM-160S	Page 1, Para 1	Use of word “requirements,” followed by “not mandatory.”	AC’s are advisory by definition, and therefore cannot specify requirements.	Eliminate “and requirements.”	Not adopted The AC as a whole document is not a requirement, but some of the provisions within the AC are required. The commentator is correct in that the AC is advisory and the applicant has the option to follow or choose another method to show compliance. But as it states in the beginning of this document, once the applicant decides to follow this AC, then all of the provisions of this document (must) be followed in order to achieve the anticipated results. The purpose is to [try to achieve] standardization. One of the benefits of having an advisory circular is to provide a common path to approval by including guidelines, and in some cases requirements, to ensure that

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					<p>the outcome will be the same for every applicant who chooses to follow it. Allowing the applicant to selectively pick and choose some but not all the provisions of this AC renders it useless and inconsistent. Further, the applicant won't be able to take full credit for complying with the AC.</p>
<p>E. Kolano ANM-160S</p>	<p>Page 1, Para 2</p>	<p>Effectivity statement in wrong place.</p>	<p>It seems specifying the effective date is more appropriately addressed under Applicability than Audience.</p>	<p>Move the statement to Para 3, Applicability.</p>	<p>Adopted Revised per suggested comment</p>

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S. Ripple ANM-160S	Page 1, Paragraph 4	The list reference documents doesn't include AC 23-22, Guidance for AML STC Approval of Part 23 Airplane Avionics Installations	Users may not be aware another AML AC exists.	Add AC 23-22 to the references section, or combine all the AML guidance into one mega AC (preferred).	<p>Not adopted</p> <p>This AC 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 Advisory Circular (AC) 23-22. However, our 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. This AC addresses part 21 frame work for AML approvals. AC 23-22 sets the compliance requirements for avionic installations only.</p> <p>The recommended MEGA AC was discussed last year during the SMT meeting, but right now no effort has been initiated to</p>

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					pursue this action item. Hopefully soon!
ES (ANM-140L)	Pg 1, para 4	How does this relate to: AC 23-22 “ <i>GUIDANCE FOR APPROVED MODEL LIST (AML) SUPPLEMENTAL TYPE CERTIFICATE (STC) APPROVAL OF PART 23 AIRPLANE AVIONICS INSTALLATIONS?</i> ” I presume this is a generic AC for any AML-STC and AC23-22 is specific as its title indicates. As such, since it is related, suggest AC 23-22 be referenced in the “Reference Document”	See comment.	See comment. Suggest adding the reference AC 23-22 to the Reference Document section (para 4 on pg 1).	Answer to the question: This AC covers any installation under AML. AC 23-22 is only used for Part 23 aircraft avionics installation. Referencing AC 23-22 in this document conflicts with the general language and the approach taken in this AC. This AC sets the frame work (minimum requirements), and AC 23-22 establishes the substantive (data, compliance) part of the AML for avionics only.

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		section with the caveat that it is specific to Part 23 avionics installations.			
G. Panger ANM-100S	Page 1, Para. 5	Include a brief definition/description of a standard STC.	Provides context of how an AML STC differs from a standard STC.	e.g., “Whereas a standard STC is an approval method for the same model TC product, an AML-STC is...”	Adopted Revised 4.a to include the suggested text.
ES (ANM-140L)	Pg 1&2, para 6	This section, titled “ <i>AML-STC Requirements</i> ,” lists ICA, cert requirements, etc. Later in the document, the AFMS is mentioned. And, there is no mention of the noise requirements. It could be beneficial to mention these in this section of the document.	See comment.	Consider adding to paragraph 6 something similar to para 6d that addresses the AFMS per §21.5, and acoustic changes IAW §21.93(b).	Adopted Revised and added 5.e, f. Further, FMS and acoustical changes under “applicable data (e.g., type design, substantiating data, flight manual supplement, acoustical changes for the areas that are affected by the modification).

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ANM-120L	Page 2, par 6.b.	There is no need for the restriction that the AML-STC be restricted to a single category or a single regulatory part such as Part 23.	<p>It is easy to envision situations where an installation could cross parts or categories without any decrease in safety or confusion to the installer. This restriction is arbitrary and will lead to needless duplicate STC's and cause the FAA more work that does not exist today.</p> <p>The need to contact two directorates is easily accomplished within the project planning, and internal coordination. This internal coordination should not stop the process.</p>	Remove paragraph b.	Not adopted There have been numerous mistakes in applying Part 23 criteria to a Part 25 installation and vice versa. To ensure proper evaluation and compliance to regulations, each CFR part 23, 25,27, etc will have a separate AML to ensure appropriate compliance to each category of aircraft.
E. Kolano ANM-160S	Page 2, Para 7	Include more common AML installations.	PFD/ND, GPS, composite engine displays are common – and potentially controversial - AML candidates.	Incorporate these, instead of a volt meter, as examples in the AC.	Not Adopted. Removed all examples to prevent further confusion. This AC is all inclusive and the intent is to provide certain requirements that are applicable to all installations, not just avionics.

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E. Kolano ANM-160S	Page 2, Para 7	Human factors considerations.	Some installations require specific placement with regard to the pilot's primary/secondary field of view, physical access, requirement for remote annunciators, etc.	Emphasize the consideration for equipment location in installation instructions.	Adopted Revised paragraph 13.g to incorporate the suggested comment.
K. Arrigotti ANM-120S	Page 2 7.a, first line	"Must" shouldn't be used in an AC unless it's a regulatory requirement.	The sentence immediately following this allows you to violate the "must." Therefore, this isn't a "must."	Change must to should.	<p>Not-adopted The word "must" is not forbidden from ACs, and it does not have to be a regulatory requirement for it to be used. Based on plain language <i>guidelines</i>, <i>"Use must to indicate requirements. The word "must" is the clearest way to convey to your audience that they have to do something. use "must" for an obligation, "may" for a discretionary action. "should" for a recommendation.</i></p> <p>This document sets out guidelines and certain requirements that "must" be followed to achieve a consistent result. Certain</p>

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					<p>provisions in the document must be followed, or the anticipated outcome is not achieved. There must be similarities in installation (not should) between models otherwise it is not AML qualified. In this particular instance it “must be followed”. The adequacy of the installation instruction, and the level of detail is unchanged whether the instruction itself is generic or non-generic. The installation type determines if the instructions can be of a generic form (does not mean in-adequate) or complex (with specific appendix attached). If the installation is simple and non-complex, then the applicant “MAY” use a generic instructions, (it must still be adequate for the Type of installation) for the FAA to accept it.</p>

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ANM-120L	Page 2. f.	An autopilot installation is an example of how a regular AML-STC is done, and should not be subject to limitations.	An autopilot installation is of such complexity that it will always require a complete set of compliance data and installation instructions for each specific model. Therefore, it is like a normal STC, and there is no reason for the limitations of this type of AML-STC.	Remove autopilot from the example.	Not adopted The commentator is correct in stating that “An autopilot installation is of such complexity that it will always require a complete set of compliance data and installation instructions for each specific model. “ However, if the applicant chooses to fully comply with the requirements and requests to have an AML approval, they can do so. Auto-pilot is not excluded from AML approval, but the level of complexity (as stated by the commentator) may make the AML unlikely candidate to pursue. This is not a limitation, but a preference.
ES (ANM-140L)	Pg 3, para 7a (Note)	Minor point that we generally don’t use names of parts but use part numbers.	See comment.	Consider rewriting the note to read something like: <i>Note: It is acceptable to move the wire standoffs to a suitable location in order to clear obstacles and use <u>part number XYZ (tie wraps) to secure wires to the standoff.</u></i>	Adopted Revised and removed the example completely to avoid further confusion. It appears that many readers inferred from the given examples in the document that this is an avionics AC. For clarity, all electrical and avionic examples are removed. The

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					intent is to provide guidelines and requirements relating to AML-STC approvals.
K.Arrigotti ANM-120S	Page 3, Par. 7	Section C should be added.	This section sounds like it requires a single document for every aircraft on the AML. This is not the current practice, and is refuted by the example.	Add: "c. Multiple installation instruction documents are acceptable."	Not adopted Revised the document and omitted the "C" section to avoid confusion. The commentator mis-read the paragraph. Any Installation instruction format is accepted in multi or single set instruction document. There is no limitation to the type of installation instruction as long as there is "adequate installation instruction."
ES (ANM-140L)	Pg 3, para 8c.	This paragraph is titled " <i>Electromagnetic Field (EMI) and High Intensity Radiated Field (HIRF) Considerations.</i> " This subsection (c.) discusses lightning and EMI effects for external components. For all external components, noise should be addressed per §21.93(b).	See comment.	Consider adding a note that reminds applicants that §21.93(b) should be addressed for all external changes as they may increase the noise level. This note could be in this section under 8(c) - EMI and HIRF - but alternatively could be described in its own (new) paragraph.	Adopted Added the proposed text to section 5.e to address acoustical changes. The EMI/HIRF section is rewritten based on lightning CISTA Dave Walen The commentator is correct in that " all external changes as they may increase the noise level." As part of the normal STC

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					compliance process the noise issue is addressed when there is any substantial external changes requiring further review of acoustical change.
K. Arrigotti ANM-120S	Page 3, Par. 9	This should be made a little more generic, and consequently, more broadly applicable.	This does not apply only to TSOs, so remove all reference to them. STCs do not certify products, so allow for modifications where needed. This does not apply to only AML STCs, so remove the unnecessarily exclusive references.	Delete "technical standard order (TSO)." Change "product" in the second sentence to "product or modification." From the last line, delete "AML-."	Adopted, Revised the paragraph accordingly.
G. Panger ANM-100S	Page 4, Para. 10	Change the title and some content of this section to be more consistent with CFR 21.97.	Consistency and clarity. Major changes should be discussed in terms of changes to type design, not just changes to the AML-STC.	Change title to: "Type Design Changes" Revise the first sentence of 10.a. as follows: "Major changes to an AML-STC (e.g., models added, existing models amended) are considered major changes to type design and require FAA approval."	Adopted Revised accordingly.

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K.Arrigotti ANM-120S	Page 4, Par. 10a	Why reference an ODA here? This seems an odd place to call it out, when really, an ODA could be doing any STC step.	I think it should either be understood that an ODA can do FAA jobs, or else you have to call out everywhere in this document that a step could be taken by an ODA.	Delete "or an authorized organization delegation authorization (ODA)"	Not adopted Certain functions are strictly reserved for the FAA, such as major design changes. 10.a states that ODA can approve major design changes on behalf of the FAA, if they are delegated under the ODA manual.
K.Arrigotti ANM-120S	Page 4. 10b	This should be made a little more generic, and consequently, more broadly applicable.	This sounds like it applies mostly to software and occasionally other things, as opposed to applying to all changes, one of which is software.	Change "a software revision (upgrade) to an existing hardware (component)" to "an upgrade (e.g., a software revision) to existing hardware or components." For consistency, also change "For example, the revised software version" to "For example, a software revision."	Adopted Revised accordingly.
E. Kolano ANM-160S	Page 4, Para 10.b	"effect" should be "affect."	"effect" should be "affect."	"effect" should be "affect."	Adopted Revised accordingly.

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K.Arrigotti ANM-120S	Page 4. 10b	"Must" shouldn't be used in an AC unless it's a regulatory requirement.	No one is regulatorily required to give "careful consideration" to anything.	Change must to should.	Adopted the suggested text but Non-concur to the commentator's statement that "Must" shouldn't be used in an AC unless it's a regulatory requirement. Please see the previous response to E. Kolano from ANM-160S on page 4 for the same comment. However, in this particular instance the word should and must make no difference in the purpose of why consideration is given. Therefore the word " must " is changed to " should. "
K.Arrigotti ANM-120S	Page 4. 11	If splitting models is not permitted, why is the chain broken by splitting three sentences later?	Splitting is not permitted. It should not be explained what the negative consequences are for when you do decide to split it.	Delete fourth sentence.	Not adopted The explanation is the reason why AML models are not allowed to split. Rather than leaving the reader to ask why this is not allowed.
ES (ANM-140L)	Pg 4, para 11	Splitting Models – it isn't specifically defined and a definition of what "splitting models" is could be beneficial.	See comment.	Consider defining "splitting models" in the first sentence. It could read something like: <i>"Splitting models in this context means splitting up an AML-STC into individual STCs."</i>	Adopted Revised accordingly

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K.Arrigotti ANM-120S	Page 4. 12b	Why does a template only capture "most of the pertinent information?"	As a template, it should capture ALL the pertinent information. As an AML also, it needs to capture ALL the pertinent information.	Change "most of the" to "the most"	Adopted Revised accordingly
K.Arrigotti ANM-120S	Page 5. 13	"Must" shouldn't be used in an AC unless it's a regulatory requirement.	The changes are required to be assessed on a case-by-case basis.	Change "must" to "can," "should," or "may."	<p>Adopted the suggested text but Non-concur to the commentator's statement that "Must" shouldn't be used in an AC unless it's a regulatory requirement.</p> <p>The word "must" is not forbidden from ACs, and it does not have to be a regulatory requirement for it to be used.</p> <p>Based on plain language <i>guidelines</i>, <i>"Use must to indicate requirements. The word "must" is the clearest way to convey to your audience that they have to do something. use "must" for an obligation, "may" for a discretionary action. "should" for a recommendation.</i></p> <p>This document sets out guidelines and certain</p>

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					<p>requirements that “must” be followed to achieve a consistent result. Certain provisions in the document must be followed, or the anticipated outcome is not achieved. There must be similarities in installation (not should) between models otherwise it is not AML qualified. In this particular instance it “must be followed”.</p> <p>However, in this particular instance the word “should” can be used because it is a suggestion not a requirement. Revised to “may.”</p>
K.Arrigotti ANM-120S	Page 5. 14	<p>This checklist seems like good information to have up front, not last.</p> <p>Also, "AFMS" is very commonly "airplane" not "aircraft" so should not be used or it'd appear you're neglecting helicopters.</p>	The first comment is useful definition information.	<p>Move 14 to be 5.c. or a new 6.</p> <p>Delete "(AFMS)"</p>	<p>Partially adopted, Due to formatting requirements for ACs, the checklist information remains in the same location in the document.</p> <p>Adopted Revised AFMS to “FMS” to be all inclusive.</p>

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ES (ANM-140L)	Pg 5, para 14 a.	Minor point and just for clarification – indicate that the “category” is the “certificated category”	See comment.	Suggest revising to read: “... <i>in the same <u>certificated</u> category</i> ”	Adopted Revised accordingly
ES (ANM-140L)	Pg 5, para 14	Noise isn’t addressed and quite often overlooked.	See comment.	Consider adding a reference to §21.93(b). A possible way to do this would be to add another item that read something like: <i>i. Possible increase to the aircraft noise level has been considered.</i>	Adopted Added section 6.f to specifically address noise.
K.Arrigotti ANM-120S	A-1	A lot of these columns are ones I’ve never seen on an AML ever.	As long as the assumption is that this really is just one example, and we're not going to be required to add all these columns (Category, CFR and amendment separately, COA, Status) then it's fine.	Change "Sample Only" to "Sample Only - Some columns are optional. Additional columns acceptable." And remove "(continued)" from title. This is the first page.	Partially adopted. Air-100 has not issued an official AML-STC format template. Until now every AML-STC template are unique and specific to a project. AML “Sample Only” means only a sample. It is a recommendation but not a requirement. For better clarity the suggested text is added to 12.b Removed (continued) from the title.

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<p>J. King (ANM-103L, 140L) x-5255</p>	<p>Appendix A, pg A-1</p>	<p>It appears from the AML sample that the AML-STC would be reissued to reflect that the AML-STC was surrendered. We don't do that here at the LAACO. The policy here is that we stamp the AML-STC as surrendered, with a date, and it's kept on file with the substantiation of the surrendered action. We then notify the Regulatory Guidance Library of this action where it is published.</p> <p>Preparing and reissuing the surrendered STC would be an administrative burden especially since older AML-STCs are not already in MS Word. Also some AMLs are very lengthy. Reissuing an AML-STC to reflect that something was surrendered isn't necessary.</p>	<p>See comment.</p>	<p>Recommended this procedure not be adopted and since this is a rare case, propose it not be part of the Appendix A sample as it may lead to confusion.</p>	<p>Clarification: When a model on an AML-STC is surrendered, the AML-STC is not re-issued. The "note section" ,or other suitable place on the AML makes a notation about the surrendered model and the date of the surrender. The sample column is a means to capture the surrendered model. The new 8110.4X, and Draft Surrender Order will further expand to include provisions regarding surrenders on AML-STC.</p>

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ES (ANM-140L)	Pg A-1, Template in Appendix A	It's not clear how the configuration control is maintained and what the approval status is when if/when the AML is revised.	See comment.	Consider adding: 1) a column titled "AML Amendment date"; 2) an approval block below the table (in the RH corner) that is reserved for the FAA (or designee - ODA) signature and title; 3) an original issue date space; 4) title; and 5) page X of Y at the bottom. See example below and yellow highlighted areas.	Adopted Added the suggested text.

Example referenced in comment above:

FAA Approved Model List (AML) SA01157LA For Installation of Fuel Flow/Pressure Instrument										
										Issue Date: 06/01/01
Item	Aircraft Make	Aircraft Model	Original T.C. Number	Cert. Basis for Alt.	Flight Manual Supplement		Installation Instructions		E.I. Instrument Model Number (see Note 2)	AML Amended Date
					Number	Rev. No.	Number	Rev. No.		
1.	Commander Aircraft	112	A12SO	FAR 23	AFM2112	Original	IIS0506931	A	FP-5L-L00H12	None
2.	---	112B	---	---	POH2112	---	---	---	---	---
3.	---	114, 114A	---	---	---	---	---	---	FP-5L-L00H9.5	---
4.	---	112TC, 112TCA	---	---	---	---	---	---	FP-5L-L15H30	---

- Notes: 1. “---“ indicates same as entry in column above
 2. Fuel Flow/Pressure (Electronics International) Instrument Model Designation System:

FP-5L-LxxHyy or FP-5-LxxHyy

where ‘xx’ is the low fuel pressure limitation in PSI from the AFM/POH or ‘00’ if no limitation exists and ‘yy’ is the high fuel pressure limitation in PSI from the AFM/POH or ‘00’ if no limitation exists.

Example: FP-5L-L05H40 indicates the calibration for low pressure limit is fixed at 5PSI and the high pressure limit is fixed at 40PSI.

FAA Approved: _____
 Manager, Propulsion Branch
 Los Angeles Aircraft Certification Office

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K.Arrigotti ANM-120S	A-2	Make and Model are closely controlled on AMLs, so it wouldn't hurt to include the instructions for them in here.	Make and Model have to match the TCDS or MIDO makes you redo the AML.	Add "as shown on the TCDS" to both the Make and Model definitions, where ever it sounds good.	Adopted Revised accordingly
ES (ANM-140L)	Pg A-3, General	It isn't immediately clear what this chart is.	See comment.	Consider removing the chart altogether, or suggest this chart have a title. It could be something like: <i>"Process for initial and Subsequent AML-STC Issuance"</i>	Adopted Removed chart
ES (ANM-140L)	Pg A-3, references to G-1 IP and issue paper	G-1 Issue Papers (and IPs) are not required for all STCs or all AML-STCs. This chart implies a G-1 IP is required for all AML-STC projects.	Issue Papers are not required for all projects. This suggests a G-1 IP is required. And, we don't want to state or imply that a G-1 IP is required for all projects.	Suggest removing all references to Issue Papers, or wherever an IP is referenced, indicate "as applicable".	Adopted Removed chart
ACE100-2717					

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Raymond Johnston, ACE-119W	Page 1, para 4	Non-concur Not enough related information.	In addition to the listed references, the reader should be aware of the following directives, guidance, and policy: <ul style="list-style-type: none"> • Order 8900.1 (Airworthiness Insp. Handbook) – What requires an STC? • Others.... 		Not adopted Order 8900.1 is an inspector hand book. This AC is a certification document and it is related to part 21, “certification procedures and products.” Furthermore, 8110.4C is the primary controlling document for AML approval process.
Raymond Johnston, ACE-119W	Page 1, para 5.a. Page 1, para 5.b. Page 2, para 6.b. + Others	Non-concur Text in this paragraph refers to “aircraft” or “aircraft models”. However, paragraph 3 indicates AC is applicable to aircraft, rotorcraft, engines, and propellers.	Text is confusing or contradictory. On the other hand it is difficult for me to imagine the usage of the AML process for engines and propellers.	Make changes, as appropriate, to indicate the approval method is applicable to products covered by a STC.	Partially Adopted Revised “3 applicability section” AML can be used for propellers and engines. For example, an applicant applies for an STC to install a different propeller on to their aircraft. They can go through the STC process or an AML approval, if they choose to install the same propeller on different models. As long as they meet all the regulatory requirements.

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J. Kuen	Page 1 Paragraph 5.a.	Concur: The last sentence discusses the use of an AML for multiple models on the same TCDS. What is the definition of different models?	In the past, we have not considered different models on the same TCDS appropriate for an AML STC. At what point do we consider the need for an AML? Different certification basis? Different dash number (757-200, 757-300)? Different sub-models (757-204, 757-208)? The example on page A-1 shows different TCDSs as new entries on the AML.	Explain when an AML STC would be used for different models on the same TCDS.	Question answered. The Key to AML-STC is identical/similar installation between models. Whether on the same TCDS or different TCDS is not the main factor. Models listed on the same TCDS, e.g., 757-200, 757-300 are acceptable. Models listed on different TCDS, e.g., A320-100, 737-800 are also acceptable.
Raymond Johnston, ACE-119W	Page 1, para 5.a.	Non-concur The AML STC contains more than “baseline data”. It must contain data applicable for all models in the AML.	While it is acceptable to have a set of “baseline data” applicable to all models on the AML, there will be “supplemental” data for each model as well.	Address the use of supplemental data for each model, using a model qualification process.	Clarification – This is the approach established in the AC. Base line data+ supplemental data, if it requires it. The key to AML is to have identical or similar installation which forms the “baseline data”, in addition to the differences (if applicable) that is supplemented. The model qualification process is unique to Small Airplane directorate and it is not adopted by other

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					<p>directorates. The intent of this AC is to provide general guidelines, and minimum requirements under which each directorate can establish their own process such as” model qualification process” according to their line of business.</p> <p>Not having the model qualification process does not circumvent or relieve the applicant from the certification requirements to show compliance.</p>
ACE-114WR	Page 1, Paragraph 6.a	<p>Non-concur Add bold text “...must be established by a documented and repeatable engineering process”</p>	Simply stating the baseline data must be applicable leaves that process open for interpretation. AC 23-22 specifically called out an engineering based process, called a model qualification process, that documents applicability by engineering analysis.	As noted in “Comment” section	Not adopted See above response
ACE-112 DR	Page 2, paragraph 6.b.	<p>Non-concur This paragraph states: “ An AML-STC is issued for aircraft that are type certificated in the same category (e.g., an AML-STC</p>	See comment	Clarify to state cannot cross parts not categories.	Partially adopted There are distinct differences between categories in certain situations. For example Subpart B-performance for climb-critical engine

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		<p>for an aircraft certificated under 14 CFR part 23, normal category, cannot include aircraft certificated under part 23, commuter category, or part 25, transport category). Each category of aircraft requires ...”</p> <p>Agree you cannot go across 14 CFR parts such as 23 to 25, but you can within part 23, so the statement of not allowing a commuter category airplane on a normal category AML is not correct. This statement would also not allow a aerobatic or utility cat part 23 on a normal. Clarify this otherwise what industry has been doing for years is no longer allowed.</p>			<p>inoperative between commuter and the rest of the categories. In Subpart C-structure There are distinct differences between categories in maneuver load factor in g’s.</p> <p>Revised the statement to allow for exception if the modification between categories have the same certification basis and no further substantiation or data submittal is required.</p>

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ACE-114	Page 2- Paragraph 6.c	Non-concur “Compliance data is required for every model” needs clarification.	This statement has already been misinterpreted to mean that a separate data package is needed for every model, with model specific drawings, etc.	State “Compliance data must be shown to be applicable for every model” instead.	Adopted Revised accordingly to include the suggested text in section 5C.
ACE-114	Page 2 - Paragraph 6.e	Non-concur Certification basis tracking is THE most difficult issue with an AML besides applicability of the data. This section needs to be expanded to explain the process needed to satisfy a 21.101 analysis, and to separate the basic cert basis of each model from the potentially common certification basis applied to the modification.	It is possible to separate the basic cert basis of each aircraft, and the areas affected by the change. It is also common to have a single list of rules being applied to all models at the latest cert amendment level. Therefore it is possible to create a simple list of where each model starts, referencing its current TCDS basis, and simply list the areas affected by the change as the basis for the AML. We do not expect each model to list the entire original basis, and the areas impacted, for each model individually.	Add wording to clarify: <ol style="list-style-type: none"> 1) Each model must be evaluated against its original cert basis according to 21.101. 2) The areas affected by the change should be listed, and a common certification basis identified for the change that can apply to all models, regardless of the cert basis where each model begins. 3) The AML should then list a general cert basis for each model, and specifically call out the areas of change and amendment levels. 	Partially Adopted The AC will provide a general requirement to establish cert basis and amendment level for the areas affected. As part of substantiation for the affected area the 21.101 analysis is required anyway, so it is not necessary to mention it. Revised 5.d to include The certification basis, and amendment level for the areas affected by the modification must be established for each model.

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Raymond Johnston, ACE-119W	Page 2, para 6.e.	<p>Non-concur The “baseline data” should be adequate to cover all certification basis for all models on the STC.</p>	There should be a model qualification process that examines the baseline data relative to the certification basis	Add a model qualification process that also includes certain requirements such as the examination of the certification basis for each model.	<p>Not adopted. 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. . 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 baseline data is that portion of the data that can be shown to be applicable to the other models that are on the AML. If the commonality of data (baseline) cannot be established, then separate STC is required for each model.</p> <p>The suggested adoption of model qualification process is unique to Small Airplane directorate and it is not adopted by other directorates. The intent of this AC is to provide general guidelines</p>

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					under which each directorate can establish their own process such as” model qualification process” according to their line of business.
Gerald Avella ACE-102A	Page 2, Section 6.f.	Concur: STCs on flight control systems should not be considered for AML STCs.	Because of the criticality of flight control systems they should not be open to AML STCs.	Change “may not” to “is not”. The AML-STC is not suitable for systems that can directly control the aircraft.	Not-adopted Other commentators suggested to change” is not” to “may not” The commentator is correct in expressing the criticality of certain installations that have direct input to control system, however AML-STC does not limit the applicant who wish to show full compliance to each model from obtaining their approval. Similarly, in a regular STC process the applicant is not prohibited from obtaining approval for installations that may directly control the aircraft. In the AML-STC it would be very difficult to show compliance to one model and try to justify (without actual testing) the installation commonalities between other

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					models in the flight control systems area. But this is not impossible if the applicant is willing to conduct full testing and comply with each rule.
Raymond Johnston, ACE-119W	Page 2, para 6.F.	<p>Non-concur The argument about complex installations and functions goes all the way back to N8110.43, which made the following statement: “The STC’s modification should not be a simple installation on one product and a complex installation on another product.” In AC 23-22 (chap 2, 6.c & d), generic guidance was provided regarding the more complex installations that could be encountered. Thus, prior policy indicated that complex systems could be handled, but the supporting data would have to be adequate for all models.</p>	The draft AC specifically mentions autopilot and RVSM approvals as types of installations not conducive to the AML process.	Provide generic guidance regarding what is needed to deal with more complex installations instead of providing several examples of installations that may not be suitable for AMLs.	<p>Explanation: This document is not for avionics installation only (AC 23-22). The examples provide “some guidelines” as to what may be considered complex installation. Furthermore, it gives the reason why certain installations may require model specific compliance. Complex versus simple installation is very subjective and it is dependent upon the functional criticality of the component and the severity of its failure affecting the aircraft. Further, the level of integration and interface in to the existing system determines complexity of the modification.</p> <p>Revised section 6 of installation instructions and</p>

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					removed generic instructions per comments received from FAA AEG on page 60.
ACE-114	Page 2, paragraph 7.a	<p>Non-concur The installation instruction section should mention part 43 requirements and guidance for acceptable installation for wiring best practice, etc.</p>	Chapter 11 of AC 43-13 and ASTM wiring guidance documents provide wiring best practices for STC and major/minor alterations to aircraft. Wire routing may or may not be critical, depending on the aircraft, the component being installed, its intended use, etc.	Change the paragraph to recognize existing guidance for installers, including AC 43-13 and other sources of best practice for wiring, routing, etc. FAA EWIS requirements would be appropriate for part 25 installations, and not for part 23. Installation shops know the subtleties of this, so this section should focus on the requirement for the equipment OEM to highlight what installation aspects re critical between models, based on the component and specific installation. It should not simply mention wire routing as the most important issue.	Partially adopted Revised the paragraph and omitted references to wiring and avionics examples. The intent of this AC is to provide guidelines that are all inclusive and it is not specific to one type of modification. The specific compliance requirements for each type of installation can be implemented at the ACO level in the PSCP including the AC 43-13 reference.

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Michael Cann ACE-117A	Page 3, Section 8.c.	Concur: Since both 8a and 8c mention structure and 8c specifically states, “In locating and integrating external components (e.g., antenna), the lightning and EMI effects (e.g. close proximity of other antennas that may be a source or recipient of EMI) should be considered. For external equipment installations (e.g., antenna), it may be necessary for the installation instructions to provide detail description of the location, structural attachment, and lightning protection integration,” we believe another clarification would help (even though this is the HIRF/EMI section.	Clarification	Since structure is mentioned, we recommend adding the two following sentences to paragraph 8c. “Though a system may function similarly, the applicant is responsible to identify and substantiate any changes in the structural installation between models including, but not limited to, differences in metallic skin or doubler material and thickness. For composites, differences between material, stack-up, and environment must be considered.” Optionally, the Atlanta ACO would not object if Structural considerations was given its own short paragraph using these sentences.	Partially adopted Revised Section 7.0 and incorporated some of the suggested text. Section 7.0 was written by lightning SISTA (Dave Walen). The details to specific structural requirements can be implemented during certification. The AC provides the general guideline which is all inclusive. The suggested text is still valid even if all the details are not specifically mentioned. Revised 7.c to include “identify and substantiate any changes in the structural installation between models.” Added suggested text “differences in metallic skin or doubler material and thickness
Raymond Johnston, ACE-119W	Page 3, para 9.	Non-concur Verbose and confusing paragraph.	This paragraph is a confusing, long-winded way of simply saying, “each STC must have its own compliance substantiation”. Also, if the third party willingly	Change wording to simply indicate that applicants for an STC must have substantiating data (to show compliance)	Not adopted This is a recurring problem with most of the Manufacturers of avionic components when they apply for AML without having access or privilege to use the

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			<p>provides the data to manufacturer X (not likely –but possible), then manufacturer X can use it. There really is no reason for this paragraph the way it is.</p>		<p>data as part of their own substantiation. The suggested verbiage “each STC must have its own compliance substantiation” has existed for many years in various (ACs, Orders, etc), and this has not obviated the problem.</p> <p>The written paragraph was agreed and concurred by the AML-STC national team to specifically address this recurring problem.</p>
<p>John Lee ACE-119A</p>	<p>Page 4, Section 10.b.</p>	<p>Concur: Instances of software should be modified to be software and AEH.</p>	<p>Correction</p>	<p>Modified to be software and AEH.</p>	<p>Adopted Revised the paragraph based on other comments which eliminated the need to incorporate this particular comment.</p>
<p>Raymond Johnston, ACE-119W</p>	<p>Page 4, para 10.b.</p>	<p>Non-concur Eliminate this paragraph.</p>	<p>This situation is not unique to an AML STC.</p>		<p>Not adopted Some provisions in the AC are unique to AML approval and some are guidelines that can have a big impact on a multi-model approval. The software revision upgrades has its biggest adverse effect on the AML approval where there are many models listed.</p>

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ACE-114	Page 4, paragraph 11	<p>Non-concur Splitting models may be acceptable, if the applicant re-applies for a single model STC as a new approval, using the baseline data as substantiation for the approval.</p>	The AC should not eliminate any chance of splitting models, since there may be valid technical reasons to do so. For example, if a particular model has unique and complex installation issues, such as how to properly pierce the pressure vessel on an all-composite high altitude jet, it may be desirable for the STC holder to seek a new STC approval using their existing baseline data.	State that splitting models is only acceptable if a separate STC is applied for so COS issues can be tracked to a specific approval for the unique aspects of that particular model approval.	<p>Acknowledged, but not adopted</p> <p>8110.4C does not allow for splitting out the AML models, except for AD or typographical errors. However, as the commentator points out, obtaining a new STC with the existing data is not prohibited. The applicant can apply for and get a new STC with the existing data, if the data package is complete and stands alone on its own. This issue will be addressed in the new 8110.4X.</p>
ACE-112DR	Page 5 paragraph 14 a.	<p>Non-concur Same comment as above.</p>	See comment	Clarify to state cannot cross parts not categories.	<p>Adopted. Revised paragraph 5.b</p>
ACE-100M (Brys & Morgan)	Page 5, Para 14	<p>Concur: It says "...to pursue an AML-STC, the following items are a pre-requisite..." It's not clear to the reader whether these prerequisites are just listed as conditions</p>	The title of the paragraph and the items listed, which are coined "prerequisites" as opposed to "requirements" (listed earlier), cause confusion about what the applicant is expected to do with this	Please specify the intended use of the checklist of prerequisites and consider referring to the items in the checklist as conditions under which an AML-STC may be appropriate or the terms under which the AML-STC will be	<p>Adopted Revised for clarity "To pursue an AML-STC approval, the following items are required."</p>

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		under which an AML-STC may be appropriate or if the checklist should be documented as part of a submittal to the FAA (e.g. certification plan).	information.	approved or both.	
ACE-114	Page 5, Checklist	Non-concur The models do not need to be of the same category, as stated earlier.	The key issue was not mixing categories, but mixing CFR parts on an AML. Also, type rated aircraft have caused issues, but these are not mentioned.	Change the requirements to cannot mix CFR FAR Parts instead of categories, and add a note to state type rated airplanes may require special attention to be included on an AML, including potential evaluation by the Type Evaluation Board in AEG to determine the impact of the proposed change on the training program.	Adopted. Revised section 5 b. Added the suggested text to 13 G.
J. Kuen	Page A-1 Sample AML	Concur: The sample AML should be removed from the AC.	The documentation of the AML STC is a FAA function and should be covered in Order 8110.4 or a separate AML order.	Remove sample AML.	Not adopted The sample is to provide some guidance for standardization. This template will also be included in the new 8110.4XX revision
J. Kuen	Page A1 Sample AML	Concur: Suggest adding column with the AML entry number (1, 2, 3...).	This is useful in referring limitations, certification basis or other notes to an individual line(s) on the AML	Add first column with entry number.	Adopted Added numerical column.

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J. Kuen	Page A1 Sample AML	<p>Concur: The columns for Cat, Part, Amendment and Component should be removed from the table.</p>	<p>The Cat (Category) is required to be the same for all AML STC entries and therefore it is redundant in the table</p> <p>The CFR Part and Amendment level should only be defined if it is different from the original TCDS certification basis. Normally the certification basis is defined after the AML table, because it is too lengthy to fit in the table. (reference STC ST02541CH AML http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgstc.nsf/0/8ece476b0d154b8086257b13006910f5/\$FILE/ST02541CH_AML.pdf)</p> <p>The component parts that are installed should be defined in the MDL/Installation Drawing and therefore are redundant in the table.</p>	Remove these columns from the table.	<p>Adopted Revised and added “Item” and other suggested columns by other commentators.</p> <p>Not adopted AML principle relies on the particular article to be installed in different models. Theoretically, the article and its associated part numbers must remain the same for it to be AML qualified. However, there are instances that may require a part number change without affecting the form, fit and function of the component. This is a good example to show that even if a part number is changed the part remains the same based on the given explanation. The benefit of the example outweighs its elimination from the column, especially</p>

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					<p>when there are more than 100 models listed on the AML. The ability to trace the article and its associated part number from the 1st installation to the 100th is crucial to maintain configuration control. Furthermore, the ACO engineers don't have access to installation dwg to check for correctness of the part number. As stated, the sample table can be modified to delete this column if deemed unnecessary</p>
J. Kuen	Page A1 Sample AML	<p>Concur: The Surrender Status does not seem to make sense in the AML.</p>	<p>It seems that surrendering an AML STC entry is similar to splitting up the entries in the AML (discussed in paragraph 11) and should not be permitted. There will be parts of the surrendered AML STC entry that will be similar in the other entries that are not surrendered.</p>	<p>If an applicant can surrender an entry on an AML then guidance should be provided in this AC.</p>	<p>Clarification The certificate holder (CH) of an AML-STC can surrender a particular model due to various reasons. This does not mean splitting out that model. The certificate holder relinquishes the responsibility of COS for that particular model. Further, the CH has to go through surrender procedure outlined in 8110.4c. The rest of the models on the AML are still active and the</p>

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					CH still has the responsibility for COS.
Michael Cann ACE-117A	Page A-1/A-2, Appendix A	Concur: Appendix A states: “General note: Start with the latest approved model at the top and list previous models in sequential order based on the approved date (2012, 2011, 2010, 2009, 2008, etc).” This is not visible upon review of the table.	Clarification	Since the ACO expects the tabular format to be in sequential order, it would be a good idea to include the “Approval Date” as a column in the sample. That way the approval date is always visible and there is no guesswork on whether the table accurately reflects sequential order.	Concur- Added column AML amendment date
John Lee ACE-119A	Appendix A	Concur: Appendix A's last diagram's last block says "Issue ASTC". Is this AML STC or Amended STC?	Clarification	If AML STC, please specify as such and with appropriate details. If Amended STC, does this mean all subsequent models require an Amended STC project? If so, is Part 23 an exception via AC 23-22?	Clarification To avoid further confusion, the chart was deleted.

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Gerald Avella ACE-102A	General Comment	Concur: There is no mention of how an AML STC will be administered. Is this information contained somewhere else?	Draft Order 8110.4D does not mention AMLs at all. How AML STCs are administered should be documented somewhere so that the applicant knows what to expect.	Include general guidance on how an AML STC is administered.	Clarification: The revision to 8110.4XX will include the provision for AML administration. Section 10. A “When the STC holder decides to add a new model or amend an existing approved model, the FAA or an authorized organization designation authorization (ODA) will oversee the AML project
J. Kuen	General	Can an entry (aircraft make and model) on the AML be removed once it is approved?	When design has been approved it should remain on the list.	Add some guidance to the AC.	Question Answered. The current 810.4C allows for removal of the model from the AML under two conditions. 1. There is a typographical mistake, or 2. an Airworthiness Directive issued against a particular model. However, the new 8110.4X, will allow removal of a model if there is typographical error, but removal of a model from the AML due to an AD is not recommended. This is because of historical traceability. Under the new published AC 20.179 “ <i>Certificate data retention</i>

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					<p><i>and governmental record .”</i> The record of all issued approvals are kept but noted and captured in the appropriate place, which in the case of AML is under model specific note or other appropriate place. See appendix A, sample table, the AD is noted for Raytheon aircraft.</p>
Raymond Johnston. ACE-119W	General Comment	<p>Non-Concur with the Draft AC: The proposed AC should <u>prescribe</u> an acceptable process. Like any AC it is recognized that an applicant can come up with a different approach. However, it is important that the AC provide a “standard” process (this one does not). There is very little substantive or helpful information in the proposed AC. This proposed AC also takes a much weaker position relative to AC 23-22 with respect to adding models.</p>	<p>AC 23-22 outlines a model qualification process that is necessary for successful implementation of AML STCs. The AC should outline to the fullest extent possible, the roles and responsibility of the applicant, and the processes involved to achieve success. Otherwise, there is very little standardization offered with this AC.</p>	<ol style="list-style-type: none"> 1) Extract and revise the Model Qualification Process found in AC 23-22 (Chap 3, para 3) to provide a template for a model qualification process This is vital to having the applicant’s perform the necessary work. 2) Provide indication of what happens at each of the Directorates. Currently, they all have differences of opinion regarding AML STCs 3) The guidance needs to deal with different 	<p>Acknowledged but not adopted. AC 23-22 model is not accepted by other directorates. It is for avionics installation only. The Model qualification process is not an acceptable process at a national level, because it is an engineering process specific to small aircraft. It is better implemented at a local level than the national level. Further under QMS guidelines, once it is adopted it must conform to all of ISO requirements for auditing purposes. It is difficult to discern how the suggested verbiage</p>

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				<p>type ratings. AEG views type-rated aircraft differently and may require multiple model variation evaluations.</p>	<p>“...must be established by a documented and repeatable engineering process” would not allow for open interpretation and inconsistency. Any engineering evaluation by its virtue is open to interpretation by the engineer who reviews the document. Two engineers reviewing the submitted data from different directorates may not come to the same conclusion. Furthermore, the applicant is responsible to substantiate every single model that is approved whether there is a model qualification process in place or not. The AML-STC is not a blanket approval for adding model without further substantiation. Each directorate can tailor further “compliance requirements” unique to their line of business, (such as AC 23-22 for avionic installation, etc) which may be more involved than the minimum</p>

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					<p>requirement this AC prescribes.</p> <p>Item(3) Revised 13.G to address possible AEG evaluation</p>
Raymond Johnston, ACE-119W	General Comment	<p>Non-Concur What happens to AC 23-22 after this AC gets published? Presumably this draft AC “standardizes” the process and each Directorate no longer needs their own policy?</p>	<p>There is no indication that AC 23-22 gets cancelled, nor any mention of it anywhere.</p>	<p>Provide disposition of Directorate-generated policy and guidance relative to this proposed AC.</p>	<p>Question Answered: See above comment. In addition, none of the generated directorate policy is cancelled. AC 23-22 is not cancelled. This AC provides the general guidelines and minimum requirements for an AML-STC. This AC is for any installation, not just Avionics i.e., AC 23-22.</p>
Raymond Johnston, ACE-119W	General Comment	<p>Non-Concur AML STC should identify applicable, unique model variations from each TCDS. In many cases AML cannot be applied to all models on TCDS.</p>	<p>Due to unique model variations, there are many cases in which there are many models of aircraft listed on a single TCDS, and the AML may only be able to be applied to a single model or subset of models listed on a given TCDS.</p>	<p>Address model variations in the AC.</p>	<p>Answer to the question This problem can be resolved during the substantiation of each added model. If the model variations are such that the similarities in installations are no longer applicable then AML is not the proper approval. Added note section to section 13.b to clarify that models must share the same baseline data.</p>

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Air 120					
John Strasburger AIR-120	Page 2, paragraph 7	There should be a section on installation of equipment on the external aircraft surfaces. Even something as innocuous as a small antenna could have airworthiness issues if the installation is not properly integrated into the aircraft structure and consider lightning zones, existing lightning protection (e.g. copper mesh), proximity of other antennas that may be a source or victim of EMI if not there is inadequate spacing between antennas, ice shedding that could damage the aircraft structure, propulsion system (tail rotor) or be ingested by the engine, etc.	Further example	Add 7.d. In locating and integrating external components (e.g. antenna), all applicable airworthiness requirements should be considered to include structural, lightning, icing, EMI (e.g. close proximity of other antennas that may be a source or victim of EMI), etc. For any external equipment installations (e.g. antenna), the installation instructions should specify the exact location, the structural attachment details, and lightning protection integration if any.	Adopted, re-wrote the paragraph 7.c where it is more appropriate, and omitted some minor sections. Section 7.0 was written by Dave Walen (SISTA) for Lightning and HIRF.

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John Strasburger AIR-120	Page 3; Para 10a	States: Minor changes to the AML-STC are typically addressed by certificate management agreements. Many STC applicants do not have certificate management agreements. How would minor changes be handled for those applicants that don't have an agreement?	clarification	No suggestion	Adopted Revised the sentence and added the word "or" to allow the FAA to accept the applicant's internal process for handling minor changes if there is no certificate management agreement in place.
John Strasburger AIR-120	Page 4, Section 12b	The last sentence is missing a verb.	correction	Insert the word, "are" between the word models and added.	Adopted.
AIR-130					
Kevin Bridges, AIR-130	Page 2, Para. 6.f.	Determining suitability for complex installations and functions	Is there a special need to address TSO avionics that require "personality modules" for individual models? For example, an AML application for a PFD that has to have unique airspeed indications for each particular model.	clarification	Clarification: There is no special need for installations that have unique airspeed indicators for different models. These types of installations will require specific appendix to the installation instructions, and flight manual supplement, if

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			Or, is that part of the installation instructions guidance intended for complex systems in 7.b?		there are specific operational requirements that must be followed.
Kevin Bridges, AIR-130	Page 2, Para. 7a	For example, the instructions my include the following:	Typo	correction	Adopted
Dave Walen, CSTA - EMC	Section 8	The text related to EMC, HIRF and lightning is not consistent with existing regulations and technology	Rewrite this section to clarify EMC, HIRF and lightning issues	Attached.	Concur Inserted the suggested text.
ANE-100					

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Tony Pigott	Page I & Paragraph 3	Does this AC cancel AC 23-22?	This AC is not in harmony with/contradicts AC 23-22.	Ensure that this AC is in harmony with/ full alignment with AC 23-22 or ensure that this AC cancels AC 23-22.	<p>Acknowledged but not adopted This AC does not cancel AC 23-22. The commentator does not give specifics as to what is contradictory between the ACs.</p> <p>AC 23-22 is used for “avionics installation only.” As stated at the beginning of the document, this AC should not be used for other installations that are not avionic specific. The AC 20-180 is intended for all types of AML approvals.</p>
Tony Pigott	Page I & Paragraph 5	AML STC should not apply to multiple models on the same TCDS.	An 8110.4 'Multiple STC' is for multiple models on the same TCDS.	Reword to state: AML STC applies only to multiple models on more than one TCDS.	<p>Not Adopted. 8110.4 does not categorize multiple STC for multiple models on the same TCDS. Page 7 description of multiple, one-only, AML states as such (1) One-Only STC – a special case of limiting the change to a specific serial numbered aircraft, the FAA does not require the STC data to be sufficient for accurate reproducibility.</p>

Commenter	Page & Paragraph	Comment	Reason for Comment	Suggested Change	Comment Resolution
					<p>(2) Multiple STC – any STC that is not “One-Only.”</p> <p>(3) Approved Model List (AML) STC – a special case of multiple STC using an AML to control installation eligibility, such that adding new make and model products does not require amendment of the STC.</p> <p>As stated in item 3 of the 8110.4 AML is a special case of multiple STC. There is no reference of limitations to the same TCDS or multiple TCDS,</p>
Tony Pigott	Page 2 & Paragraph G	No mention of Foreign CAA validation concerns.	ACO experience has proven that not all Bilateral agreements recognize an AML STC. Applicants need to be aware that an FAA AML STC may not be recognized by a foreign CAA for validation.	State that: An FAA AML STC may not be recognized by a foreign CAA for validation. Check the applicable Bilateral Agreement.	Not adopted The AML is STC has been used by both (EASA, TCCA) authorities in the past. Their concern is primarily for lack of standardization resulting in inadequate substantiation and oversight of multiple models. Currently, efforts are on the way to harmonize our requirements for AML with other foreign authorities.

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Tony Pigott	Page4 & paragraph 11	No mention of removing models	Per 81 10.4, ACO must issue an AD to removing a product from an AML, unless the STC holder can show no completed installations were accomplished or the product that was mistakenly listed on the AML	State that: An AD is required to remove a product from an AML, unless the STC holder can show no completed installations were accomplished or the product that was mistakenly listed on the AML	Acknowledged but not adopted There is a current effort in revising the 8110.4X to re-write this particular section regarding AD on AML. Until the procedure for removing a model is finalized , it will not be included in this AC.
Nick Rediess	Appendix A Page 1 & Header	Incorrectly states (continued)	This is the start of Appendix A	Delete (continued)	Adopted Will revise accordingly.
S. Gesele & F. Pieri ANE-172	Page 4 Paragraph 13	<p>The AC states that, under certain circumstances, an installation conformity inspection may not be required.</p> <p>Does this only apply to the FAA conformity. Or does it also apply to the applicant's requirement for 100% company conformity,</p>	The AC implied that 100% company conformity may not be required. The way it is worded, I would expect applicant to propose adding models to an AML without actually modifying, and conforming, an aircraft.	Clarify this paragraph with regard to company conformity and the requirements of § 21.33 and 21.53	<p>Clarification: Section 12," Conformity" states "During the certification program, an <u>FAA installation conformity inspection.</u>"</p> <p>This refers to FAA conformity §21.33, not company conformity. There are instances where</p>

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		reference 21.33?			installations are identical or similar and the applicant has already complied with the FAA conformity inspection requirements on the first installation. In that case, the FAA (at its discretion) may find that the follow on installations are similar in form, fit, and function, not requiring any further conformity inspection. Revised and added §21.33 for clarity.
S. Gesele ANE-172	Page A-1 AML Table	The 14 CFR part column is redundant	An AML STC is only applicable to a single Category of aircraft. The face of the corresponding 8110-2 already contains the 14 CFR part. This column adds no value and takes up valuable real estate on the AML. While this is only a sample, QMS auditors have written uo ACOs for not following samples exactly as published	Remove 14 CFR part column	Adopted Revise table to remove the CFR column

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	Page A-1 AML Table	The CAT column is redundant	An AML STC is only applicable to a single category of aircraft. There will not be an issue where an AML differentiates between categories on the same AML if anything ; this column almost implies that different categories could be on an AML.	remove CAT column	Adopted Revise table to remove the CAT column
S. Gesele ANE-172	Page A-1 AML Table	The component MFG PIN column has questionable value	The information under this column should already be captured under the MDL/ Installation DWG	Consider removing this column	Not adopted AML principle relies on the particular article to be installed in different models. Theoretically, the part and its associated part number must remain the same for it to be AML qualified. However, there are instances that may require a part number change without affecting the form, fit and function of the component. This is a good example to show that even if a part number is changed the

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					<p>part remains the same based on the given explanation. The benefit of the example outweighs its elimination from the column, especially when there are more than 100 models listed on the AML. The ability to trace the part and its associated part number from the 1st installation to the 100th is crucial to maintain configuration control. Furthermore, the ACO engineers don't have access to installation dwg to check for correctness of part number. As stated, the sample table can be modified to delete this column if deemed unnecessary.</p>
S. Gesele ANE-172	Page A-1 AML Table	The COS column does not belong on the AML	<p>An AML is an alternate method of writing an STC. We do not include COS information on an STC, so it should not be included on an AML STC. There is no requirement, or expectation to update an STC or AML once an</p>		<p>Adopted Revise from COS to model specific notes. The configuration control is crucial in AML-STC, especially when there are numerous models involved. Providing specific model notes is a useful tool to an ACO engineer for determining if any action is</p>

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			<p>AD is published</p> <p>If an AD is published, and the AML is not updated, then we will have a current, published approval that shows no AD is applicable to the installation. We're setting the public up for failure.</p>		<p>required based on the description in the note section. It is very efficient when working with large number of models.</p>
S. Gesele ANE-172	Page A-1 AML Table	The AML should include an Original Issue and Amendments Dates	An AML is an extension of the associated STC. When models are added, the AML, not the STC, is amended. Just as with the corresponding STC, there are benefits associated with keeping a record of amendments.	Add an Original Issue and Date Amended line. Consider adding a Date Added column to the table to document when a particular model was added	Adopted Added column for AML initial approve date and amendment date column.
ASW-112					

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G. Schwab ASW-112	Page 2, para 6c	In the last sentence of paragraph needs to be more definitive of the requirement to substantiate any differences between models included on an AML STC.	This sentence uses the word “may”, which leaves it open to interpretation that it may not be required to substantiate differences. It needs to be clearly stated that each model and all differences must be substantiated by data.	Change last sentence to “If adding a new model that has differences from the previously approved models will necessitate substantiation to address any and all of those differences.	Adopted Newly revised paragraph from other commentators addresses this issue. First sentence “The compliance with the requirements per §21.20 and applicable data must be shown to be applicable for every model on the AML.” The differences between models, depending on the changes, may need further substantiation. This does not mandate that the applicant is required, if for example, a simple Hubs meter is installed on two different aircrafts. For more complex installation it is obvious that the applicant is required to show full compliance to every model which by its virtue of application has to account for the differences between the models as well.
G. Schwab ASW-112	Page 2, para 6f	This paragraph (or section) may be a good place to provide an example of a system that has numerous variations (number of displays, for example) and	The substantiation for a 4 display EFIS may be significantly different if only installing 3, or 2 displays of the same basic system. The complexity of	Add some kind of statement or note to the effect that complexity as well as variations or options complicate the system and may preclude those from being	Partially adopted Revised and re-wrote the particular section. Based on comments received. Many thought that this AC was mostly written for

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		how each “version” needs to be assessed and substantiated.	how data is shown and what existing equipment is either retained or removed exemplifies why a “complex installation” may not be suitable for an AML STC.	good candidates for the AML STC.	avionics installation. For this reason examples of avionics or electrical installations were removed. This AC sets the frame work (minimum requirements), and is all inclusive and does not discriminate whether the installation is electrical or mechanical. The substantive part of the compliance can be tailored to each directorate.
G. Schwab ASW-112	Page 3, para 7b	This would be a good section/paragraph to add a note, or statement that a type design for each model is required, and the emphasis that a reference to AC 43.13 is NOT a type design.	Applicants have used reference to AC 43.13 as substantiating data for type design, typically for the electrical circuits, wire routing, circuit protection, etc. This leaves too much “design” work on the installer, who should not be required to engineer an installation.	Add some verbiage to define what a type design is, and is not.	Acknowledged, and added 21.20 to section 5.c to distinguish compliance requirements. It is not necessary to add 43.13 since by its title is a performance rule separate from Type design. The revised sentence in 5.c in parenthesis defines the example of data for certification.
G. Schwab ASW-112	Page 3, Para 8 Title	Acronym for Electromagnetic Field is EMF, not EMI (Electromagnetic Interference). However, my comment is that the title needs to include Lightning,	All of these issues need to be assessed and addressed for each model on the AML STC.	Change title to “Lightning, Electromagnetic interference (EMI) and High Intensity Radiated Fields (HIRF) Considerations.	Adopted Dave Walen, Lightning SISTA provided the suggested text for the whole 7.0 section.

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		in addition to EMI and HIRF.			
G. Schwab ASW-112	Page 3, Para 8a	Paragraph needs revision to expand upon the ideas presented.	Paragraph is too brief.	The evaluation and consideration of the effects of lightning, EMI and HIRF is becoming more important in aircraft. Increased incorporation of composite materials in aircraft construction, significantly changes airframe reactance to electrical energy compared to more traditional aluminum construction. Increased use of digital electronics to perform flight essential functions increase susceptibility to the electromagnetic environment of the aircraft. Each model included on the AML STC should be assessed with respect to the appropriate electromagnetic environment based on its construction, particular design features and systems. This should be accomplished at the aircraft	Adopted see above disposition

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				level and as a result, standardized unit testing, such as those found in RTCA DO-160 may not be sufficient without further evaluation between the different models included on the AML STC.	
G. Schwab ASW-112	Page 3, Para 8c	First sentence example needs to also mention proximity to other components, besides antennas.	A transmitting antenna may create EMI on a critical system (such as FADEC) that is mounted in close proximity to the emitter.	Add “and/or systems” after the word ‘antennas’ in the second parenthesis of the first sentence.	Adopted Revised and added the suggested text.
G. Schwab ASW-112	Page 4, para 10b	Need to address the adding of functionality via a software update and how that functionality needs to undergo its own approval process.	With the current products on the market, it has become standard practice to add features via a software update. Depending upon what features are being added, that feature may significantly change the functionality of the approved product and needs to be assessed and approved under its own STC.	Add verbiage to clarify that functionality changes need to be assessed and approved on their own.	Adopted Revised the sentence based on all the comments received. .

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G. Schwab ASW-112	Page 4, para 12a	Third sentence, ‘challenge’ needs to be changed to ‘requirement’	AML STC holders need to understand their responsibility to maintain configuration control.	Incorporate word change in sentence from challenge to requirement	Adopted Revised sentence per suggested text.
G. Schwab ASW-112	Page 4/5, para 13	Need to clarify that FAA and applicant agreement is necessary with regard to whether, or not, similarity has been shown to the extent that conformity inspection is not necessary for subsequent model being added to the AML.	Applicant could have a biased opinion as to what level of similarity is sufficient to alleviate the need for a conformity inspection.	Add a statement to clarify that FAA agreement to similarity must be received before no showing of conformity inspection is required for additional models being added to AML.	Adopted Revised sentence based on other commentators comments.
G. Schwab ASW-112	Page 5, para 14	Need to add a checklist item to address that differences between models to be included on AML are known.	Applicants have been known to add models to AML for which they have little or no actual knowledge of or access to, with an assumption that the proposed model is “similar” to a model for which they have familiarity and have shown a compliant installation.	Add checklist item with words to the effect that models added to AML need to have differences, as well as similarities to previous models noted and addressed, so as to ensure compliant installations on the final product.	Adopted Revised and rewrote 13.C

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ASW-170					
Efrain E. Esparza	2. paragraph b, first and second sentences	Clarify or add more examples of acceptable certification bases to the first sentence. The second sentence should be rewritten.	Yes, it's true that different category of aircraft have different certification bases: however, aircraft under the same category can have substantially different certification bases. For example, there are aircraft that have been certificated to CAR regulations and others to FAR regulations. Some even have a mix of CARs and FARs in their certification bases. There is no reference on what to do with Restricted Category aircraft. The emphasis should be on certification basis, in particular the certification basis of the modification, instead of the category.	The emphasis should be on the certification basis of the modification, or STC, and not so much on the category. Yes, generally speaking, different categories render different certification bases but sometimes there are substantial certification differences in certification bases for aircraft within the same category. This will allow the combination of (surplus military) Restricted Category and Standard Category of aircraft when the modification certification basis is exactly the same. Suggestions: Add reference to CARs to the first sentence. Remove the word "possible" from the second sentence. Add the following sentence after the second sentence: A deviation to this policy may	Acknowledged and partially adopted. The certification basis and compliance checklist is required for every STC approval by default. This AC does not change that. The applicant is required to establish the cert basis for each installations. The deficiency in the AML compliance has been that different categories are substantiated with the wrong FAR regulations. For example, a 23.1309 analysis was accidentally used to approve a part 25.1309 installation because there was no prohibition of placing different categories of aircraft (23, 25, 27) on the same AML. The differences in cert basis

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				be approved through the accountable Directorate.	<p>under the same category can be addressed easier than different categories with the same regulation number as mentioned above.</p> <p>Revised section 5b to put emphasis on the certification basis of the modification.</p> <p>The suggested wording will be included in the new revision of 8110.4X not to the advisory circular, because it is not a policy document “A deviation to this policy may be approved through the accountable Directorate.</p>
AEG	Entire document	<p>I find the A/C draft to be generally well written, if a bit vague (which may be "on purpose" and perfectly understandable for an Advisory Circular.) However, there are several problems that should be corrected with regards to ICA development.</p> <p>Firstly, I would submit that</p>	With the "generic" instruction statement, there is no standard for the applicant's "showing".		<p>Clarification: The A/C is not written with the intent to be vague. It is written to provide a frame work with minimum requirements for an AML-STC approval. Part 21, outlines the frame work for certification of products and part 23, 25, 27, etc, set the requirements to find compliance to the regulations.</p>

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		<p>many applicants do not understand the difference between "installation instructions" (i.e those steps necessary to initially install a modification to an aircraft) and ICA (those steps needed to remove and install an existing modification to an aircraft.) As a result, when AML-STC's are submitted, only one set of "installation" instructions is provided, supposedly covering both scenarios. This is generally acceptable, but if so, that single set of instructions need to meet the requirements of 21.50. The problem is that many times, the installation process for an item is different than the in-service removal and replacement, and does not meet the requirements of 21.50. Applicants don't seem to understand that, and it would be useful to add to this A/C.</p> <p>Secondly and more</p>			<p>It was not our intent to re-state every detail of certification process in this document, because there are many supporting documents such as FAA Order 8110.4C providing ample information. This AC highlights the AML requirements that have been overlooked, mis-understood, and not considered in the past. The requirements of section 21.50 are well documented with FAA Order 8110.54B, and the accompany draft AC (in works) 20-ICA. These documents collectively will provide every detail there is to complete a satisfactory ICA.</p> <p>The “Generic Instructions” are those types of instructions that are simple, non-complicated, repetitive, and part of common knowledge.</p> <p>For example: a generator voltmeter that contains two wires, one (black)and one (red), with 4 quantity of MS-1020 screws can have a</p>

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		<p>specifically, your draft document section 6 states that <i>"a.The installation instructions must describe the installation in adequate detail such that follow-on installations are repeatable and result in a consistent and compliant installation for every model when properly followed. Generic instructions may be pursued for simple and non-complex installations if it is shown that the instructions are applicable to all models on the AML."</i> The statement about "generic. Secondly and more specifically, your draft document section 6 states that <i>"a.The installation instructions must describe the installation in adequate detail such that follow-on installations are repeatable and result in a consistent and compliant installation for every model when properly followed. Generic instructions may be pursued for simple and non-complex</i></p>			<p>generic installation instruction that states "Install the unit in the center console , <i>connect wires to the Main electrical Bus and torque screw to 20in/lb.</i> As long as this Installation remains the same for each model and there are no changes, then it is considered a "generic instructions."</p> <p>However, the sufficiency of generic instructions is a matter of subjective review. We do not want to burden the applicant with elaborate ICAs for a simple installation of a Hubs meter. In a simple remove/replace maintenance action the installation instructions may also serve as the ICA. This proposed installation instruction must be acceptable by the AEG.</p> <p>This AC provides guidelines for the applicant in coordination with the FAA to consider in making that determination.</p>

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		<p><i>installations if it is shown that the instructions are applicable to all models on the AML.</i>" The statement about "generic instructions" can and has lead to issues with the requirements of the various appendixes to the rules (23, 25, 27, 29, 31, 33) which all require that the applicant provide for ICA</p>			<p>Further, as the number of models on the AML increase, it becomes more difficult to use a generic instruction.</p> <p>Proposed ICA changes: The proposed ICA changes are good comments and it would be appropriate for the current draft headed by ICA team in OKC.</p> <p>Adopted and revised part of the AC to reflect the suggested text. Removed ICA reference from Section 5 and added the suggested text "<i>Installation Instructions and Instructions for continued Airworthiness (ICA)</i>" to section 6.C</p> <p>Removed the word "Generic" from the document to avoid further ambiguity, and Confusion as to what is considered "generic."</p> <p>Added the published Order 8110.54B (ICA) to the reference section.</p>

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					Under “Checklist” section (h), it is clear that ICA must be applicable for each model listed on the AML. Therefore, no need to add a specific section regarding this.