

RESOLUTION OF PUBLIC COMMENTS AC 23.1311-1C GAMA, GARMIN, CIRRUS, EASA, EMBRAER, CESSNA

Originating Office: ACE-100	Document Description: INSTALLATION OF ELECTRONIC DISPLAY IN PART 23 AIRPLANE	Project Lead/Reviewer ERVIN DVORAK	Reviewing Office: ACE-111	Date of Review: 2-17-11
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Commenter	Page & Paragraph	Comment	Reason for Comment	Suggested Change	Comment Resolution
GAMA	Section 8.1.b –	<p>There have been applications to install equipment, such as flight and navigation displays, as nonrequired. These applications request approval for these installations as Situation Awareness (SA) only. It is not acceptable to label an instrument as “SA-Only” and assume that its failure condition is acceptable.</p> <p>...</p> <p>The first sentence uses the examples of “flight and navigation displays”. The second sentence then uses the term “instrument”. A navigation display and an instrument are different items and therefore GAMA recommends the FAA utilize the term “flight and navigation display” in place of “instrument”.</p>			Adopted.
GAMA	Section 8.1.b –	<p>... Installing compelling displays that provide Primary Flight Information (PFI), but which do not meet the appropriate operational and airworthiness requirements, and labeling them as “Supplemental” or</p>			Adopted. Removed the word “compelling”

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		<p>“SA-Only” is not acceptable. Section 13.6 provides more guidance. GAMA is concerned that this statement will spawn debate and discussion about what is “compelling”. For example, there is no means to determine the difference between a compelling display of PFI and a noncompelling display of PFI. Furthermore, the referenced section 13.6 (intended function) provides no additional guidance that can be used to make this determination. GAMA recommends the FAA clearly define how “compelling” is determined or remove the discussion of compelling all together. In its current state, this statement only serves to complicate the certification process and it does not add guidance on compliance.</p>			
GAMA	Section 8.3 -	<p>This section provides for “a minimum of 3 inches displayed” when standby instruments are combined. GAMA believes the FAA intends for “a minimum diameter of 3 inches (or equivalent)”.</p>			Adopted.

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GAMA	Section 8.3.2 –	<p>This section states “The autopilot may be reengaged if appropriate mitigation is available (for example, see 1 through 3 above).”</p> <p>Items 1 through 3 no longer exist in 8.3.2; instead they have been replaced by items a through c</p>		. GAMA suggests the FAA change the reference to “a. through c. above”.	Adopted.
GAMA	Section 8.8.3	<p>This section states “These consist of equipment itself, the current flow in any item of electrical equipment and its associated wiring, the movement of any part (for example, controls or undercarriage), and the proximity of any item of equipment containing magnetic material to the direction indicators.”</p>		GAMA believes the FAA intends to use the term “magnetic sensor” in place of “direction indicators” at the end of this sentence as the proximity of material to the direction indicator is irrelevant while to the magnetic sensor is critical.	Adopted.
GAMA	Section 17.7.3.b.	<p>This section states “Unfortunately, most stalls occur in VMC and the pilot probably is not looking at the airspeed indicator when the airplane is slowing to a stall.”</p>		GAMA suggests the FAA utilize the abbreviation “VMC”.	Adopted.

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		In the context of this paragraph, it appears the abbreviation “VMC” should be “VMC” for Visual Meteorological Conditions, not VMC for Minimum Controllable Airspeed.			
GAMA	Section 17.8.b.	– This sentence uses the abbreviation VS1 when GAMA believes the FAA intended to use VSI (Vertical Speed Indicator).		GAMA suggests the FAA replace VS1 with VSI	Adopted.
GAMA	Section 27.3 –	<p>This section states: If the electronic display system contains electronic devices whose functions cannot feasibly be evaluated by test and/or analysis, the electronic devices should comply with RTCA/DO-254, or other acceptable means of compliance, as agreed to by the appropriate ACO. Determine the hardware levels for all hardware by the appropriate safety assessments (see AC 23.1309-1E, Figure 2) and any more requirements, such as those specified by functional TSOs.</p> <p>The phrase “whose functions cannot feasibly be evaluated by test and/or analysis” is indeterminate, subject to</p>		GAMA recommends the FAA align this guidance with AC 20-152 & RTCA/DO-254.	Adopted.

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		<p>opinion, and inconsistent with both RTCA/DO-254 and AC 20-152 guidance. For example, AC 20-152 specifically applies to only custom mirco-coded components such as ASICs, PLDs, and FPGAs and specifically excludes electronic devices such as COTS microprocessors. COTS microprocessors could be considered as “electronic devices whose functions cannot feasibly be evaluated by test and/or analysis”.</p>			
GARMIN	8.1.b	<p>States in part:</p> <p>b. There have been applications to install equipment, such as flight and navigation displays, as non-required. These applications request approval for these installations as Situation Awareness (SA) only. It is not acceptable to label an instrument as “SA-Only” and assume that its failure condition is acceptable. ...</p> <p>The first sentence uses the examples of “flight and navigation displays”. The second sentence then uses the term</p>		Suggest changing “instrument” to “display” or another term that correctly encompasses both flight and navigation displays.	Adopted.

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		<p>“instrument”. A navigation display is not an “instrument”.</p>			
GARMIN	8.1.b	<p>States in part:</p> <p>b. ... Installing compelling displays that provide Primary Flight Information (PFI), but which do not meet the appropriate operational and airworthiness requirements, and labeling them as “Supplemental” or “SA-Only” is not acceptable. Section 13.6 provides more guidance.</p> <p>The quoted text adds restriction and/or limitation to the installation of “compelling displays”. However, there is no definition of “compelling” nor is there any method provided to measure what is meant by “compelling”. For example, there is no means to determine the difference between a compelling display of PFI and a non-compelling display of PFI. Furthermore, the referenced section 13.6 (intended function) provides no additional</p>		Remove the restriction or provide sufficient definition and guidance to allow manufacturers to make the “compelling” PFI determination.	Partially Adopted. A revision was made.

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		guidance that can be used to make this determination.			
GARMIN	8.3.2	<p>States in part:</p> <p>... The autopilot may be reengaged if appropriate mitigation is available (for example, see 1 through 3 above). ...</p> <p>Items 1 through 3 no longer exist in 8.3.2; instead they have been replaced by items a through c.</p>		Change “1 through 3” to “a through c”.	Adopted.
GARMIN	17.7.3.b	<p>States in part:</p> <p>b. ... Unfortunately, most stalls occur in V_{MC} and the pilot probably is not looking at the airspeed indicator when the airplane is slowing to a stall.</p> <p>In the context of this paragraph, it appears the abbreviation “V_{MC}” should be “VMC” for Visual Meteorological Conditions, not V_{MC} for Minimum Controllable Airspeed.</p>		Change “ V_{MC} ” to “VMC”.	Adopted.

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GARMIN	27.3	<p>States:</p> <p>If the electronic display system contains electronic devices whose functions cannot feasibly be evaluated by test and/or analysis, the electronic devices should comply with RTCA/DO-254, or other acceptable means of compliance, as agreed to by the appropriate ACO. Determine the hardware levels for all hardware by the appropriate safety assessments (see AC 23.1309-1E, Figure 2) and any more requirements, such as those specified by functional TSOs.</p> <p>The phrase “whose functions cannot feasibly be evaluated by test and/or analysis” is indeterminate, subject to opinion, and inconsistent with both RTCA/DO-254 and AC 20-152 guidance. For example, AC 20-152 specifically applies to only custom mirco-coded components such as ASICs, PLDs, and FPGAs and specifically excludes electronic devices such as COTS microprocessors. COTS microprocessors could be considered as</p>		Align the guidance in 27.3 with AC 20-152 and RTCA/DO-254.	Adopted.

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		<p>“electronic devices whose functions cannot feasibly be evaluated by test and/or analysis”.</p>			
Cirrus	8.6.2	<p>Hazardous Misleading Heading Information The wording used in Section 8.6.2 is unusual, as though it was a partial copy-and-paste from something else. Because this may cause interpretation issues in the future, the wording in this section should be reconsidered.</p>			Adopted. Clarification was made.
Cirrus	8.8	<p>Accuracy of the Magnetic Heading System Section 8.8 mentions that the §23.1303(c) requirement of installing a “direction indicator (non-stabilized compass)” was changed to ”magnetic direction indicator.” This change was made to reflect that many electronic flight systems use an electric compass system. Subsequent sections of this document then give accuracy requirements for magnetic non-stabilized direction indicators and magnetic gyroscopically stabilized direction indicators. No accuracy</p>			Adopted. A revision was made.

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		requirements are given for electronic magnetic direction indicators. Either a new section should be created or the accuracy requirements should be modified to include the electronic magnetic direction indicators.			
Cirrus	12	Electronic Checklist Section 12 states that a current backup checklist must be carried onboard the aircraft and be readily accessible to the crew. Some allowance beyond paper checklists should be considered, such as highly reliable displays or a second electronic checklist (electronic flight bag).			Partially Adopted. This section is revised.
Cirrus	17.7 (a)	Low-Speed and High-Speed Awareness Cues There is no discussion of 'tactile' cues in Section 17.7(a). This paragraph should not be limited to visual cues only.			The guidance for tactile cues is in section 20.
Cirrus	25.3 (c)	Independent Power Source Section 25.3(c) designates 25,000 ft as the transition point from 30 minutes of emergency battery requirement to 60 minutes. This requirement is more conservative than power requirements for air transport aircraft, which have			Not Adopted. The Cirrus comment was not accepted in the jet rulemaking. See the jet rulemaking preamble for more information.

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		<p>established 35,000 ft as the transition point. Since air transport category aircraft have significantly reduced landing field options during emergencies than Part 23 aircraft, standby battery requirements should be more conservative for this category than they are for Part 23 aircraft.</p> <p>The current Part 23 NPRM provides the following justification for the change to a 60-minute standby battery requirement: “We believe that most jets will operate at high altitudes and in predominantly IFR conditions. These conditions probably push the 30-minute rule for battery power because of the time it would take to descend from maximum altitude. We have considered several different schemes to address this issue, but the simple and straightforward approach is to just require a dedicated battery that would provide 1 hour of power.” This reasoning is very general and does not seem to consider the following:</p> <ol style="list-style-type: none"> 1. The 30-minute rule has been applied to all Part 23 aircraft, including commuter class aircraft, above 25,000 ft 			

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		<p>with acceptable service history.</p> <p>2. The purpose of an aircraft’s emergency battery is to provide sufficient power for key functions for the duration of a descent and landing. As such, aircraft capability—including landing field length, time-to-land, and type of operation—should be accounted for. Aircraft with low stall speeds have shorter field lengths, enabling them to land at most airports. Therefore, a 30-minute battery would more than suffice and should be allowed for these aircraft. Aircraft with higher stall speeds have correspondingly longer field lengths, restricting their landing options. These aircraft would require larger batteries to support the additional time needed to find a suitable landing field and perform a safe landing.</p> <p>3. Multiple power sources and distribution paths provide a higher level of safety to the aircraft and crew. More emphasis should be placed on and allowances given to those systems with additional system redundancy. Determining battery size through a risk-based approach would be more</p>			

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		consistent with the safety management			
Cirrus	28.3	<p>Attitude Information</p> <p>Section 28.3 states that “attitude information should continue to be presented for a minimum of 30 to 60 minutes after the in-flight loss of cooling for the primary instrument...”</p> <p>It is unclear as to whether or not this is set by the same altitude requirements as for power (30 minutes below 25,000 ft and 60 minutes if above 25,000 ft). This should be clarified.</p>			Adopted. A slight revision was made to indicate that it was a recommendation and not based on a requirement.
Cirrus	29	<p>Electromagnetic Protection</p> <p>Section 29 adds reference documents pertaining to lightning and HIRF protection. AC 20-136A is incorrectly referred to as “AC 23.136A.”</p>			Adopted.
Austrian Airworthiness Authority	22	<p>1) The wording of Cautions and Warnings displayed is not harmonized. Example: The caution FAIL may be used as a FAILURE or an FAILED SYSTEM.</p> <p>This is only one example of a number.</p>			Not Adopted. This comment came through an email from an individual on the Diamond project. The color standardization in this AC has been accepted and

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		2)The blue colour spectrum is important for the healthiness of the eyes, therefore good sunglasses protect the eyes by filtering some frequencies out of the visible spectrum, that means that some colours displayed are not visible for the pilot.			used for several years by the certification authorities. If there is a new concept being considered they should introduce it in the FAA/EASA harmonization program.
EMBRAER	General	Embraer believes that the draft revision of the advisory circular is a big improvement and we appreciate the FAA's efforts in providing this update. Thus, Embraer is pleased to offer the following suggestions for changes to the AC:			Thank You.
EMBRAER	Paragraph 8.2.1, page 16	The AC would require that one display of information essential for continued safe flight and landing will be available within one second to the crew with a single pilot action or by automatic means for continued safe operation. Embraer believes that the immediate need after an electrical failure is not for all the information necessary for continued safe flight and landing (which would include things like communication frequencies, navigation information, etc.), but that which is			Not Adopted. Currently, and in most cases, the attitude may be the only information essential for continued safe flight and landing for that particular airplane. But, we do not want to limit the one second requirement to only attitude since some airplanes may have other information essential for continued safe flight and

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		<p>necessary for immediate control of the airplane. We believe the “one second” requirement should be limited to attitude display as it is in AC 25-11A for function after power transients.</p>			<p>landing as new technologies are implemented.</p>
<p>EMBRAER</p>	<p>Paragraph 8.4.1.d, page 18</p>	<p>In the description of the requirements for reversionary displays, the AC says that the PFI should in substantially the same format and size in the reversionary mode as in the primary mode. While the format should certainly be substantially similar, the requirement for the reversionary display to show PFI in the same size as the primary display will limit the ability to combine displays. A combined display of PFI and engine data on the MFD is frequently preferable to a small independent display or replicating PFI on the copilot’s side even though the PFI display area may be significantly smaller than on the PFD. Embraer recommends that the sentence be changed to say: “However, The PFI must be displayed in substantially the same format and size in the reversionary mode as it is in normal mode and in a size sufficient to allow the pilot to easily</p>			<p>Adopted.</p>

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		control the airplane.”			
EMBRAER	Paragraph 8.4.2.b, page 18	We do not understand what is meant by the sentence “Faults that result in automatic switching should be extensive enough to ensure PFI is available at the reliability level required by § 23.1309.”			Adopted. The sentence was revised.
EMBRAER	Paragraph 9.4, page 23	Similar to our comment to the NPRM, there should be allowance for the engine limit exceedance protections provided by modern full-authority digital engine controls (FADECs). The basis for most of the findings of equivalent level of safety (ELOS) is based on these FADEC limiters that reduce the need for pilot monitoring provisions rather than additional sensory cues as described in Paragraph 9.4d.			Partially Adopted. The proposed section 23.1305 was withdrawn in the rule so the related guidance is also deleted.
EMBRAER	Paragraph 25.3a, page 47	The second sentence would be more easily understood if written as “It should function independently from the power source of the primary display, such as a second alternator or battery.”			Adopted.

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EMBRAER	Paragraph 26.2, page 48	In a modern integrated system, it is not practicable to design systems so that failure effects cannot always be isolated to a single system. The sentence “Design systems such that a fault in one system does not cause a fault in a different system” should be deleted, or be amended to say “. . .cause a fault in a different system or assess the effect of the common failure on all affected systems.”			Adopted. The paragraph was revised and the sentence deleted.
CESSNA	4.0.b(2) and 4.0.c(2)	Both of these sections note that Amendment 23-XX made changes for necessary trend and rate-of-change information and sensory cues. Cessna Engineering objects to this proposed change.		Cessna Engineering provided comments on the proposed rule relating to this paragraph (ref Docket # FAA-2009-0738, Notice # 09-09) in which we objected to the proposed change as well	Adopted. Regarding proposed section 23.1305, it was withdrawn from the jet rulemaking. This paragraph was revised.

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CESSNA	8.3.2 PFD and Autopilot with an AHRS	<p>This AHRS guidance, while welcome in principle, is slightly confusing as written. The mitigation list is labeled as a,b,c but a reference to it refers to 1-3. Also, to re-engage the autopilot requires a "dedicated standby" but this follows the sentence mentioning "For aircraft that do not have an independent attitude indicator".</p>		Cessna Engineering suggests clarification.	Adopted. The paragraphs were revised for clarification.
CESSNA	8.4.1.d	<p>“However, the PFI must be displayed in substantially the same format and size in the reversionary mode as it is in normal mode.”</p> <p>Generally a fair amount of information is shown in reversionary mode on a single display. It may be impractical to retain the same format and size. In many cases, the PFI is smaller to allot for CAS messaging, EIS, and means to keep Situational Awareness (SA) with maps, charts etc to decrease cognitive workload. This format does not degrade from a safe flight and landing.</p>		Cessna Engineering suggests: “However, the PFI must be displayed in a similar format in the reversionary mode to provide backup information essential to continued safe flight and landing.....”	Adopted. A revision was made.

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CESSNA	9.1.b	“The FAA needs to evaluate each airframe, engine and airframe/engine interface with the operational characteristics of these systems to determine the primary powerplant requirements.”		Cessna Engineering believes this is unclear. If the OEM is ODA does the FAA still need to evaluate and determine the powerplant requirements? Can the Unit Member (UM) determine the requirements?	Adopted. FAA was deleted.
CESSNA	9.2.a	Cessna Engineering agrees with the specific mention of engines with electronic controls, but disagrees with the deletion of the text contained in the current AC 23.1311- 1B, which is more inclusive of other acceptable methods of preventing engine limitations from being exceeded.		We propose the text be changed to: “Usually, for engines that do not generally rely on the pilot to prevent exceeding their limits in normal operations (such as engines with electronic engine controls featuring engine limit protection),	Adopted.

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				<p>...”.</p> <p>Otherwise, the draft AC text implies that the loss of powerplant displays is more hazardous for aircraft without electronic engine controls, which is not necessarily a valid conclusion.</p>	
CESSNA	9.2.d	<p>“The FAA needs to evaluate and determine the adequacy of each proposed airframe, engine, and airframe/engine interface, including appropriate human actors considerations. Appropriate procedures for operation of an integrated electronic powerplant display system should be in the AFM.”</p>		<p>Cessna Engineering believes this could use some clarification such as describing the human factors considerations. Please give examples or give reference in the AC to the information.</p>	<p>Adopted. The AC was revised by deleting this paragraph.</p>

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CESSNA	9.4.a	Reference is made to Amendment 23-XX stating that prior to that amendment indicators should have the ability to provide rate of change information if appropriate to the specific engine parameter. That italicized statement is Cessna Engineering's basis for objecting to the proposed rule relating to this paragraph (ref Docket # FAA-2009-0738, Notice # 09-09). We object to a change requiring trend or rate of change information for all parameters, because we believe it is not appropriate for all engine parameters to provide rate of change information.			Adopted. This section 23.1305 proposal was withdrawn from the rule and the sentence was deleted from the AC.
CESSNA	9.4.b	This paragraph is a direct repetition of the text in the proposed rule for 23-XX. Cessna Engineering disagrees with the incorporation of AC guidance into the rule text itself for proposed §23.1305(f). The draft AC anticipates rule changes which have not yet completed the public comment process. The items in 9.4(b)(1) through 9.4(b)(4) are already captured in the existing AC 23.1311-1B (as well as later in the draft AC) as considerations which are subject to evaluation on a case-by-case basis. Incorporating these		Cessna Engineering suggests deletion of 9.4(b) and 9.4(b)(1) through 9.4(b)(4).	Adopted. This section 23.1305 proposal was withdrawn from the rule and the sentence was deleted from the AC.

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		considerations into the rule text negates the guidance material and is redundant.			
CESSNA	9.4.c	Cessna Engineering proposes deleting the first sentence of 9.4(c) (ref Cessna comments to Docket # FAA-2009-0738, Notice # 09-09).			Not Adopted. This requirement had a minor revision in the rule under section 23.1311 and not under section 23.1305. Section 23.1311 revision is still in the final rule.
CESSNA	12.0	<p>“A current paper backup checklist must be carried on board the aircraft and be readily accessible to the crew.”</p> <p>This will date the advisory circular mandating a paper checklist. As technology improves, there is a growing desire for a paperless system in the cockpit.</p> <p>”</p>		Cessna Engineering suggests: “If the system on board meets these requirements <insert requirements here> a current paper backup checklist may not be needed to be carried on board the aircraft and be readily accessible to the crew. If a	Partially Adopted. This section is deleted since the policy in AC 20-176A no longer addresses checklist and the guidance in AC 120-64, dated 4/24/96, may be outdated.

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				paper checklist is needed the steps in the paper backup must be....	
CESSNA	13.2	“Policy statement number PS-ACE100-2001-004 provides guidance to FAA certification teams. This guidance covers review of an applicant’s Human Factors Certification Plan or the human factor components of a general certification plan when one is submitted as part of a TC, STC, or ATC project.”		Cessna Engineering believes this could use some clarification: Who signs off on the report using an 8100-9? Also, who signs off showing compliance? We know of no Human Factors discipline for a Unit Member (UM).	<p>Adopted. The paragraph was revised to delete this conflicting guidance, that is, Human Factor Certification Plan. This issue will be addressed in the revision of the Policy statement number PS-ACE100-2001-004.</p> <p>The signing of reports and Human Factor sign off should be discussed with the ACO that is part of the ORDER 8100.15, CHG 1, Organization Designation Authorization Procedures.</p>

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CESSNA	13.5.b(6)	<p>“The manufacturer should provide design rationale for their decisions regarding new or unique features in a display. Evaluation pilots should verify that the data support a conclusion that any new or unique features have no unsafe or misleading design characteristics.”</p> <p>Cessna Engineering has issue with the clarity of the statement about the evaluation pilots verifying data to support a design decision. The human factors specialists is conducting evaluations using pilots of the product user group to collect the data, complete an analysis as appropriate and make recommendations/conclusions. The pilots of that product team, management and avionics engineers (just to name a few – known as the design team) should be verifying or concurring with the conclusions.</p>		<p>Cessna Engineering suggests: “The manufacturer should provide design rationale for their decisions regarding new or unique features in a display. Evaluations should be conducted to collect data in support of the new or unique feature having no unsafe or misleading design characteristics. The design team, including pilots, should concur with the conclusion found with the data collected.”</p>	Adopted.

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CESSNA	13.6.2.a	<p>“List the intended function(s) and associated task(s) for the system, as well as for individual features or functions of that system. A system may have multiple intended functions, provided each function is documented and all information depicted or indicated to the flight crew supports one or more of the documented intended functions.” p. 28.</p> <p>The literal interpretation of this section would require each feature to be listed with their tasks. This paragraph should be more in line with PS-ACE100-2001-004 2.a. Intended Function</p> <p>This section should describe the intended functions of the major flight crew interfaces. For each, the HFCEP should identify the following items, as appropriate, focusing on new or unique features that affect the crew interface or the allocation of tasks between the pilot(s) and the airplane systems:</p> <ul style="list-style-type: none"> - The intended function of the system from the pilots’ perspective. - The role of the pilot relative to the 		Cessna Engineering suggests: “List the intended function(s) and associated task(s) for the major flight crew interfaces focusing on new or unique features that affect the crew interface. A system may have multiple intended functions, provided each function is documented and all information depicted or indicated to the flight crew supports one or more of the documented intended functions. Refer	Adopted. However, change flight crew to pilot.

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		<p>system.</p> <ul style="list-style-type: none"> - The degree of integration or independence with other flight deck equipment. - The novelty of the system. - The assumed airplane capabilities (for example, communication, navigation, and surveillance). - The criticality of the system and alerting mechanism. 		to PS-ACE100-2001-004 2.a. Intended Function for more detail.”	
CESSNA	17.2 & 18.3	<p>“Flashing, when used, should not be a caution or one parameter, and a warning for another.” And 18.3 “Abnormal indications, should be clear and unmistakable, using techniques such as different shapes, sizes, colors, flashing, boxing, outlining, etc”</p> <p>Flashing is a technique to acquire the pilot’s attention. The color then tells the pilot if it is an abnormal or warning condition.</p>		Cessna Engineering suggests deleting the comment from 17.2.	Adopted.

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CESSNA	25.3(c)	<p>Cessna Engineering disagrees with what seems to be an arbitrary delineation of battery endurance between less than and greater than 25,000 feet. Perhaps a performance based rule could read something like:</p> <p>The greater of 30 minutes or the demonstrated descent from max certificated altitude after loss of main generators to a simulated landing plus 10 minutes. This would scale the requirement to the performance capability and equipment of the aircraft (e.g. speed brakes that could allow a more rapid descent from 30k ft than a lower performance aircraft not so equipped from 24,999ft).</p>			Not Adopted. The comment was not accepted in the final rulemaking. See the preamble of the final jet rule.
CESSNA	25.3(d)	Cessna Engineering believes many aircraft use the battery as an emergency source of power; it seems like this rulemaking effort (revision of the Part 23 rules, this AC, AC 23-17 and AC 23.1309) would be the perfect time for the FAA to resolve the need for an ELOS by writing rules and guidance that allow such a configuration with adequate compensations.			Partially Adopted. There needs to be provisions if one of the starter batteries is used for an emergency power source that the battery has sufficient capacity. The final rule making on this issue did not provide compensation standards. It would be

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					difficult to know all the compensation standards that are appropriate. This will be considered in future rulemaking when more knowledge is known. The commenter did not provide any compensation standards.
CESSNA	27.3	As Cessna Engineering understands it, the FAA now requires all "airborne electronic hardware" including "simple" devices that can be tested to use DO-254 to some extent (via FAA order 8110.105 which apparently supersedes AC20-152); therefore this guidance is outdated and should be updated to include a reference to the order and a note that it supersedes the AC.			Adopted.