

CONSOLIDATED COMMENT LOG FROM FAA REVIEW

Originating Office: AIR-134	Document Description: AC 20-Laser	Project Lead: John Strasburger, Computer Engineer, AIR-134	Reviewing Office: Multiple FAA Offices	Date of Review: N/A
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	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
1.	V. Khanna, ANM-111, (425) 227-1298	Overview	<p>The roles of the FAA and the FDA and possibly the FCC if applicable, must be defined.</p> <p>Further operation rules and processes must be defined.</p>	<p>With overlapping responsibility of the various federal agencies on this system and its installation, it is imperative to define who is responsible for what and when. It would also be appropriate to get other agency “buy in” on the AC.</p>	<p>Add a responsibility section. This should include all aspects of the system life cycle from cradle to grave. System design/build, system test, system installation, continued airworthiness, monitoring safety and changes, maintaining tolerances and power levels throughout the life cycle, maintenance requirements for the system and or re-calibration of laser function, managing changes and re-certification.</p>	<p>Partially Accepted - FDA, FAA, installation applicants and laser manufacturer roles are now described in the AC in section 4. The AC does describe how changes to laser equipment must be recertified. FDA reviewed an earlier version of the AC and will be invited to comment on the AC that goes out for public comment. We have had a telecom with the FDA on 15 January 2014 to discuss the FDA and FAA roles.</p>
2.	ASW-111/112	General	<p>The rotorcraft Directorate strongly believes that the FAA has a duty and responsibility to ensure that certification of any equipment onto any aircraft must not only address hazards to the aircraft, crew and its occupants, but also hazards to other aircraft, ground personnel, and the public. Safe aircraft systems extend beyond the aircraft and should include consideration for other</p>	<p>Existing FAA guidance, industry guidance, and military guidance includes requirements for mitigating hazards to all aircraft in the NAS and the general public. This guidance establishes precedence that hazards outside the aircraft must be considered when evaluating the installation of systems/equipment.</p>	<p>The AC should include requirements to address and mitigate hazards to other aircraft and people on the ground.</p>	<p>Partially accepted. The FDA has regulatory authority to control laser hazards. The AC relies on the FDA’s regulatory variance process to minimize the risk of a laser hazard to the public outside the aircraft (e.g other aircraft and personnel on the ground).</p>

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			<p>aircraft, and people on the ground. Paragraph 6.1.d. on page five limits the responsibility of FAA certification to consideration of hazards to own-ship airworthiness and own-ship crew and occupants.</p> <p>The use of high energy lasers on rotorcraft for covert surveillance is an inherently governmental operation limited to federal, state or local law enforcement and military operations. High-powered lasers should not be allowed in civil operations, even though covert government uses (public use) may be justified. Civil-use lasers should have an upper limit, and safeguards should ensure that the upper limit is not exceeded under failure conditions.</p>			<p>Additional operational limitations have been added to the AC's flight manual supplement paragraph 7.3.7 to reduce the risk of exposing other aircraft and personnel on on the ground. Paragraph 7.2 requires the FDA technical variance controls to be part of the laser installation type design. As a result of this comment, and associated comments from the other Directorates, AIR-130 had a telecon with the FDA to better understand the variance process. The FDA stated that they require conservative variance technical controls. Example - in a recent FLIR laser illuminator variance request, the FDA required that a Class I laser range finder be installed that automatically disables the laser when the distance between the laser and the object being exposed is less than the nominal</p>

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						ocular hazard distance.
3.	ASW-111/112	General	The value of this tool to law enforcement and such commercial applications as mapping is recognized. The military has been using lasers for years and have an administrative structure to manage laser safety. In the military model responsibilities are defined, training requirements are defined, and operational limitations are defined. FDA regulations evolved around the land based industrial, medical, and research application of laser products. In the last ten years the utilization of airborne laser applications has seen rapid growth. Regulation and guidance for airborne lasers are evolving still. Industry and government guidance recommend that the laser operator be “knowledgeable”. A “Laser Safety Officer” is defined as having the authority and responsibility to monitor and enforce control of the laser hazard. A “Laser Safety Specialist” has the formal training to determine the hazard and		Consider working with AFS to look into the possibility of establishing operational requirements for operating lasers that will recognize and encompass the areas identified by this comment (i.e. establishing training requirements, identification of a laser safety officer, etc.).	Partially Accepted - We have had discussions with AFS on whether or not they could impose training and laser safety officer (LSO) requirements on aircraft operators that use laser equipment. For part 135 operators, ops specs may be possible but for part 91 operators flight standards can not require training or an LSO without rule making. We did discuss this with FDA and they can require training as part of the administrative variances controls. The need for laser training was included in 7.2 as an example of administrative variance control in the AC. Paragraph 7.3.8 also recommends that aircraft operator establish a laser safety program in accordance with the ANSI

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			<p>appropriate control measures. Those requirements are beyond the scope of this document but are equally important in overall safety. There is a need for the standardization of operational and training requirements.</p> <p>Title 21 used by the Federal Drug and Food Administration contains a number of significant product label warnings that must be posted to prevent exposure to the laser. For example, “LASER RADIATION – AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION.” While those warnings may be useful to persons near the equipment, perhaps in a medical facility, they are useless to persons on the ground that may be radiated by aircraft from significant distances in some instances, but may provide some safeguards for persons on the ground around or in the hanger.</p>			Z136.1 which includes a laser safety officer and training.
4.	W. Ryan ACE-100	General	The Purpose or Background statement should also mention that “provisions only” STC installation of LASER systems do not adequately address the potential safety hazards associated with visible and invisible spectrum lasers.	Many systems have been installed by field approval or STC in the past that did not adequately address the true hazards of the system to crew, and the general public.	Add simple change to proposed text to address the inadequacy of provision only STCs, Field Approval, etc.	Accepted – The following was added to paragraph 3.1: “Before this guidance, many surveillance systems were installed using an STC for laser surveillance equipment

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						that only included provisional wiring for the laser. For these installations, the STC type design would show that the laser was electrically disabled. These installations may have not completely addressed all the laser hazards.”
5.	W. Ryan ACE-100	General	The policy does not go into the installation effects and the potential need to visit structural, aerodynamic, and flight performance aspects for changes to mass, aerodynamic shape, etc. due to installation of the laser sensor head.	The mass of larger sensor packages and fairings to cover them can potentially impact the flight characteristics, drag, stall, etc. of the aircraft. Also, if mounted asymmetrically away from the center of gravity, could influence stall, trim, and handling characteristics of the aircraft. These are basic certification issues, but the policy may need to highlight the need to address these items.	Add to policy to address the need to consider the installation effects on the basic airworthiness and certification of the aircraft.	Partially accepted – the scope of this AC is the unique laser aspects. It is not guidance on how to install equipment on the outside of the aircraft. Paragraph 7 now highlight the flight characteristics that may be impacted: “changes to flight and handling characteristics (such as drag, stall, max and min air speeds, and trim).”
6.	F. Mokry	General	The Purpose or Background statement should also mention that “provisions only” STC installation of LASER systems do not adequately address the potential safety hazards associated with visible and	Many systems have been installed by field approval or STC in the past that did not adequately address the true hazards of the system to crew, and the general public.	Add simple change to proposed text to address the inadequacy of provision only STCs, Field Approval, etc.	Accepted – The following was added to paragraph 3.1: “Before this guidance, many surveillance systems were installed using an STC for laser

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			invisible spectrum lasers.			surveillance equipment that only included provisional wiring for the laser. For these installations, the STC type design would show that the laser was electrically disabled. These installations may have not completely addressed all the laser hazards.”
7.	AIR-500	Global			Adjust tabs so that there are only 2 spaces between the label and the paragraph title. Then, the label of the subparagraphs should align with the title above it. For example: 1. Purpose a. In this ... b. This AC...	Accepted – alignment and spacing updated globally.
8.	AIR-500	Header Area, Agency Logo, Page 1	Incorrect font.	Non-compliance to Order 1320.46C.	Look at the template font size for Order 1320.46C and adjust accordingly.	Accepted – copied header from a AC template.
9.	AIR-500 Angeline Garret	Subject Area/AC title, Page 1	Incorrect format.	Non-compliance to Order 1320.46C template.	Place a solid black line under the AC title in the Subject Area.	Accepted – line added

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10.	T. Ebina, ANM-100L	Page 1 & 7 paragraphs 1 & 14 Reference applicable 14CFR	<p>a. The Electrical Wiring Interconnection Systems (EWIS) requirements should be added</p> <p>b. Require installer to conduct temperature verification</p>	<p>a. For completeness of the proposed airworthiness standards</p> <p>b. To ensure Laser installation compliance with the established Cockpit Temperature Survey requirements</p>	<p>a. Suggest to add 25-17xx if required</p> <p>b. Suggest to add the laser temperature verification to meet established cockpit temperature survey requirements</p>	<p>Partially Accepted – EWIS added to paragraph 7: “This section provides installation guidance for the laser aspects of equipment with invisible wavelength lasers. In addition to this specific laser installation guidance, the installation must meet all other applicable airworthiness requirements such as those involving electrical system capacity, electrical circuit protection, lightning direct effects, ice protection, flammability, environmental qualification (such as radiated emissions, crash safety, vibration, and temperature), changes to flight and handling characteristics (such as drag, stall, max and min air speeds, and trim), vibration, structures, static and pitot systems, and electrical wiring interconnection</p>

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						systems. “
11.	ASW-111/112	Page 1 paragraph 1.a.	The intent seems to exclude visible lasers from certification.	Please consider explicit exclusion of visible lasers from certification.	A visible laser of any classification should not be certified on civil aircraft.	Accepted. Paragraph 1.5 added to the purpose: “This AC is only intended for invisible lasers. This AC does not apply to visible lasers because they pose additional hazards (such as flash blindness) that are not addressed in this AC..”
12.	AIR-500 Angeline Garret	Paragraph 1a, 2 nd sentence, Page 1	Incorrect spacing.		There should be only two spaces between sentences.	Accepted – extra space deleted
13.	AIR-500	Paragraph 1a, 3 rd sentence, Page 1	Incorrect formatting for citing reference and using section symbol (§).	Non-compliance to the Federal Register Document Drafting Handbook.	Do not use the section (§) symbol or the word “section” when the reference follows “XX CFR”. Only use the section symbol (§) when referring to different paragraphs/subparagraphs within the same section. For example: Correct way to cite: 14 CFR 23.1301 Incorrect: 14 CFR § 23.1301	Accepted deleted (§) symbol

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14.	ASW-111/112	Page 1 paragraph .c..	As written: "This AC is not intended for installations seeking airworthiness approval of an aircraft mounted laser system replacing a system required under 14 CFR, such as a navigation instrument."	Please add "air data systems" to the list of systems that are not intended for this guidance. An air data system is a required system so there are other important parameters outside the proposed guidance that must be considered.	This AC is not intended for installations seeking airworthiness approval of an aircraft mounted laser system replacing a system required under 14 CFR, such as a navigation instrument or an air data system.	Partially Accepted – Paragraph 1.3 revised to the following: "This AC is not intended for installations seeking airworthiness approval of required aircraft equipment that has a laser with radiation contained within a protective housing (for example, a ring laser gyro)."
15.	ASW-111/112	Page 1 paragraph .d.	Please define a weapon.	There is not an upper limit on laser energy in the document.	Provide an upper allowable limit for an allowable laser system	Not accepted. Weapon have a specific purpose (e.g. to inflict damage or harm to living beings, structures, or systems) and are not tied to a specific emissions power threshold. All invisible lasers that exceed a class 1 emissions will be evaluated by the FDA. If the FDA deems that technical and/or administrative controls can not reduce the risk of hazardous exposure the laser will not be approved for operational use.

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16.	J Keefer AIR-40	Page 1, Para 2.	The word “FAA” in parenthesis should be shown after the words “Federal Aviation Administration.”	Acronyms should be spelled out with the acronym placed at the end of the words. The rest of the acronyms are displayed this way.	The word “FAA” in parenthesis should be shown after the words “Federal Aviation Administration.”	Accepted
17.	AIR-500	Paragraph 2, Page 1	Change wording.	It’s obvious it is the FAA since this is an FAA document.	Rewrite to read: We wrote this AC for aircraft manufacturer, laser equipment manufacturers, installation shops...	Accepted.
18.	AIR-500	Paragraph 2, Page 1	Missing comma.		Place a comma after “part 27”.	Accepted
19.	J Keefer AIR-40	Page 1, Para 3.a	The 3 rd and the 4 th sentences repeat themselves.	The same information is presented in the 3 rd and the 4 th sentences. One sentence should be deleted due to its redundancy.	The 4 th sentence should be deleted. This sentence begins with the word “indadvertent.”	Accepted, deleted the sentence that starts with inadvertent
20.	ACE-117C, Roy Boffo, 847-294-7564	Page 1 Para 3.a	Several installation approvals have been made for “provisions” for equipment installation.	Additional information.	The Background should indicate that these approvals exist and do not approve the final installed laser equipment.	Accepted – new text added to background section

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21.	AIR-500 Angeline Garret	Paragraph 3b, Page 2	Define the term for the acronym “LIDAR” at the first usage.		Use the acronym “LIDAR” after the first usage.	Accepted
22.	AIR-500 Angeline Garret	Paragraph 3c, 2nd sentence, Page 2	Change wording.		Rewrite to read: ...laser performance standard found in Title 21 of the Code Federal Regulations 1040.10.	Accepted
23.	AIR-500 Angeline Garret	Paragraph 3c, 3rd sentence, Page 2	Change wording.		Rewrite to read: ...for self-certifying the laser meets the 21 CFR 1040.10 performance standards.	Accepted
24.	AIR-500	Paragraph 3d, 2 nd Sentence, Page 2	Define the specified CFR.	Only 14 CFR was defined earlier. Define 21 CFR.	Rewrite to read: ...laser performance standards found in Title 21 of the Code Federal Regulations 1040.	.Accepted
25.	AIR-500	Paragraph 3e, 3 rd sentence, Page 2	Incorrect reference format	1040.10 is not a part; it’s a section	Rewrite to read: ...for self-certifying the laser meets the 21 CFR 1040.10 performance standard...	Accepted

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26.	J Keefer AIR-40	Page 2, Para 4.a.	(AEL) is not listed behind Accessible Emission Limit.	AEL is being spelled out so this acronym should be in parenthesis after it is spelled out in conjunction with the rest of the AC.	The word AEL should be shown in parenthesis after the word Limit.	Accepted
27.	AIR-500	Paragraph 4a, Page 2	Incorrect reference citation		Remove “part” after 21 CFR and “paragraphs” and rewrite as “...as stated in 21 CFR 1040.10(c), (d), and (e).”	Accepted
28.	AIR-500 Angeline Garret	Paragraph 4a, Page 2	Missing acronym.		Place the acronym “AEL” after the term “Accessible Emission Limit”.	Accepted
29.	AIR-500 Angeline Garret	Paragraph 4a, Page 2	Change wording.		Rewrite to read: ...within a particular laser class as stated in 21 CFR 1040.10, paragraphs (c), (d), and (e).	Accepted
30.	AIR-500 Angeline Garret	Paragraph 4e, Page 2	Missing space.		There should be two spaces between sentences.	Not accepted. Could not find sentences spaced with only 1 space

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31.	AIR-500	Paragraph 5, Page 3	Change case		Change "Table" to "table."	Accepted
32.	V. Khanna, ANM-111, (425) 227-1298	Section 6	The system must have some automatic disabling feature to limit biological/physiological harm to people and animals on the ground.	When installed in an aircraft the system must utilize its range finding function to automatically disable the laser if the object being scanned is closer than the nominal ocular hazard distance (NOHD) of the installed system or 200 feet in all directions or whichever is greater. Such automatic protection must be designed, built and tested at the highest design assurance level i.e., Level "A" to ensure no people or animals are ever exposed to the hazard.	Please include wording to address issues.	Partially accepted. The FDA has regulatory authority to control laser hazards. The AC relies on the FDA's regulatory variance process to minimize the risk of a laser hazard to the public outside the aircraft (e.g other aircraft and personnel on the ground). Additional operational limitations have been added to the AC's flight manual supplement paragraph 7.3.7 to reduce the risk of exposing other aircraft and personnel on on the ground. Paragraph 7.2 requires the FDA technical variance controls to be part of the laser installation type design. As a result of this comment, and associated comments from the other Directorates,, AIR-130 had a telecon with the

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						FDA to better understand the variance process. The FDA stated that they require conservative variance technical controls. Example - in a recent FLIR laser illuminator variance request, the FDA required that a Class I laser range finder be installed that automatically disables the laser when the distance between the laser and the object being exposed is less than the nominal ocular hazard distance.
33.	W. Ryan ACE-100	Page 3 - Para 6, Failure Condition Classification	Item (1), where crew or pax eyes are exposed to levels greater than MPE may need to be more than a Hazardous failure condition.	It seems ironic that we call eye damage Hazardous, but we might call structural damage to a control surface Catastrophic, per the results of a 1309 analysis. Instantaneous eye damage and permanent blindness can occur for some class IV laser systems, particularly if the exposure occurs at the close ranges of typical crew, maintenance personnel, or ground support crew that might be in close proximity to the source.	Keep the Hazardous classification, and add “hazardous failure condition, or greater, depending on the spectrum and strength of the Laser source and the nature of the exposure”.	Accepted. Changed the first sentence in 7.3.1.1 to following: “Laser equipment malfunction resulting in an aircraft crewmember’s or passenger’s eye or skin being exposed to invisible laser radiation exceeding the MPE is considered no less than a hazardous functional failure condition and could be catastrophic if continued safe flight is not possible because of

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						the severity of the laser damage to a pilot's eye or skin.”.
34.	J Keefer AIR-40	Page 3, Para 6. a (1)	The words “off of” are stated after the word “reflections.” This is located in the 4 th sentence.	The sentence does not flow well with the current words.	Replace the words “off of” with “from.”	Not accepted - Not found
35.	AIR-500	Table 1, Page 3	Suggestion.		Inset lines in the table to improve readability.	Accepted. Lines added
36.	ASW-111/112	Page 4 paragraph 6.a.	The paragraph is titled “FDA Laser Equipment Certification”, but the installer “Before installing the laser equipment it must comply with all applicable 21 CFR parts”. How will the installer show compliance to 21 CFR parts? How will a designee or a representative document this compliance?	A clean and unambiguous showing of compliance is most helpful to a clean and unambiguous finding of compliance. Installing the system on a rotorcraft is a 14 CFR part 27 and 29 issue, so showing compliance to 14 CFR part 27 or 29 will have a requirement to show compliance to all applicable 21 CFR parts. The responsibility for showing compliance to 14 CFR parts 27 and 29 does not stop at the equipment interface. The FAA regulations require it to be shown that installed equipment can perform its intended function, in the installed environment without causing a hazard to the		Partially accepted.. Paragraph 7.3.3 was added: “The installation type design must include all the 21 CFR 1040 requirements that would be applicable to the installation (e.g. key switch, emissions indicator, labels, remote interlock connector, etc.) and the technical controls specified in the FDA variance for the installed laser equipment.” If the laser is Class II, III or IV, there will be a FDA variance and the installation must

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				rotorcraft, crew or occupants. The level of design assurance, configuration control, and quality assurance required by the FAA seems greater than that required by the self-certification of products to the FDA. Even considering the FDA process perfect the final regulatory responsibility for the installation rests with the FAA.		satisfy that variance. The FDA has regulatory responsibility for all lasers not the FAA.
37.	ASW-111/112	Page 4 paragraph 6.a.	The last sentence of paragraph states “If this label or tag specifies an FDA variance, the type design for the installation must show the variance’s engineering controls applicable to the installation (e.g. aircraft interface safety interlock) have been satisfied.”	Please add suggested wording to include system monitoring functions that may be utilized to mitigate hazards.	If this label or tag specifies an FDA variance, the type design for the installation must show the variance’s engineering control and monitoring functions applicable to the installation (e.g. aircraft interface safety interlock) have been satisfied.	Not Accepted. Engineering controls is the terminology used by the FDA which can include monitoring functions.
38.	ASW-111/112	Page 4 paragraph 6.a.	Please add wording to include the requirement that system design assurance levels should be commensurate with the hazards identified in the SSA.	Clarity.	System hardware and software design assurance levels must be commensurate with hazards identified by the system safety assessment.	Partially accepted. Already states for both software and hardware develop. ...to a level commensurate with functional failure condition classifications in paragraph 7.3.1 where 7.3.1 is the system safety analysis paragraph.

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39.	AIR-500	Paragraph 6a, 2 nd Sentence, Page 4	Change wording.	Incorrect reference citation. Add commas to offset phrase	Rewrite to read "...comply with all applicable 21 CFR <i>requirements</i> (e.g. §§ 1002.10, 1010.2, 1010.3...) and have a label permanently affixed to, or inscribed on, the laser equipment..."	Accepted. Changes made as recommended
40.	AIR-500	Paragraph 6a, Note: Page 4	Incorrect alignment.		Increase left and right margins in the note	Accepted. Increased left and right margins.
41.	AIR-500	Paragraph 6b, 1 st sentence, Page 4	Incorrect formatting for citing reference and using section symbol (§).	Non-compliance to the Federal Register Document Drafting Handbook.	Do not use the section (§) symbol or the word "section" when the reference follows "XX CFR". Only use the section symbol (§) when referring to different paragraphs/subparagraphs within the same section. For example: Correct way to cite: 14 CFR 23.1309 Incorrect: 14 CFR § 23.1309	Accepted. Section symbol deleted.
42.	ASW-111/112	Page 4 paragraph 6.b.	Guidance should be provided on how to perform a SSA.	Experience has shown that installers need guidance on how to perform a SSA.	The SSA should be performed in accordance with SAE ARP4761.	Not accepted. The AC points to ACs 23.1309-1, AC 25.1309-1, AC 27-1309 and AC 29-1309. AC 27.1309 and AC 29.1309 call out ARP 4761. There are difference between the various aircraft 1309 ACs, and the system safety analysis process.

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43.	ASW-111/112	Page 4 paragraph 6.b.	Add environmental qualification requirements for no hazard installation of non-required equipment.	Installers need guidance on how to show equipment is manufactured to perform safely in its intended environment.	Environmental Qualification may be shown by performing the appropriate environmental tests specified in RTCA/DO-160. The full test portfolio found in DO-160 need not be performed for most non-required equipment. Tests for Temperature, Vibration, and RF Emissions may be adequate for most rotorcraft applications.	Partially accepted. The AC scope is the unique laser aspect but paragraph 7 does state that the equipment installation must meet all of the applicable airworthiness standards to include environmental (radiated and emissions, crash safety, vibration and temperature>
44.	W. Ryan ACE-100	Page 4 - Para 6.b	I disagree that exposure to non-flying public should not be considered under XX.1309.	System lockouts and protections are put in place to protect the crew, ground personnel, and the general public. If a laser has a NOHD of 1000ft or more, which is typical of some Class IV systems, exposure to the general public could lead to permanent eye damage. International weapon treaties forbid the use of lasers on the general public, so failures that lead to inadvertent exposure should meet FAA safety expectations.	Pull exposure to the public and other flight crews under Section 6.a as item (5), addressing potential exposure through XX.1309 compliance as is being proposed for the other items in Section 6. For visible spectrum lasers that may be used, this is of particular concern.	Partially accepted. The FDA has regulatory authority to control laser hazards. The AC relies on the FDA's regulatory variance process to minimize the risk of a laser hazard to the public outside the aircraft (e.g other aircraft and personnel on the ground). Additional operational limitations have been added to the AC's flight manual supplement paragraph 7.3.7 to reduce the risk of exposing other aircraft and personnel on on the ground. Paragraph 7.2 requires the FDA technical variance controls

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						to be part of the laser installation type design. As a result of this comment, and associated comments from the other Directorates, AIR-130 had a telecon with the FDA to better understand the variance process. The FDA stated that they require conservative variance technical controls. Example - in a recent FLIR laser illuminator variance request, the FDA required that a Class I laser range finder be installed that automatically disables the laser when the distance between the laser and the object being exposed is less than the nominal ocular hazard distance.
45.	ACE 118C, Scott Fohrman, 847-294-7136 ACE 116C, Shawn Malekpour, 847-294-7837	Page 4 Para 6B	Paragraph states that *.1309 for laser installation does not apply to non flying public or occupants of nearby aircraft. The very people we should be protecting from these type of installation are the non-flying public. Lasers present very	As a safety organization it is our responsibility to protect the public for hazards associated with aircraft. As a laser system can inadvertently blind those around an aircraft, the seriousness of the injury begs that we do our utmost to insure the public's safety.	Rewrite paragraph to indicate that 1309 does apply for non flying public or occupants of nearby aircraft.	Partially accepted. The FDA has regulatory authority to control laser hazards. The AC relies on the FDA's regulatory variance process to minimize the risk of a laser hazard to the public outside the aircraft (e.g

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			<p>little hazard to the passengers or flight crew of an aircraft because they are not normally aimed at them. Conversely lasers present a HUGE safety risk for non-flying public.</p>			<p>other aircraft and personnel on the ground). Additional operational limitations have been added to the AC's flight manual supplement paragraph 7.3.7 to reduce the risk of exposing other aircraft and personnel on on the ground. Paragraph 7.2 requires the FDA technical variance controls to be part of the laser installation type design. As a result of this comment, and associated comments from the other Directorates, AIR-130 had a telecon with the FDA to better understand the variance process. The FDA stated that they require conservative variance technical controls. Example - in a recent FLIR laser illuminator variance request, the FDA required that a Class I laser range finder be installed that automatically disables the laser when the distance between the laser and the</p>

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						object being exposed is less than the nominal ocular hazard distance.
46.	J Keefer AIR-40	Page 4, Para 6.b	The word “of” after the word “exposure” and the words “to include” after the word “public.”	The sentence does not flow well with these words.	The word “to” should replace the word “of” and the word “including” should replace the word “to include.”	Accepted. Both changes made.
47.	AIR-500	Paragraph 6b(1), 2 nd sentence, Page 4	Add AC titles.		Add AC titles at 1 st usage	Accepted AC titles added.
48.	ASW-111/112	Page 5 paragraph 6.b.(1)d)	As written: 14 CFR §§ 23.1309, 25.1309, 27.1309 or 29.1309 do not apply to failure conditions which may result in inadvertent exposure of the non-flying public to include airport personnel and occupants of other nearby aircraft. 21 CFR part 1040.10 applies to the performance of the laser, including the fail safe design of the laser’s interlocks and beam attenuators.	FAA Order JO 7400.2 and AC 70.1 address outdoor laser operations in the NAS and provide measures to avoid lasing aircraft. Industry documents such as SAE ARP5674, <i>Safety Considerations for Aircraft-Mounted Lasers Projected Into the Navigable Airspace</i> and SAE ARP5293, <i>Safety Considerations for Lasers Projected in the Navigable Airspace</i> recognize the hazard to other aircraft, to all aircraft, and to maintenance and ground crew. It seems inconsistent to recognize the hazard a land based laser system poses to aircraft but not to recognize the hazard a mobile airborne	Please include guidance for mitigating hazards to other aircraft and for maintenance and ground crew. Some high-powered lasers pose a hazard for considerable distance the evaluation should include persons on the ground or even high rise buildings for helicopter installations. The hazard distance is range from the	Partially accepted. The FDA has regulatory authority to control laser hazards. The AC relies on the FDA’s regulatory variance process to minimize the risk of a laser hazard to the public outside the aircraft (e.g other aircraft and personnel on the ground). Additional operational limitations have been added to the AC’s flight manual supplement paragraph 7.3.7 to reduce

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				<p>mounted laser poses to other aircraft.</p> <p>The recognition of hazards posed to other aircraft and persons on the ground is found in other guidance and policy, i.e. it is illegal to throw anything out of an aircraft. Some non-aviation mission radios are capable of interfering with own-ship communications and navigation systems or other aircraft comm/nav systems and requirements are imposed to mitigate those hazards. We routinely impose flight restrictions on experimental flight tests to protect persons on the ground. We also don't allow shedding of blue ice or helicopters carrying external loads to operate over the school yard. There is plenty of precedent for the Agency protecting property and persons beyond the aircraft itself.</p> <p>FDA approval is, AT BEST, equivalent to a TSO approval. The FAA is responsible for safe airworthy installations and operational limitations. Hazards to the aircraft, other aircraft, and persons on the grounds should be understood and efforts to mitigate those hazards should be implemented.</p> <p>Whether XX.1309 applies directly or not, the Agency cannot in good</p>		<p>the risk of exposing other aircraft and personnel on on the ground. Paragraph 7.2 requires the FDA technical variance controls to be part of the laser installation type design. As a result of this comment, and associated comments from the other Directorates,, AIR-130 had a telecon with the FDA to better understand the variance process. The FDA stated that they require conservative variance technical controls. Example - in a recent FLIR laser illuminator variance request, the FDA required that a Class I laser range finder be installed that automatically disables the laser when the distance between the laser and the object being exposed is less than the nominal ocular hazard distance.</p> <p>Also ICA paragraph 7.3.9. in the AC requires service information to protect the</p>

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
				conscience certify something for civil operations that will harm the public, especially when the public may be totally unaware of the exposure to the harmful radiation.		maintainers:
49.	AIR-500	Paragraph 6b(1)(d) Page 5	Incorrect formatting for citing reference and using section symbol (§).	Non-compliance to the Federal Register Document Drafting Handbook.	Do not use the section (§) symbol or the word “section” when the reference follows “XX CFR”. Only use the section symbol (§) when referring to different paragraphs/subparagraphs within the same section. For example: Correct way to cite: 14 CFR 23.1309 Incorrect: 14 CFR § 23.1309	Accepted. Section symbols deleted.
50.	AIR-500	Paragraph 6b(1)(d) Page 5	Incorrect reference citation	1010.10 is not a part	Rewrite to read “ 21 CFR 1010.4.”	Accepted. “part” deleted
51.	ASW-111/112	Page 5 paragraph 6.b.(2)	As written: If the laser equipment software can contribute to malfunctions described in paragraph 6.b.(1), develop the software using the guidance in AC 20-115C to a software level commensurate with the functional failure condition classifications in paragraph 6.b.(1).	Clarity.	If the laser equipment control or monitoring software can contribute to malfunctions described in paragraph 6.b.(1), develop the software using the guidance in AC 20-115C to a software level commensurate with the functional failure condition classifications in paragraph 6.b.(1).	Not accepted. Did not want to include a function name of the software since there may be other functions other than control and monitoring that can contribute to a the laser functional failure conditions.

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
52.	AIR-500	Paragraph 6b(2), 2 nd sentence, Page 5	Define AC by title at first usage		Add title to AC 20-115C.	Accepted. AC titles added.
53.	AIR-500	Paragraph 6b(3), 1 st sentence, Page 5	Define acronym		Define RTCA.	Not accepted. RTCA is not an acronym.
54.	ASW-111/112	Page 5 paragraph 6.b.(3)	As written: If the equipment includes custom AEH (e.g., application specific integrated circuit, field programmable logic device, and programmable logic device), and the AEH can contribute to malfunctions described in paragraph 6.b.(1), develop the AEH using RTCA/DO-254, <i>Design Assurance Guidance for Airborne Electronic Hardware</i> , to a design assurance level commensurate with the functional failure condition classifications defined in paragraph 6.b.(1). For custom AEH classified as simple, RTCA/DO-254, paragraph 1.6, applies.	Clarity.	If the equipment includes custom AEH (e.g., application specific integrated circuit, field programmable logic device, and programmable logic device), and the AEH laser control or monitoring functions can contribute to malfunctions described in paragraph 6.b.(1), develop the AEH using RTCA/DO-254, <i>Design Assurance Guidance for Airborne Electronic Hardware</i> , to a design assurance level commensurate with the functional failure condition classifications defined in paragraph 6.b.(1). For custom AEH classified as simple, RTCA/DO-254, paragraph 1.6, applies.	Not accepted. Did not want to include a function name of the AEH since there may be other functions other than control and monitoring that can contribute to a the laser functional failure conditions.

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
55.	ASW-111/112	Page 5 paragraph 6.b.(4)	As written: Unapproved changes to the laser equipment or the installation should not be made since they could affect the airworthiness (e.g., electromagnetic and environmental compatibility, new failure modes, etc.) of the equipment installation and invalidate the FDA equipment certification and approved variances.	Configuration control of installed systems is critical to continued operational safety.	Unapproved changes to the laser equipment or the installation should not be made since they could affect the airworthiness (e.g., electromagnetic and environmental compatibility, new failure modes, etc.) of the equipment installation and invalidate the FDA equipment certification and approved variances. Applicant must provide a plan for maintaining configuration throughout the product lifecycle.	Accepted. The following text was added in 7.3.6: Applicant should provide a plan for maintaining configuration throughout the product lifecycle.
56.	AIR-500	Paragraph 6b(5), Page 5	Should this be an "Airplane Flight Manual" or an "Aircraft Flight Manual"?	Paragraph uses both "airplane" and "aircraft."	Clarify	Accepted. Airplane changed to aircraft.
57.	AIR-500	Paragraph 6b(5), Bullet points, Page 5	Incorrect format		Remove bullets and replace with a), b), & c).	Accepted. Bullets replaced with letters.
58.	AIR-500	Paragraph 6b(6), Page 6	Define acronym.		Define "ICA" at first usage.	Accepted. Acronym ICA defined.

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
59.	AIR-500	Paragraph 6b(6) Bullet points, Page 6	Incorrect format.		Remove bullet points. Replace with: a) b) c) d) e) f)	Accepted. Bullets replaced with letters.
60.	AIR-500	Paragraph 7a, Page 6	Minor grammatical errors.		*Insert a comma in the first sentence to read as: "...process, or." *In the third sentence, rewrite to read: "...as defined in Title 49 of the United States Code..." *In the third sentence, there is an extra space between the comma and "are." *Remove the quotation marks after "disabled" in the last sentence	Accepted. All grammatical errors corrected.
61.	J Keefer AIR-40	Page 4, Para 7. a, b	The sentence in paragraph b. should be included in paragraph a.	The sentence in para. b has similar information to para. a. Page 6, Para 13.a.(3) states all of the information in the same para.	Move para. b to para. a. This will change the following lettered paragraphs.	Accepted. The sentence in paragraph b was moved to a.
62.	AIR-500	Paragraph 7b(3), Page 7	Revise wording.		Replace "parts" with "requirements."	Accepted. Replaced parts with requirements.
63.	AIR-500	Paragraph 7b(4), Page 7	Acronym defined earlier		Rewrite to read: "The ICA must include inspection instructions to verify..."	Accepted. Changed to ICA

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
64.	AIR-500 Angeline Garret	Paragraph 7a, b, & d, Page 4	Improper usage of the term “parts”.		Remove the term “parts” found before each reference to “21 CFR”.	Partially accepted. Replaced parts with requirements.
65.	AIR-500 Angeline Garret	Paragraph 7a, Page 4	Missing comma.		Place a comma after “part 27.1301”.	Accepted comma added.
66.	ACE 118C, Scott Fohrman, 847- 294-7136 ACE 116C, Shawn Malekpour, 847-294-7837	Page 4 Para 7a	Paragraph illustrates ways that installed laser systems can be shown to comply with *.1301. However this may conflict with Para 6 a 4 on page 3 describes how the laser system is non required equipment and has no safety effect.	From page 3, it would appear that this type of equipment could be installed as a non interference STC. Therefore compliance with 1301 may not be required.	Add the statement that 1301 compliance may not be required.	Accepted. Added the following in Section 9: “For part 23 aircraft, § 23.1301 may not be applicable.”. 23.1301 states the following: “Each item of installed equipment must-- (a) Be of a kind and design appropriate to its intended function; (b) Be labeled as to its identification, function, or operating limitations, or any applicable combination of these factors; and (c) Be installed according

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
						<p>to limitations specified for that equipment.”</p> <p>The laser equipment will have been certified by the manufacturer as complying with the FDA rules that includes performance and interface requirements. Most or all will have controls in the cockpit that will have labels and the laser will have labels specifying the laser class. In some cases, the manufacturer will specify whether or not the laser equipment has any FDA variance requirement which may need to interface with other aircraft equipment and sensors (e.g. weight on wheel switch). I can't think of a case where the equipment will not have any cockpit controls or labels.</p>

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
67.	W. Ryan ACE-100	Page 4 - Para 7.g	Should not be limited to “law enforcement” systems.	Dwell time is a function of the laser surveillance system design, not who is using it. Civilian security services, contractors, and other non-law-enforcement entities should be subject to the same limitations on applying scanning factors to range NOHD calculations and safety considerations.	Simply change 7. to apply to all camera systems with range finding and illumination laser sources, since all of them are non-scanning lasers with high dwell times on a particular target, which impacts the potential hazard.	Partially accepted. Text discussing law enforcement applications have been modified in section 3.1, the exposure time must be justified as described in paragraph. 7.3.2 Also the 7.3.2 states that exposure time can not be less than 10 seconds for illuminators and pointers. FDA has stated that they may include an administrative variance which would only allow installations for surveillance FLIRs with lasers by local, state, or federal government agencies
68.	ASW-111/112	Page 5 paragraph 7.a.	As written: Most surveillance lasers were developed for public use operations and have not been developed using FAA-recognized software, system, or airborne electronic assurance process or a system safety process. As a result, the laser feature is electrically disabled.”	A good quality control system is necessary for good configuration control and is thus important to continued operational safety.	Most surveillance lasers were developed for public use operations and have not been developed using FAA-recognized software, system, or airborne electronic assurance process, a system safety process, or a FAA recognized manufacturing quality control system. As a result, the laser feature is electrically disabled.”	Partially Accepted. Para 8.1 changed to the following: Most surveillance lasers were developed for public use operations and were not developed using FAA-recognized software assurance, system assurance, airborne electronic hardware assurance, and safety analysis process. As a

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
						result, they will most likely not meet the applicable airworthiness requirements. We recognize public aircraft, as defined in Title 49 of the United States Code sections 40102(a)(41) and 40125, are not required to meet FAA airworthiness requirements. However, if the public aircraft operator wishes to remain FAA compliant, the applicant must either (1) satisfy the guidance materials in paragraph 7 of this AC, or some acceptable alternative, or (2) the type design for the installation must show the laser feature is disabled.
69.	W. Ryan ACE-100	Page 4 – Para 7.i	Both Class IIIb and Class IV laser systems are available for purchase through civilian sources to the general public. The limitation in 7.i should be changed to include the specific regulatory violation an operator would be subject to,	The FAA does not enforce laser regulations, but the FBI does. The penalties for improper use of high power lasers is a serious offence and the general public needs to be reminded of the regulatory basis for the liability they are assuming if they choose	Add additional text to address the suggestion in item 7.i	Not accepted. The AC has been updated to specifically not include laser weapons. The FBI appears to be focusing on laser weapon use and lasers being used against law enforcement agencies

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
			and the potential penalty, to discourage the installation of systems outside the scope of FAA and FDA acceptable use policies.	to use non-approved laser sources.		and visible lasers to interfere with pilot vision. Also the scope of the AC is limited to invisible lasers.
70.	J Keefer AIR-40	Page 5, Para 7. J	The first and second sentence states some of the same information	The words “as certified by the laser manufacturer” are stated in both sentences.	“As certified by the laser manufacturer” can be deleted in one of the sentences. I recommend the second sentence, while changing the word “failure” with Failing to accomplish this results in a modified laser system	Partially accepted - sentence moved to 7.3.6 and changed to the following: “If the installation results in a modification to the laser equipment as certified by the laser equipment manufacturer, the laser equipment must be recertified as described in § 1040.10(i).”
71.	J Keefer AIR-40	Page 5, Para 8	The first sentence states the word “software” twice.	The sentence does not flow well with the word “software” stated twice.	Remove the words “and the software” with the word “which.” It will flow like this....”software which can contribute....”	Partially Accepted. Paragraph 7.3.4 changed to the following “If the laser equipment includes software that can contribute to malfunctions described in paragraph 7.3.1 above, develop the software using the guidance in AC 20-115C, <i>Airborne Software Assurance</i> , to a software level commensurate with the

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
						functional failure condition classifications determined from paragraph 7.3.1”.
72.	J Keefer AIR-40	Page 5, Para 8	The acronym RTCA should be spelled out.	RTCA should be spelled out because this is the first time it is stated in the AC.	Spell out RTCA.	Not accepted. RTCA is not an acronym.
73.	AIR-500 Angeline Garret	Paragraph 8, 1st sentence, Page 5	Change wording.		Rewrite to read: If the equipment includes software and the software can contribute to malfunctions described in paragraph 6a....	Partially Accepted. Paragraph 7.3.4 changed to the following “If the laser equipment includes software that can contribute to malfunctions described in paragraph 7.3.1 above, develop the software using the guidance in AC 20-115C, <i>Airborne Software Assurance</i> , to a software level commensurate with the functional failure condition classifications determined from paragraph 7.3.1”.

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
74.	T. Ebina, ANM-100L	Page 5 Paragraphs 8 & 9 Reference software and AEH	The design assurance level of both the software and the airborne electronic hardware should be level C.	Because of governing 21CFR1040.10, rather than the aircraft functional hazard analysis results.	Consider level C to meet 21CFR1040.10.	Not accepted. The software and AEH level should be based on the functional failure condition which could be greater than C.
75.	W. Ryan ACE-100	Page 5 – Paragraphs 8 and 9 for software and complex hardware	Most of the systems used for airborne surveillance were developed for military or civilian security purposes, and therefore do not meet DO-178, DO-254, etc. The policy needs to recognize the potential acceptance and software development tools used by the military and other sources.	Most FLIR systems were not developed to DO-178 or DO-254 requirements. Both are MOC to XX.1309, and the FAA must consider alternatives to these processes to potentially accommodate other MOC to XX.1309.	Sections 8 and 9 should state: “Alternate methods to DO-178 and DO-254 may be considered for certain systems shown to be reliable in service and/or that have been accepted as safe by another govt. agency.”	Partially accepted. Most of the airborne surveillance systems were not developed using an assurance process with process rigor commensurate with assurance level. Therefore they may have residual errors that are not consistent with functional failure conditions. AC 20-115C for software and AC 20-152 for hardware provide an acceptable means of compliance but not the only means of compliance. DO-178B section 12.3, DO-178C section 12.3, and DO-254 section 11.1, 11.2, and 11.3 already provide guidance on alternate methods of compliance.

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						<p>AC 20-171 which is being revised is expected to provide additional alternate means of compliance guidance for DO-178B and DO-178C. AC 20-171 was added to the draft AC.</p> <p>In addition, the following note was added to 7.3.5 that states: “We encourage the use of industry-recognized system safety standards (such as SAE International ARP 4761 and IEC 61508) and development assurance standards (such as RTCA/DO-178C, RTCA/DO-254, and IEC 61508) for the laser equipment when its malfunction could result in an exposure that could exceed the MPE for people outside the laser-equipped aircraft. “</p>

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
76.	G. Acker, ANM-160L	Page 5, paragraph 11	The title should read Aircraft Flight Manual Supplement “. First sentence should read “...characteristics of the basic aircraft ”	This AC applies to several categories of aircraft, including both airplanes and rotorcraft. The title of paragraph 11 and the first sentence should reflect all of the above categories rather than just the airplane category.	Change airplane to aircraft in the title and first sentence.	Accepted – Airplane changed to aircraft.
77.	J Keefer AIR-40	Page 5, Para 12	ICA should be spelled out before the acronym. Instructions for Continued Airworthiness.	This is the first place where ICA is written, therefore this acronym should be spelled out.	Place Instructions for Continued Airworthiness before the ICA acronym.	Accepted
78.	J Keefer AIR-40	Page 5 Para 12	The parenthesis present after the acronym CFR	The parenthesis needs to be deleted after the acronym CFR because it is connected with 1040.10.	Delete the parenthesis directly behind the CFR acronym.	Partially Accepted. Sentence revised and reference CFR deleted.
79.	AIR-500 Angeline Garret	Paragraph 12, Page 5	Define the term “Instructions for Continued Airworthiness” at first usage.		Use the acronym “ICA” after the first usage.	Accepted. Acronym spelled out first time.
80.	AIR-500 Angeline Garret	Paragraph 12, Page 5	Improper usage of parenthetical.		Remove the parenthesis from the reference to “21 CFR”.	Partially Accepted. Sentence revised and reference CFR deleted.

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
81.	AIR-500 Angeline Garret	Paragraph 12, Bullet Section, Pages 5 & 6	Inconsistent format.	Remove bullets. Bullets can be different to reference.	Replace bullets with a letter.	Accepted. Bullets replaced with numbers.
82.	V. Khanna, ANM-111, (425) 227-1298	Section 12	Who is responsible for maintaining this system in a safe and airworthy condition?	<p>As far as the FAA is concerned only the installation of this system is covered the 1301 and 1309. The system itself is certified or approved by the FDA and or the FCC. So the system is installed on the airplane on a non-interference basis and should not cause a fire or harm the crew. Outside of that the intended function of the system is not FAA's domain. However the failure of the system or its safeguards could have serious effect on life and property on the ground.</p> <p>Who is responsible for that? Will there be a special group of inspectors trained to approve these systems? Will there be annual or bi-annual re-calibrations or test to ensure the system is performing as</p>	There are several practical questions that need to be asked and addressed. Having several agencies involved makes it rather complicated. We have a hard enough time within our own agency and our organizations. If this AC is to be a means of compliance, then we need to give it some teeth. Specific detail is definitely needed. Perhaps this is an area where a joint working group may be effective.	<p>Partially accepted. The operator is ultimately responsible for aircraft operation and use of the laser. Depending on the risk of the laser hazard to the non flying public, the FDA may require technical variance (e.g. a laser range finder that disables the laser when the distance between the laser and the people being lased is less than the NOHD) and administrative variance (e.g operator laser training)..</p> <p>Flight Standards could issue an ops spec for 135 operators that would require training and a laser safety officer. However some of these operators may operate part 91 and flight standards can't require an ops spec for these operators. Rule</p>

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
				approved? Will the FAA inspectors be doing this or will the FDA take the lead?		making would be required for part 91 operators..
83.	AIR-500 Angeline Garret	Between Paragraphs 12 & 13	Incorrect spacing.	There should only be two spaces between paragraphs.	Remove the extra space from between paragraphs 12 & 13.	Accepted. Extra space removed.
84.	J Keefer AIR-40	Page 6, Para 13. a	There is an apostrophe after the word "alternative." This is in the 3 rd sentence	There are too many commas in this sentence. This comma can be deleted to provide a better flow in the sentence.	Remove the comma after the word "alternative."	Partially accepted. Sentence has been completely replaced.
85.	J Keefer AIR-40	Page 6, Para 13. B (4)	The words "instructions for continued airworthiness" are placed in front of the acronym ICA	This is the 2 nd time that ICA is stated in the AC. This can be deleted.	Delete the words "instructions for continued airworthiness" from the sentence.	Partially accepted. Sentence has been completely replaced.
86.	ACE-117C, Roy Boffo, 847-294-7564	Page 6 Para 13	Installation of unsafe equipment such as a Class IV laser should not be allowed even if it is deactivated.	Installation of deactivated equipment without additional guidance on all of the issues of Class IV lasers could lead to approval by uniformed FAA employees and used in areas where people could get hurt.	Remove paragraph.	Not accepted. Public use operators, such as the DEA, FBI and law enforcement organizations who operate public use can use any equipment they wish without FAA involvement in the airworthiness approval. This paragraph only

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
						applies to Public use aircraft.
87.	AIR-500 Angeline Garret	Paragraph 13a, 1st sentence, Page 6	Improper usage of conjunction.		Remove the term “or” found after the term “system”.	Accepted. First sentence in 8.1 revised to the following: “Most surveillance lasers were developed for public use operations and were not developed using FAA-recognized software assurance, system assurance, airborne electronic hardware assurance, and safety analysis process.”.
88.	AIR-500 Angeline Garret	Paragraph 13a, 3rd sentence, Page 6	Change wording.		Rewrite to read: If the guidance material in paragraphs 6, 8, and 9, or some...	No longer applicable. Paragraph has been revised.
89.	AIR-500 Angeline Garret	Paragraph 13a, 3rd sentence, Page 6	Incorrect spacing.		There should be only two spaces between sentences.	Accepted. Extra space deleted.

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
90.	AIR-500 Angeline Garret	Paragraph 13b(1), 2nd sentence, Page 6	Incorrect spacing.		There should be only two spaces between sentences.	Accepted. Extra space removed.
91.	AIR-500 Angeline Garret	Paragraph 13b(3), Page 6	Improper usage of the term “parts”.		Remove the term “parts” found before each reference to “21 CFR 1040.10 and 1010.2”.	Accepted. Changed to 21 CFR requirements (e.g. 1002.10, 1010.2, 1010.3, 1040.10, 1040.11).
92.	AIR-500 Angeline Garret	Paragraph 13b(4), 1st sentence, Page 6	Define the term “Instructions for Continued Airworthiness” at the first usage on page 5.		Use the acronym “ICA”.	Not accepted. Already defined earlier.
93.	AIR-500 Angeline Garret	Paragraphs 14 & 15, Page 7	Incorrect formatting for citing reference and using section symbol (§).			Accepted. Deleted the symbols §§
94.	AIR-500 Angeline Garret	Signature Block, Page 7	Missing signature block.		Place the signature block after the last paragraph before the appendix section.	Accepted. Signature block added.

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
95.	AIR-500	Paragraph 8 & 9, Page 7	Incorrect formatting for citing reference and using section symbol (§).	Non-compliance to the Federal Register Document Drafting Handbook.	Do not use the section (§) symbol or the word “section” when the reference follows “XX CFR”. Only use the section symbol (§) when referring to different paragraphs/subparagraphs within the same section. For example: Correct way to cite: 14 CFR 23.1301 Incorrect: 14 CFR § 23.1301	Accepted. Section symbols deleted.
96.	AIR-500	Page 7	Add paragraph and appendix with feedback template per AIR-500 memo dated 8/30/13			Accepted: Feedback form added.
97.	AIR-500	Signature Block, Page 7	Missing signature block.		Place the signature block after the last paragraph before the appendix section.	Accepted. Signature block added.
98.	AIR-500	Appendix A, Paragraph 1, Page A-1	The term “Advisory Circulars” has already been defined.	Delete the term “Advisory Circulars”.	Rewrite the paragraph title to read: FAA ACs.	Accepted. ACs replaced Advisory Circulars.
99.	ASW-111/112	Page A-1, Appendix A, paragraph 1.a.	AC 20-115B and RTCA/DO-178B will soon be AC 20-115C and RTCA/DO-178C	Anticipate release of latest revisions to documents.	AC 20-115C and RTCA/DO-178C	Accepted. AC20-115C replaced AC 20 -115B

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100		Appendix A, Paragraphs 1a – g and 2a – g, Page A-1	Incorrect alignment.		The labeling of the subparagraphs should be placed directly under the first term in the main paragraph title.	Accepted. Alignment corrected.
101	AIR-500	Appendix A Paragraph 2(a), Page A-1	Define Acronym.		Define SAE.	Not Accepted. SAE is no longer an acronym
102	ASW-111/112	Page A-1, Appendix A. paragraph 2.b.	RTCA/DO-178B will soon be RTCA/DO-178C	Anticipate release of latest revision to document.	RTCA/DO-178C	Accepted. DO-178C replaced DO-178B.
103	AIR-500 Angeline Garret	Appendix A, Paragraph 1, Page A-1	The term “Advisory Circulars” has already been defined.	Delete the term “Advisory Circulars”.	Rewrite the paragraph title to read: FAA ACs.	Accepted. ACs replaced Advisory Circulars.
104	AIR-500 Angeline Garret	Appendix A, Paragraphs 1a – g and 2a – g, Page A-1	Incorrect alignment.		The labeling of the subparagraphs should be placed directly under the first term in the main paragraph title.	Accepted. Alignment changed.

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
105	AIR-500 Angeline Garret	Appendix A, Paragraph 4e, Page A-2	Improper usage of parenthetical.		Remove the parenthesis from the reference to “21 CFR”.	Accepted. Parentheses deleted.
106	AIR-500 Angeline Garret	Appendix A, Paragraph 4f, Page A-2	Add wording.		Rewrite to read: You can find copies of the FDA...	Accepted. “Can” was added to the sentence
107	AIR-500	Appendix A between A-1 and A-2	Delete blank page			Accepted. Blank page deleted.
108	AIR-500	Appendix A Paragraph 4d, Page A-2	Add RGL website			Accepted . URL for AC web site is provided.
109	AIR-500	Appendix A, Paragraph 4e, Page A-2	Improper usage of parenthetical.		Remove the parenthesis from the reference to “21 CFR”.	Accepted. Parenthesis removed.

	Commenter	Page & Para	Comment	Reason for Comment	Suggested Change	Comment Resolution
110	AIR-500	Appendix A, Paragraph 4f, Page A-2	Missing word		Rewrite to read: You <u>can</u> find copies of the FDA...	Accepted. "Can" was added
111	V. Khanna, ANM-111, (425) 227-1298	Overall	<p>John,</p> <p>I think your effort is great. It would be better if we could provide specifics. I have a host of other question that I could send to you via e-mail as a word document list so that you can address them. I am not a laser expert nor am I a medical doctor so my comments are based on prudent airplane safety and system design experience. I maybe way of the mark -- if so kindly disregard the comments. Should you need any clarification or help please call. Thanks</p>			Accepted. Appreciate the feedback.