European Union Aviation Safety Agency

Comment-Response Document (CRD) 2022-07

RELATED NPA: 2022-07 & ED DECISION 2023/021/R — RMT.0673
15.12.2023

Table of contents

1. Summary of the outcome of the consultation

EASA received via the CRT tool **145** unique comments on this NPA (**147** in total) made on 20 segments by 22 users, distributed among the NPA segments as follows:

S	Page	Description	Comments
0	-	(General Comments)	5
1	4	1.1. How this NPA was developed	2
2	6	Item 1.2 Structural ditching analysis	1
3	7	Item 1.3 Buoyancy - evacuation analysis	1
4	11	Item 3: Installed systems and equipment for use by the flight crew	2
5	11	Item 2: Amendment of AMC 25.1309 - Development assurance and AMC 20 references	1
6	13	CS 25.563 Structural ditching provisions	5
7	13	CS 25.801 Ditching	5
8	14	AMC 25.563 Structural ditching provisions	28
9	22	AMC 25.801 Ditching	8
10	27	CS 25.1302 Installed systems and equipment for use by the flight crew	8
11	28	AMC 25.1302 Installed systems and equipment for use by the flight crew	66
12	72	GM1 25.1302 Explanatory material	2
13	78	GM2 25.1302 Examples of compliance matrices	4
14	83	AMC 25.21(g) Performance and handling characteristics in icing conditions	1
15	84	AMC 25.735 Brakes and Braking Systems Certification Tests and Analysis	1
16	86	AMC 25.831(a) Ventilation	1
17	86	AMC 25.1443(e) Minimum mass flow of portable oxygen equipment	2
18	87	AMC 25.1447(c)(4) Equipment standards for portable oxygen equipment dispensing units	3
19	88	AMC 25.1449 Means for determining use of oxygen	1

Note: some comments actually consisted of a list of comments covering different topics. Therefore, the actual number of comments is **175**.

The following organisations (users) provided comments:
ANAC Brazil, ATR, Airbus, Airbus Defence & Space, Boeing, Bombardier, CAA Netherlands, COMAC, Dassault Aviation, De Havilland Aircraft of Canada, DGAC France, Embraer, FOCA Switzerland, Garmin, Heart Aerospace, LBA Germany, Swedish Transport Agency, The royal express travels, KLM.

Overall, the comments received sought clarifications or complementary guidance/information. EASA used these comments to improve the proposed CS-25 amendment.
Individual responses to comments are provided in Chapter 2 below.

It can be noted that most comments were directed towards item 1 ‘Ditching survivability’ (53 comments) and item 3 ‘Installed systems and equipment for use by the flight crew’ (98 comments). A summary is therefore provided hereafter on the essential changes made on these two items as a result of the comments analysis.

Regarding item 1 'Ditching survivability', the review of the comments led to:

— improvement of CS 25.563 to specify that damages may occur provided that these are accounted for in the assessments required by CS 25.801(b) and that the airframe structural integrity is maintained,

— improvement of AMC 25.563 to:

- add a note in paragraph 2.6 (*Ditching* definition) stating that the defined ditching phases may overlap,
- delete the last sentence of paragraph 2.7 (*Planned ditching* definition) regarding the inclusion of reduced power/no power conditions,
- complement paragraph 2.8 (*Reduced Engine Power or Thrust/No Engine Power or Thrust ditching conditions* definition) with a sentence to specify that ditching phases beyond the approach phase, as well as the definition of the structural impact loads and the structural capability assessment, need not be considered,
- in paragraph 6 *Variation of flight parameters*:
  - specify that, for planned and unplanned ditching evaluation for all aeroplanes, any leakage should be accounted for in the flotation analysis,
  - clarify that the last 2 bullets apply to 'planned' ditching only,
- correct editorial mistakes and make wording improvements,

— improvement of CS 25.801(b) to:

- better mention the applicability of the sub-paragraphs to 'planned' emergency landing on water,
- specify that the flotation and evacuation assessment must account for all sources of water leakage that may be present after a planned emergency landing,

— improvement of AMC 25.801 to:

- in paragraph 1. CS 25.801(a) – Evacuation after an unplanned ditching:
  - specify that calm water states may be assumed,
  - add a note concerning the flotation and evacuation analysis, to mention the possibility and the conditions under which an exit may qualify as a ditching exit although it does not remain above the waterline for the full duration of the evacuation,
- in paragraph 2. CS 25.801(b) – Certification with ditching provisions:
  - add a note concerning the flotation and evacuation analysis, to mention the possibility and the conditions under which an exit may qualify as a ditching exit although it does not remain above the waterline for the full duration of the evacuation,
  - delete paragraph 3 as the reference to FAA AC 25-17A is not required anymore. Applicants should use the content of the amended AMC 25.801, not the FAA AC.

- correct editorial mistakes and make wording improvements.

Regarding item 3 'Installed systems and equipment for use by the flight crew', the review of the comments led to:

— in CS 25.1302, correct the wording of paragraph (a) to read 'the controls and information that are necessary to accomplish these tasks',

— in AMC 25.1302:

- better reflect the change made in CS 25.1302 highlighting the applicability to 'systems and equipment',
- in paragraph 1.3 Definitions:
  - amend the 'alert' definition to align it with the content of AMC 25.1322,
  - amend the definitions of 'automation', 'design item', 'flight deck' to improve them taking into account the comments received,
  - delete the definition of 'system function allocation'. A comment led to reconsideration of the benefit of this definition and EASA concluded that it does not bring additional value to the AMC,
- in paragraph 2.1, Table 1 has been corrected (references to other certification specifications),
- in paragraph 3.1, Figure 1 has been updated to correct some terminologies and clarify the list of requirements, following the analysis of some comments,
- in paragraph 3.3.1 'Certification strategy', refer to training and procedure changes, in addition to design changes, as potentially resulting from previous HF test campaigns,
- in paragraph 3.3.2 'Methodological considerations applicable to HF assessments':
  - add in (j)(1)(i)(A) a statement that psychophysiological data may be collected when relevant to confirm or complement data gathered through direct observation,
  - delete in (j)(2) the word 'systematically' with regard to video recording during HF assessment, owing to comments received raising some concerns about an EASA mandate in the AMC. The video recording indeed cannot be made mandatory by the AMC. However, should the video recording not be used, the quality of data collection should be such that the applicant can demonstrate that the data collected by the observers is exhaustive and that no complementary means is needed.

— Correct editorial mistakes and make wording improvements.

2. Individual comments and responses

In responding to the comments, the following terminology is applied to attest EASA's position:

(a) **Accepted** — EASA agrees with the comment and any proposed change is incorporated into the text.

(b) **Partially accepted** — EASA either partially agrees with the comment or agrees with it but the proposed change is partially incorporated into the text.

(c) **Noted** — EASA acknowledges the comment, but no change to the text is considered necessary.

(d) **Not accepted** — EASA does not agree with the comment or proposed change.

(General Comments)	-

comment	*5* comment by: *Civil Aviation Authority the Netherlands* No comments on this NPA.
response	Noted.

comment	*11* comment by: *LBA* LBA: LBA has no comments
response	Noted.

comment	*12* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)* Thank you for the opportunity to comment on NPA 2022-07 'Regular update of CS-25'. The Swedish Transport Agency supports the proposal.
response	Noted.

comment	*17* comment by: *FOCA Switzerland* The Federal Office of Civil Aviation (FOCA) in Switzerland thanks EASA for the opportunity to comment on this NPA. Our experts have analysed the proposal and support the amendments.
response	Noted.

comment	*108* comment by: *Boeing* October 28, 2022 B-H020-REG-22-MT-43

Note to file:

The attached comprise comments from Boeing Commercial Airplanes submitted to EASA via the Comment Response Tool (CRT) in response to EASA Notice of Proposed Amendment (NPA) 2022-07: Regular Update of CS-25.

Sincerely,

Mildred Troegeler
Director, Global Regulatory Strategy

The Boeing Company Comments to EASA NPA 2022-07:
Regular Update of CS-25

COMMENT #1 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** ***x***
Affected paragraph and page number	Page: 12 Paragraph: *Item 5: Brakes and braking system certification tests and analysis*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** Add an introduction sentence and a numbering before the sub-paragraphs (a) to (d) which follow 4.a.(4) to make it clear that they do not only apply to 4.a.(4) Replacement and Modified Equipment, but also to 4.a.(3) Refurbished and Overhauled Equipment. Amend the text of 4.a.(4)(b) “Major Changes” to include changes to the brake as well as the wheel. **REQUESTED CHANGE:** Remove sub-paragraphs (a) to (d) which follow 4.a.(4) to make it clear that they do not only apply to 4.a.(4) Replacement and Modified Equipment only, but also to 4.a.(3) Refurbished and Overhauled Equipment by creating new paragraphs (5), (6), and (7) which clearly states this. Renumber sub-paragraphs 4.a.(4)(a)-(d) as 4.a.(5)(a)-(b), (6), and (7).		

	Amend the text of 4.a.(5)(b) (previously 4.a.(4)(b)) "Major Changes" to include changes to the brake as well as the wheel.
Why is your suggested change justified?	**JUSTIFICATION:** See comment #29, proposed text on page 85 implements new paragraphs (5), (6), and (7).
EASA response	Not accepted. This comment incorrectly interprets the intent of the change. There is no need to create new paragraphs (6) and (7).

COMMENT #2 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial***
		x	
Affected paragraph and page number	Page: 13 Paragraph: *CS 25.801 Proposed Amendment*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** 25.801(a) and (b) are re-ordered and re-organized; existing (c) and (d) are made sub-paragraphs to (b). 25.801(c) is replaced with (b)(2); 25.801(d) is replaced with (b)(3); 25.801(e) is deleted. Historically, extensive re-ordering or re-numbering paragraphs has introduced confusion when comparing requirements between models or developing the certification basis for Amended or Supplemental Type Certs. **REQUESTED CHANGE:** Request to retain existing paragraph structure and introduce changes in new sub-paragraphs to existing structure as warranted. Draft amendment (a) and (b) become (a) and (a)(1) respectively. Draft amendment (b)(1), (b)(2), and (b)(3) become (b), (c), and (d) respectively. New paragraph (a)(1) is revised "If certification with … ~~*and the following:*~~ *and paragraphs (b), (c), and (d) below.*" Paragraph (e) remains deleted. Also change (as appropriate) references to CS 25.801 within the proposed AMC 25.563 and proposed revision to AMC 25.801.		
Why is your suggested change justified?	**JUSTIFICATION:** Changing regulatory structure from one amendment to another (paragraph and sub-paragraph assignments) increases misperception during certification basis development for STC/ATC. Variations in regulatory structure between regulatory authorities increases complexity of compliance activity. Retaining the existing structure, to the greatest extent practical, improves the ability of applicants to provide clear		

	definitions of cert basis changes on a requirement by requirement basis, and address differences in regulatory authority expectations for otherwise identically numbered paragraphs. A consistent regulatory structure provides a framework for historical context when evaluating regulatory evolution and applicability of previous compliance approaches. An example of this misperception is the last section of the amended AMC 25.801 shown in NPA 2022-07 which retains a regulatory reference to "CS 25.801(d)" inconsistent with the proposed amendments to CS 25.801.
EASA response	Not accepted. EASA created a new subparagraph (a) for the sake of clarification, to separate the two ditching scenarios: 'unplanned' and 'planned' ditching. With the introduced change the numbering needs to be as proposed. Paragraph 3 in AMC 25.801 referring to CS 25.801(d) has been deleted.

COMMENT #3 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 13-14 Paragraph: *CS 25.563 & CS 25.801*		
What is your concern and what do you want changed in this paragraph?	**<u>The proposed text states</u>:** **<u>REQUESTED CHANGE</u>:**		
Why is your suggested change justified?	**<u>JUSTIFICATION</u>:** This update would cause FAA & EASA regulations to be un-harmonized. Any differences between the Reg Agencies will make it more complicated for E-UMs to find compliance to these regulations if they are different. Proposed changes codifies the unplanned case into the EASA regulations but the FAA requires reference to both the FAA regulations and the applicable Issue Paper to get both planned AND unplanned certification. Although Boeing agrees with EASA's perspective on this we recommend EASA coordinate with FAA to keep these regulations harmonized to avoid certification differences between FAA & EASA.		
EASA response	Noted.		

	This rulemaking task aims at improving the certification specifications and acceptable means of compliance taking into account the related ARAC recommendations. It is expected that FAA will also initiate an equivalent rulemaking task in the near future.

COMMENT #4 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 14 Paragraph: *25.801(b)(3)*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** Proposed 25.801(b)(3) states in part "…The flotation and evacuation assessment must account for probable damage resulting from the conditions prescribed in CS 25.563." However, the proposed revision to CS 25.563 requires that "…those parts of the airframe structure that are necessary to maintain flotation of the aeroplane must withstand ditching loads…" It is unclear from the proposal what damage is considered "probable" but that would also remain compliant with the amended version of CS 25.563 as proposed. An applicant may assume that adequate compliance to proposed CS 25.563 would preclude the existence of damage that would materially impact the flotation of the airplane, and therefore flotation and evacuation assessment need not consider damage. **REQUESTED CHANGE:** Revise 25.801(b)(3) to remove the reference to "probable damage": *(3) It must be shown that following a planned emergency landing on water, the flotation time and trim of the aeroplane will allow the occupants to leave the aeroplane and enter rafts. The flotation and evacuation assessment must account for ~~probable damage resulting from the conditions prescribed in CS 25.563~~ all probable sources of water ingression that may be present after the emergency landing on water.*" Revise AMC 25.801(b)(3) as appropriate to this change.		
Why is your suggested change justified?	**JUSTIFICATION:** The intent, based on existing CRI's and the proposed AMC content, appears to be ensuring that the flotation and evacuation assessment accounts for all sources of water ingression affecting flotation and trim of the airplane		

	at rest in the water, regardless of source. These sources are not limited to damage resulting from the landing event, and "damage" need not be present for leakage rates to be affected by the emergency landing on water. Note also this comment applies to proposed amendment of AMC 25.801, Section 2, sub-bullet (2) under "CS 25.801(b)(3)".
EASA response	Accepted. The word 'probable' is however removed, in line with our understanding of the intent of this comment. Also, the term water 'leakage' is used instead of ingression, for consistency with other paragraphs.

COMMENT #5 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page:15 Paragraph: *2.6, 2.7, 2.8, & 2.8*		
What is your concern and what do you want changed in this paragraph?	**<u>The proposed text states</u>:** **<u>REQUESTED CHANGE</u>:**		
Why is your suggested change justified?	**<u>JUSTIFICATION</u>:** It is unclear whether or not internal pressure rise analysis and the evacuation timelines should begin during the deceleration phase, when the aircraft comes to rest, or sometime after the airplane comes to rest (ref. 30s per the FAA). Additionally whether or not the crew are expected to remain in their seats during this phase or not. It is also unclear how one should determine the completion of the deceleration phase as the aircraft could continue to move due to the current, waves, wind, or its own momentum. Recommend additional guidance on what is meant to be considered of both ditching, flotation, and evacuation analysis during the Deceleration phase.		
EASA response	Partially accepted. AMC 25.563, item 2.6, has been updated by adding a note after the 5 phases (a) – (e), to mention that some of these phases overlap. Also, phase (c) has been updated to describe the end of the deceleration being when the aircraft comes to a rest in the water.		

COMMENT #6 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive x***	***Editorial***
Affected paragraph and page number	Page: 15 Paragraph: *2.7, 2.8, & 2.8*		
What is your concern and what do you want changed in this paragraph?	**The proposed text states:** 2.7 Planned Ditching. An event where the flight crew knowingly makes an emergency landing on water. In ideal cases, the flight and cabin crews have sufficient time to fully prepare the aeroplane and the passengers, and execute the ditching in accordance with the Aeroplane Flight Manual (AFM) procedures. It is recognized that some circumstances may degrade the ability of the flight crew to execute the ditching exactly per the AFM procedures. Therefore, an assessment should address variations in the aeroplane assumptions (e.g. attitude (pitch) and descent velocity) to account for potential degraded conditions. All phases of ditching (defined above) should be evaluated when showing compliance with ditching certification specifications. Planned ditching events may also involve reduced power/no power conditions, as defined below. 2.8 Reduced Power/No Power condition ditching conditions. An event where the flight crew knowingly makes an emergency landing on water but with reduced engine power or no engine power available. The flight and cabin crews may or may not have sufficient time or opportunity to fully prepare the aeroplane and passengers for ditching. The flight crew is able to perform the emergency landing in accordance with AFM procedures for a reduced/no power landing on water. It has been shown that for this condition the amount of control the flight crew has over the high lift devices is the dominant factor in maintaining water impact loads within the structural capability of the aeroplane. This condition is addressed by AFM procedures (see section 9). For such event, the applicant may focus on the approach phase of the ditching event (defined above) when showing compliance with ditching certification specifications. 2.8 Unplanned Ditching. An emergency landing on water that is typically associated with a failed or aborted takeoff, or landing overrun at an airport adjacent to a large body of water where the aeroplane is in water deep enough to float (i.e., the aeroplane is not supported by land). The flight and cabin crews do not have sufficient time or opportunity to prepare the aeroplane and passengers for this type of ditching event Typically no actions are taken before the ditching to improve		

	the flotation characteristics of the aeroplane (e.g. close the Environmental Control System (ECS) outflow valves). For such event, the applicant may focus on the flotation and evacuation phases of the ditching event (as defined above) when showing compliance with ditching certification specifications. **REQUESTED CHANGE:**
Why is your suggested change justified?	**JUSTIFICATION:** By the existing definitions herein with the basis of the Hudson River case, there is no time to prepare the aeroplane for the ditching, which indicates this should be an unplanned event for conservatism. As such, should the reduced/no power be defined as an unplanned event rather than potentially a planned or unplanned event? Per the unplanned definition, it is assumed that the aircraft is under power as these are takeoff or landing overruns. Typical crew procedures to this would be to reduce the power on the engines, apply brakes, and/or thrust reversers. Is this considered a reduced power condition? Recommend additional guidance as to whether this should be considered Planned or Unplanned and how one makes the determination of whether it should be Planned or Unplanned, including criteria that would identify it as Planned vs Unplanned.
EASA response	Not accepted. The key difference between a planned ditching and an unplanned ditching is whether the flight crew knowingly (in the case of a planned ditching) or not knowingly (in the case of an unplanned ditching) makes an emergency landing on water. The reduced power/no power condition is associated with the planned ditching event, not with the unplanned ditching event. Providing additional guidance on these events is not considered necessary as the proposed definitions are deemed to be sufficiently clear, except that the (last) sentence in item 2.7 highlighted by the commenter is removed in response to other comments.

COMMENT #7 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** ***x***
Affected paragraph and page number	Page: 16 Paragraph: *AMC 25.563 2.8 Unplanned Ditching.*		

What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** *2.8 Unplanned Ditching.* **REQUESTED CHANGE:** ~~*2.8*~~ ***2.9*** *Unplanned Ditching.*		
Why is your suggested change justified?	**JUSTIFICATION:** The prior paragraph is titled "2.8 Reduced Power/No Power condition ditching conditions." Paragraph 2.9 is next in the sequence.		
EASA response	Accepted.		
COMMENT #8 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 22 Paragraph: *AMC 25.801 Ditching*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** **REQUESTED CHANGE:** **Section 2 in AMC 25.563 provides 'Definitions' which can be used for showing compliance with CS 25.801.**		
Why is your suggested change justified?	**JUSTIFICATION:** Reference back to AMC 25.563 for definitions is necessary to understand the information in this section.		
EASA response	Noted. CS 25.801(b) already requires compliance with CS 25.563, and therefore AMC 25.563 applies, including the definitions provided therein.		
COMMENT #9 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 23 Paragraph: *AMC 25.801 1. (5) & (6)*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** (5) For the purposes of developing a flotation and evacuation analysis, an exit should be conservatively considered unusable when water comes in over the top of the door sill. (6) Aeroplane flotation should be assumed to end when the first ditching exit goes below the waterline or the attitude of the aeroplane is such that it would require extraordinary effort to move through the cabin (e.g., 20 degrees). However,		

	if it can be shown to be conservative, the flotation time may be extended. A showing of conservatism should include an assessment of the number of persons expected to be remaining in the aeroplane when the ditching exit sill(s) goes below the waterline, the number of ditching exits remaining above the waterline and the attitude of the aeroplane. **REQUESTED CHANGE:** (5) For the purposes of developing a flotation and evacuation analysis, an exit should be conservatively considered unusable when water comes in over the top of the door sill. Note: If it can be shown to still be conservative, an exit may qualify as a ditching exit if it does not remain above the waterline for the full duration of the evacuation. The substantiation of conservatism should include an assessment of how long the ditching exit remains above the waterline, the number of persons expected to be remaining in the aeroplane when the ditching exit(s) sill goes below the waterline and the number of other ditching exits remaining above the waterline. (6) Aeroplane flotation should be assumed to end when **either** the first ditching exit goes below the waterline**,** ~~or~~ the attitude of the aeroplane is such that it would require extraordinary effort to move through the cabin (e.g., 20 degrees)**, or the last occupant leaves the aeroplane, whichever is first**. ~~However, if it can be shown to be conservative, the flotation time may be extended. A showing of conservatism should include an assessment of the number of persons expected to be remaining in the aeroplane when the ditching exit sill(s) goes below the waterline, the number of ditching exits remaining above the waterline and the attitude of the aeroplane.~~ Note: If it can be shown to still be conservative, an exit may qualify as a ditching exit if it does not remain above the waterline for the full duration of the evacuation. The substantiation of conservatism should include an assessment of how long the ditching exit remains above the waterline, the number of persons expected to be remaining in the aeroplane when the ditching exit(s) sill goes below the waterline and the number of other ditching exits remaining above the waterline.
Why is your suggested change justified?	**JUSTIFICATION:** Items (5) and (6) conflict on when flotation and evacuation analysis should end. Recommend revising (5) to add statement of allowing flotation & evacuation to continue after doorsills go underwater if conservatism can be shown.

	Also, using language identical to AMC 25.563 2.2 Ditching Exit is recommended for both (5) and (6). The language used for both planned (AMC 25.801(b)) and unplanned (25.801(a)) should be the same for this item. Item (6) only: Adding this statement removes potential misunderstanding for whether or not occupants remain on the aircraft when flotation ends Per the regulation 25.801(a) & 25.801(b)(3), ensuring all occupants are able to leave the aeroplane is the primary objective, so a statement should be included to that end especially for aeroplanes where the door sills remain above the water after all occupants have evacuated.
EASA response	Partially accepted. The proposed note has been added under points (5) and (6). However, the proposed change to point (6) is not accepted. There is a confusion between flotation time and evacuation. The flotation may continue after the last occupant has evacuated the aeroplane. Also, the proposed change would conflict with the definition of flotation time provided in AMC 25.563.

COMMENT #10 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 24 Paragraph: *AMC 25.801(b) (3) & (4)*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** (3) For the purposes of developing a flotation and evacuation analysis, an exit should be conservatively considered unusable when water comes in over the top of the door sill. (4) Aeroplane flotation should be assumed to end when the first ditching exit goes below the waterline or the attitude of the aeroplane is such that it would require extraordinary effort to move through the cabin (e.g., 20 degrees). However, if it can be shown to be conservative, the flotation time may be extended. A showing of conservatism should include an assessment of the number of persons expected to be remaining in the aeroplane when the ditching exit sill(s) goes below the waterline, the number of ditching exits remaining above the waterline and the attitude of the aeroplane. **REQUESTED CHANGE:**		

	(3) For the purposes of developing a flotation and evacuation analysis, an exit should be conservatively considered unusable when water comes in over the top of the door sill. Note: If it can be shown to still be conservative, an exit may qualify as a ditching exit if it does not remain above the waterline for the full duration of the evacuation. The substantiation of conservatism should include an assessment of how long the ditching exit remains above the waterline, the number of persons expected to be remaining in the aeroplane when the ditching exit(s) sill goes below the waterline and the number of other ditching exits remaining above the waterline. (4) Aeroplane flotation should be assumed to end when **either** the first ditching exit goes below the waterline**,** ~~or~~ the attitude of the aeroplane is such that it would require extraordinary effort to move through the cabin (e.g., 20 degrees)**, or the last occupant leaves the aeroplane, whichever is first**. ~~However, if it can be shown to be conservative, the flotation time may be extended. A showing of conservatism should include an assessment of the number of persons expected to be remaining in the aeroplane when the ditching exit sill(s) goes below the waterline, the number of ditching exits remaining above the waterline and the attitude of the aeroplane.~~ Note: If it can be shown to still be conservative, an exit may qualify as a ditching exit if it does not remain above the waterline for the full duration of the evacuation. The substantiation of conservatism should include an assessment of how long the ditching exit remains above the waterline, the number of persons expected to be remaining in the aeroplane when the ditching exit(s) sill goes below the waterline and the number of other ditching exits remaining above the waterline.
Why is your suggested change justified?	**JUSTIFICATION:** Items (3) and (4) somewhat conflict on when flotation and evac analysis should end. Recommend revising (3) to add statement of allowing flotation & evac to continue after doorsills go underwater if conservatism can be shown. Also, using language identical to AMC 25.563 2.2 Ditching Exit is recommended for both (3) and (4). The language used for both planned (AMC 25.801(b)) and unplanned (25.801(a)) should be the same for this item. Item (4) only: Adding this statement removes potential misunderstanding for whether or not occupants remain on the aircraft when flotation ends

	Per the regulation 25.801(a) & 25.801(b)(3), ensuring all occupants are able to leave the aeroplane is the primary objective, so a statement should be included to that end especially for aeroplanes where the door sills remain above the water after all occupants have evacuated.
EASA response	Partially accepted. The proposed note has been added under points (3) and (4). However, the proposed change to point (4) is not accepted. There is a confusion between flotation time and evacuation. The flotation may continue after the last occupant has evacuated the aeroplane. Also, the proposed change would conflict with the definition of flotation time provided in AMC 25.563.

COMMENT #11 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** ***x***
Affected paragraph and page number	Page: 25 Paragraph: *AMC 25.801, "3. CS 25.801(d)"*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** Paragraph 3 of AMC 25.801 states: "***3. CS 25.801(d) – Flotation and trim of the aeroplane***" Under the NPA proposal, CS 25.801(d) is re-numbered as 25.801(b)(3) and therefore does not exist as a target for AMC coverage. **REQUESTED CHANGE:** Correct the regulatory reference, or move the guidance in the noted section to the AMC section covering CS 25.801(b)(3)		
Why is your suggested change justified?	**JUSTIFICATION:** Assuming CS 25.801 is re-numbered as proposed in the NPA the AMC reference to CS 25.801(d) is no longer valid. If the existing numbering of CS 25.801 is restored (as commented elsewhere) no action is required.		
EASA response	Partially accepted.		

	As the reference to the FAA AC 25-17A is no longer needed, and CS 25.801(d) indeed does not exist anymore, the commented paragraph has been deleted.

COMMENT #12 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** ***x***
Affected paragraph and page number	Page: 27(a) Paragraph: *CS 25.1302 Installed systems and equipment for use by the flight crew*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** The controls and information intended necessary for the accomplishment of the tasks must be provided. **REQUESTED CHANGE:** The controls and information that are necessary to accomplish the tasks associated with the intended function must be provided.		
Why is your suggested change justified?	**JUSTIFICATION:** Reword 'intended necessary' to provide clarity.		
EASA response	Accepted.		

COMMENT #13 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 27(d) Paragraph: *CS 25.1302 Installed systems and equipment for use by the flight crew*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** Removal of the text "To the extent practicable" **REQUESTED CHANGE:** Recommendation to keep the text "to the extent practicable"		
Why is your suggested change justified?	**JUSTIFICATION:** There are practical considerations in the design of any flight deck systems. Removal of this text may have unintended consequences.		
EASA response	Not accepted.		

	'To the extent practicable' has been removed as this statement is ambiguous and does not provide any criteria for its applicability (such wording is not used within other CSs). The extent of the requested investigation is anyway limited to the HF errors that can be 'reasonably' expected in service. GM1 provides additional clarifications regarding the interpretation of the term 'reasonably'. Please note that the deletion of 'to the extent practicable' does not have an impact on the EASA expectation regarding the demonstration of compliance with this subparagraph.

COMMENT #14 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** ***x***
Affected paragraph and page number	Page: 29 Paragraph: AMC 25.1302 Section 1.2 _ Applicability		
What is your concern and what do you want changed in this paragraph?	**<u>The proposed text states</u>:** Paragraph (b): This AMC applies to flight crew interfaces and system behavior for all the installed systems and equipment used by the flight crew while operating the aeroplane in normal, abnormal / malfunction and emergency conditions. **flight crew** **<u>REQUESTED CHANGE</u>:** Remove 'flight crew' at end of sentence.		
Why is your suggested change justified?	**<u>JUSTIFICATION</u>:** Typographical error (flight crew) at the end of the paragraph.		
EASA response	Accepted.		

COMMENT #15 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 29 Paragraph: 1.3		
What is your concern and what do you want changed in this paragraph?	**<u>The proposed text states</u>:** For the purposes of this AMC, the term 'assessment' may refer to both evaluations and tests. **<u>REQUESTED CHANGE</u>:**		

	Reword following example "For the purposes of this AMC, the term 'assessment' may refer to a variety of Mean of Compliance including mockups, design reviews, bench reviews, analysis, evaluations, tests, etc."
Why is your suggested change justified?	**JUSTIFICATION:** Assessments can also be made using other means of compliance (MOC). We suggest that other MOCs be added to this definition (beyond evaluations and tests).
EASA response	Accepted. EASA confirms the intent to limit the definition of 'assessment' to either an evaluation or a test. Furthermore, EASA would object that the other means provided as examples (mock-ups, design reviews, analysis, etc) can be considered as 'assessments'.

COMMENT #16 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** ***x***
Affected paragraph and page number	Page:29 Paragraph: AMC 25.1302 Section 1.3 _ Definitions		
What is your concern and what do you want changed in this paragraph?	**The proposed text states:** Automation: "…, which replaces the human **organism** in the sensing," **REQUESTED CHANGE:** Recommend removing or replacing the word 'organism' in this sentence; possibly by using 'interaction' instead.		
Why is your suggested change justified?	**JUSTIFICATION:** Prevent misinterpretation by defining the human element that is replaced.		
EASA response	Partially accepted. EASA recognises that the proposed definition is not fully adequate and decided to revert to the former definition: 'The autonomous execution of a task (or tasks) by aeroplane systems started by a high-level control action of the flight crew.'		

COMMENT #17 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** ***x***

Affected paragraph and page number	Page: 30 Paragraph: Flight Deck		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** The area of the aircraft where the flight crew work and where the primary flight controls are located. **REQUESTED CHANGE:** Add displays to this definition.		
Why is your suggested change justified?	**JUSTIFICATION:** Flight decks typically include both controls and displays.		
EASA response	Accepted.		
COMMENT #18 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** ***x***
Affected paragraph and page number	Page: 34 Paragraph: *3 - Figure 1*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** Analyze phase includes Cabin and Cockpit controls. **REQUESTED CHANGE:** Propose deleting “Cabin” controls. Propose replacing “Cockpit” with “Flight Deck” to be consistent with definitions here and throughout the document.		
Why is your suggested change justified?	**JUSTIFICATION:** This appears to be an inadvertent carry-over from AMC 29.1302.		
EASA response	Accepted.		
COMMENT #19 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** ***x***
Affected paragraph and page number	Page: 35 Paragraph: *3.2.2(a)*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** CS 25.1302 establishes the requirements to ensure that the design supports the flight crew in performing his tasks. **REQUESTED CHANGE:** Recommend replacement of “his” with “their” or “his/her”.		

Why is your suggested change justified?	**JUSTIFICATION:** Avoid use of gender-based pronouns.		
EASA response	Accepted.		
COMMENT #20 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 38 Paragraph: *3.2.8*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** The phrase "test" is throughout this section and it may be that some of the HF assessments will occur using non-conformed articles. **REQUESTED CHANGE:** Recommend stating that evaluations using non-conformed articles may be appropriate or replace "test" with "evaluation/test".		
Why is your suggested change justified?	**JUSTIFICATION:** Provide clarification and avoid misinterpretation.		
EASA response	Accepted. 'test' has been replaced by 'assessment' and 'test vehicle' has been replaced by 'the means used for the assessment'.		
COMMENT #21 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 39 Paragraph: *AMC 25.1302 Section 3.3.2 (a)*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** Paragraph (a): The scenario-based approach is intended to substantiate the compliance of human–machine interfaces (HMIs). It is based on a methodology that involves a **sample of various flight crew members that are representative of the future users**, being exposed to real operational conditions in a test bench or a simulator, or in the aeroplane. **REQUESTED CHANGE:** Provide a definition of 'future users', or, suggest changing this sentence to read: "It is based on a methodology that involves		

	a sample of various flight crew members ~~that are representative of the future users~~, being exposed to real operational conditions in a test bench or a simulator, or in the aeroplane.”
Why is your suggested change justified?	**JUSTIFICATION:** Provide clarification so the applicant is able to understand that its flight crew member test subjects are representative of ‘future users’. Is there a reasonable expectation of the level of training for a flight crew member? EASA definition of Flight Crew Member: A licensed crew member charged with duties that are essential for the operation of an aircraft during a flight duty period. 2.2_Flight crew member capabilities In order to demonstrate compliance with all the specifications referenced by this AMC, all the certification activities should be based on the assumption that the aeroplane will be operated by qualified flight crews who are trained in the use of the installed systems and equipment.
EASA response	Not accepted. The commented text is considered clear enough and is kept harmonised with AMC 29.1302.

COMMENT #22 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial***
		x	
Affected paragraph and page number	Page: 40 Paragraph: *AMC 25.1302 Section 3.3.2 (g)(4)*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** The roles of the flight crew: if flight crew members from the applicant participate in the assessment, they should be made aware that **their role differs significantly from their typical expert pilot role** in the development process. For the process to be valid without significant bias, they are expected to react and **behave in the flight desk as standard operational pilots.** **REQUESTED CHANGE:** Boeing respectfully requests EASA to provide additional clarification and guidance on the role of the various types of applicant flight crew members in assessments, including the different types of roles they might play or the specific types of assessments that require applicant pilots to behave as standard operational pilots. Additionally, Boeing requests a		

	definition or guidelines for applicants to define a "standard operational pilot".		
Why is your suggested change justified?	**JUSTIFICATION:** The role of an applicant flight crew member in an assessment is highly dependent on the objective and type of assessment being conducted. Additionally, there are no baseline set of skills or behaviors defining a "standard operational pilot".		
EASA response	Partially accepted. 'Flight crew member' has been replaced by 'flight test pilot', and the term 'standard' (regarding operational pilots) has been withdrawn.		
COMMENT #23 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 41 Paragraph: (j)(1)(A)		
What is your concern and what do you want changed in this paragraph?	**The proposed text states:** Objective data…. **REQUESTED CHANGE:** Recommend providing additional examples for objective metrics.		
Why is your suggested change justified?	**JUSTIFICATION:** Observable could also include psychomotor metrics; such as eye tracking, motions, etc.		
EASA response	Accepted. An addition has been made to state that psychophysiological data may be collected when relevant to confirm or complement data gathered through direct observation.		
COMMENT #24 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 41 Paragraph: (2)		
What is your concern and	**The proposed text states:**		

what do you want changed in this paragraph?	The HF assessment should be systematically video recorded (both ambient camera and displays). **REQUESTED CHANGE:** Recommend changing the wording to "Video recording should be considered for the HF assessment (both ambient camera and displays)."		
Why is your suggested change justified?	**JUSTIFICATION:** It may not always be practical to use video recordings or the pilot subjects may not agree to it.		
EASA response	Partially accepted. The video recording cannot be made mandatory by the AMC. However, should the video recording not be used, the quality of data collection should be such that the applicant can demonstrate that the data collected by the observers is exhaustive and that no complementary means is needed. Please note that in any case the video recording may be needed if EASA questions the comprehensiveness and the quality of the data collection, and also in case a specific event requires to be double checked. However, EASA agrees to remove the term 'systematically'.		
COMMENT #25 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 42 Paragraph: (k)		
What is your concern and what do you want changed in this paragraph?	**The proposed text states:** If HF-related concerns are raised that are not directly related to the objective of the assessment, they should nevertheless be recorded, adequately investigated and analyzed in the assessment report. **REQUESTED CHANGE:** Recommend removing this paragraph.		
Why is your suggested change justified?	**JUSTIFICATION:** Often times subjects will request future product and features that are well outside the scope of the project.		
EASA response	Not accepted.		

	The text clearly points at HF-related findings that may be raised during an assessment. Pilot requests for a new function or feature are not considered as problems requiring any mitigation, unless the expression of the need is an indicator of a genuine issue, which has to be confirmed thanks to the debriefing. Of course, the applicant is free to consider suggestions that are not revealing any issue for the sake of product improvement.		
COMMENT #26 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** ***x***	***Editorial***
Affected paragraph and page number	Page: 42 Paragraph: (n)(4)		
What is your concern and what do you want changed in this paragraph?	**<u>The proposed text states</u>:** The techniques used to collect data in the context of the CS 25.1302 evaluations could make use of workload rating scales, but in that case no direct conclusion should be made from the results about the compliance with CS 25.1302. **<u>REQUESTED CHANGE</u>:** Request clarification of the intent of this subparagraph.		
Why is your suggested change justified?	**<u>JUSTIFICATION</u>:** Provide clarification on the intent.		
EASA response	Not accepted. EASA considers that the commented text is clear enough. Furthermore, additional clarification is provided thanks to paragraph 3.3.2. (j)(1)(ii): 'Other tools such as questionnaires and rating scales could be used as complementary means. However, it is never sufficient to rely solely on self administered questionnaires due to the fact that crew members are not necessarily aware of all their errors, or of deviations with respect to the intended use.'		
COMMENT #27 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive*** *x*	***Editorial***
Affected paragraph and page number	Page: 44 Paragraph: (d)(1)(iii)		
What is your concern and	**<u>THE PROPOSED TEXT STATES</u>:**		

what do you want changed in this paragraph?	For example, the use of colour alone as an identifying feature is usually not sufficient. **REQUESTED CHANGE:** Suggest moving this design attribute text to the displays part of the AMC. Controls should be made distinguishable and/or predictable by differences in form, ~~colour~~, location, motion, effect and/or labelling.		
Why is your suggested change justified?	**JUSTIFICATION:** Many controls across the flight deck are the same colour and shape.		
EASA response	Not accepted. EASA prefers to keep harmonisation with AMC 29.1302. Wording improvement will be considered through future rulemaking tasks.		
COMMENT #28 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** *x*
Affected paragraph and page number	Page: 44 Paragraph: *Section 4.2 Par (d)(2)(ii)*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** The applicant can label the controls with text or icons. The text and the icons should be shown to be distinct and meaningful for the function that they label. The applicant should use standard or unambiguous abbreviations, nomenclature, or icons, consistent within a function and across the flight deck. ICAO Doc 8400 'Procedures for Air Navigation Services (PANS) — ICAO Abbreviations and Codes' provides standard abbreviations, and is an acceptable basis for selecting labels. **REQUESTED CHANGE:** Consider including ARP 4105 Abbreviations, Acronyms, and Terms for Use on the Flight Deck, which was developed to specifically address flight deck.		
Why is your suggested change justified?	**JUSTIFICATION:** Provide additional guidance.		
EASA response	Not accepted. EASA prefers to keep harmonisation with AMC 29.1302. Improvements will be considered through future rulemaking tasks.		

COMMENT #29 of 29			
Type of comment (check one)	***Non-Concur***	***Substantive***	***Editorial*** ***x***
Affected paragraph and page number	Page: 85 Paragraph: *AMC 25.735 Brakes and Braking Systems Certification Tests and Analysis*		
What is your concern and what do you want changed in this paragraph?	**THE PROPOSED TEXT STATES:** (4) Replacement and Modified Equipment. Replacement and modified equipment includes changes to any approved wheel and brake assemblies not addressed under paragraph 4a(~~2~~ 3) of this AMC. (…) (5) The following apply to both Refurbished and Overhauled Equipment as well as Replacement and Modified Equipment: (a) Minor Changes. (…) (b) Major Changes. Changes to a wheel or brake assembly outside the limits allowed by the OEM's CMM should be considered a major change due to potential airworthiness issues. (c) (…) (d) (…) **REQUESTED CHANGE:** (4) Replacement and Modified Equipment. Replacement and modified equipment includes changes to any approved wheel and brake assemblies not addressed under paragraph 4a(~~2~~ 3) of this AMC. (…) ~~Minor Changes. Changes to a brake might be considered as a minor change, as long as the changes are not to the friction elements. The proposed change cannot affect the aeroplane stopping performance, brake energy absorption characteristics, and/or continued airworthiness of the aeroplane or wheel and brake assembly (e.g., vibration and/or thermal control, and brake retraction integrity). Technical evidence justifying a minor change should be provided.~~ ~~Major Changes. Changes to a wheel assembly outside the limits allowed by the OEM's CMM should be considered a major change due to potential airworthiness issues.~~ ~~Past history with friction elements has indicated the necessity of ongoing monitoring (by dynamometer test) of frictional and energy absorption capabilities to assure that they are maintained over the life of the aeroplane program. These monitoring plans have complemented the detection and correction of unacceptable deviations. A monitoring plan~~		

	~~should be submitted to the cognisant Certification Office to ensure continued airworthiness of the product.~~ ~~Intermixing of wheel and brake assemblies from different suppliers is generally not acceptable due to complexities experienced with different friction elements, specific brake control tuning, and other factors.~~ (5) The following apply to both Refurbished and Overhauled Equipment as well as Replacement and Modified Equipment: Minor Changes. Changes to a brake might be considered as a minor change, as long as the changes are not to the friction elements. The proposed change cannot affect the aeroplane stopping performance, brake energy absorption characteristics, and/or continued airworthiness of the aeroplane or wheel and brake assembly (e.g., vibration and/or thermal control, and brake retraction integrity). Technical evidence justifying a minor change should be provided. Major Changes. Changes to a wheel or brake assembly outside the limits allowed by the OEM's CMM should be considered a major change due to potential airworthiness issues. Past history with friction elements has indicated the necessity of ongoing monitoring (by dynamometer test) of frictional and energy absorption capabilities to assure that they are maintained over the life of the aeroplane program. These monitoring plans have complemented the detection and correction of unacceptable deviations. A monitoring plan should be submitted to the cognisant Certification Office to ensure continued airworthiness of the product. Intermixing of wheel and brake assemblies from different suppliers is generally not acceptable due to complexities experienced with different friction elements, specific brake control tuning, and other factors.
Why is your suggested change justified?	**JUSTIFICATION:** It appears that the intent is to split paragraph (4) into two paragraphs, so that the portion of the old text of (4) is removed and implemented in new paragraph (5) and add paragraphs 6 and 7 so that they are applicable to new as well as modified/replacement equipment.
EASA response	Not accepted. This comment incorrectly interprets the intent of the change. There is no need to create new paragraphs (6) and (7).

response	EASA responses are provided above under each Boeing specific comment.

1.1. How this NPA was developed p. 4

comment	*18* comment by: *THE ROYAL EXPRESS TRAVELS*
response	Noted.

comment	*48* comment by: *Dassault-Aviation* General comment on whole document: For better efficiency and relevant feedback only the effectives revisions in the AMC should be highlighted (not all the 50 pages document)
response	Noted. This is what is done usually. However, when an AMC or CS is fully re-written, we highlight the full paragraph as a new one.

Item 1.2 Structural ditching analysis p. 6

comment	*64* comment by: *De Havilland Aircraft of Canada Limited* DHC-8 is not aligned to proposed changes to CS25.721; MZFW & ROD of 3 fps smaller aircraft requesting ditching certification, the proposed weight of MLW seems to bit onerous. Typically MLW are up to 95% of MTOW, wheras for larger A/C it sits at about 90%. Operational rules requiring ditching for 60 minutes or more, typically mean than landings are well below MLW. Wording to allow for a more rational weight should be introduced. CAT.GEN.MPA.150 Ditching only requires ditching at 120 minutes or 400 NM from land PROPOSED TEXT "a lower planned water weight can be used if a rational analysis for its selection can be presented, but not less than MZFW" for vehicles with no fuel capability, ie batteries, use MLW.
response	Not accepted. There is no intention to change CS 25.721 in this NPA; the reference to CS 25.721 is included to indicate that considering MLW for emergency landing conditions such as planned ditching events is in line with existing requirements and is therefore deemed appropriate.

Item 1.3 Buoyancy - evacuation analysis p. 7

comment	*65* comment by: *De Havilland Aircraft of Canada Limited* Exits not usable when water is above door sill; does not explicitly address 'sill raisers' or 'ditching dam' as in some A/C models. PROPOSED TEXT Add extra bullet: "The use of recognized 'sill raisers' or 'ditching dams' allows the door to be classified as usable for evacuation."
response	Not accepted. EASA prefers to analyse the installation of ditching dams on a case-by-case basis in the frame of each certification project.

Item 2: Amendment of AMC 25.1309 - Development assurance and AMC 20 references p. 11

comment	*19* comment by: *THE ROYAL EXPRESS TRAVELS*
response	Noted.

Item 3: Installed systems and equipment for use by the flight crew p. 11

comment	*20* comment by: *THE ROYAL EXPRESS TRAVELS*
response	Noted.

comment	*91* comment by: *COMAC* Page 11, Section 2.3, Item 3, point 3; Page 38, Section 3.2.8, Paragraph (b)(3) & (5); Page 43, Section 3.3.2, Paragraph (m) The CRI F-01 implied that HF issues are at the high level, and need to be translated into detailed HF test objectives for substantiation. In this proposed AMC25.1302, the phrases “HF findings” and “(design-related) human performance issues” are used, do they refer to specific design issues (as contrary to high level HF issues)? Because it looks like the word *issue(s)* can refer to different things, one is at the high level and need to be translated into detailed HF test objectives for substantiation; and one is specific design issues observed or reported, known as HF findings or HP issues, and would require analysis to determine the way forward. Further clarification of HF issues, human performance issues, HF findings would be helpful or adding them in the Definitions section as appropriate.
response	Noted.

Although other related documents such as CRIs were raised in the past, the proposed amended AMC is intended to take over these past documents.

EASA chose not to use the term 'HF issue' in this AMC, since the concept was difficult to understand for some applicants.

'HF findings' refers to certification findings that are related to HF. This is a synonym of 'Human performance issue'.

A 'design-related human performance issue' is a human performance issue that is due to a design weakness; the expression is defined in section 1.3.

The other terms are considered straightforward enough and therefore no addition to section 1.3 is deemed necessary.

CS 25.563 Structural ditching provisions p. 13

comment *21* comment by: *Airbus DS*

After the first sentence
"If certification with ditching provisions is requested, those parts of the airframe structure that are necessary to maintain flotation of the aeroplane must withstand ditching loads, considered as ultimate, associated with a planned emergency landing on water. "

a new additional sentence is proposed
"Local damages may occur considering that associated leakages or loss of buoyancy must be accounted for in the floatation analysis specified in CS 25.801(b)"

The reason is that "withstanding loads" for a structure is usually understood to be equivalent to a requirement of no failure at all (even local), which is not the case. Apparently, there is not coherence between the text of the rule and the AMC, being the AMC what is really requested. Therefore a clarification is proposed to be added in the rule.

response Partially accepted.

A sentence added as proposed but with a different wording. The new sentence states that damages may occur provided that these are accounted for in the assessments required by CS 25.801(b), and that airframe structural integrity is maintained.

comment *145* comment by: *Bombardier Inc.*

AMC 25.563 Section 6, page 20 of 93, line 7

Rationale:
The sentence "Per CS 25.563, variations of flight parameters have to be considered" seems to suggest that variations of all the parameters in the list below this sentence must be considered in the ditching assessment. However, we believe this is not the

intent; rather this list is a list of parameters that must have defined values only some of which should vary.

Proposed text:
Per CS 25.563, flight parameters for which values/conditions must be defined are:

response

Partially accepted.

The sentence has been updated to mention that, typically, the following parameters have to be considered and appropriately defined.

comment

146 comment by: *Bombardier Inc.*

AMC 25.563 Section 6 - page 21 of 93 lines 21-29

Rationale:

It seems items 4 and 5 apply to both planned and unplanned ditching, however it speaks of assessing loading, pressures and damage. This is in direct contast with previous statements that say for unplanned ditching no damage is to be considered ("Structural damage need not be considered for the unplanned ditching condition.") and only a flotation assessment is required (i.e. no loads).

Proposed Text:
Clarification should be provided as to the extent of the assessment to be considered for unplanned ditching.
Suggestion: "Damage limited to hydrostatic pressure should be considered for unplanned ditching." to replace "Structural damage need not be considered for the unplanned ditching condition."

response

Partially accepted.

A sentence has been created as a fourth bullet point to specify that any leakage should be accounted for in the flotation analysis.

The NPA bullet points (4) and (5) are renumbered, and for these items the statement ‘For planned ditching’ has been added.

Regarding the suggested change of the last sentence of the first bullet point, it is not accepted, as the proposed text in the NPA is aligned with the wording of FAA AC 25-17A.

comment

147 comment by: *Bombardier Inc.*

AMC 25.563 Section 2.8 page 16 of 93

Rationale
For the scenario of reduced/no power, our interpretation is that if the approach conditions exceed those defined section 6 then these conditions should be considered for the structural assessment of planned ditching.

Proposed Text:
Please clarify if this is indeed the intent. Also, what is the intent of the reduced power scenario (and what is meant by reduced power; e.g., single engine, etc) if the no power scenario must be considered.

response

Not accepted.

No structural assessment is required for the reduced power or thrust/no power or thrust conditions. These conditions are addressed by AFM procedures. As these procedures may be different for reduced power or thrust versus no power or thrust conditions, both conditions need to be assessed.

comment *148* comment by: *ATR*

It is understood from the proposed CS-25.563 amendment that some reasonable variation of A/C ditching configuration has to be considered.
Even if described in the chapter AMC 25.563 Structural ditching provisions, could you please provide more clarification ? Would it be possible to have detailed example to understand the reasonable variation with respect to a well defined A/C configuration?

response

Not accepted.

Section 6 of AMC 25.563 provides adequate guidance on the flight parameters to be considered and appropriately defined by the applicant.

CS 25.801 Ditching p. 13

comment *22* comment by: *Airbus DS*

In paragraph CS 25.801(b)(2) (new text in **bold** underlined):

"The probable behaviour of the aeroplane in an emergency a water landing on water must be investigated by model tests, **by comparison with aeroplanes of similar configuration for which the ditching characteristics are known,** or by analytical methods supported by tests."

The reason of the comment is that the possibility for "comparison with aeroplanes of similar configuration for which ditching characteristics are known" has been erased from the rule. Even though it is already considered as a possible MoC in the AMC 25.801, Airbus DS believes it would be reasonable to reflect it in the rule. This allowance has been used in the past by OEMs, providing an acceptable level of safety.

response

Not accepted.

The comparison with aeroplanes of a similar configuration as a compliance option is already mentioned in AMC 25.801. Such a comparison (analysis) would require the

	evaluation of previously performed ditching model tests. The proposed wording in the NPA (i.e. analytical methods supported by tests) therefore already adequately addresses this compliance option.
comment	*27* comment by: *AIRBUS* **PAGE / PARAGRAPH / SECTION :** **Page 13, CS 25.801 Ditching, Paragraph (2)** **PROPOSED TEXT / COMMENT:** **(2) The probable behavior of the aeroplane in an emergency landing on water must be investigated by model tests or by validated analytical methods ~~supported by tests~~. Features likely to affect the hydrodynamic characteristics of the aeroplane, must be considered.** **RATIONALE / REASON :** **The proposed text is in line with the ARAC report.** **The proposed wording clarifies the current industry practice of validating the analysis method by existing or/and new tests.**
response	Not accepted. The proposed text in the NPA aligns closely to other certification specifications that mention 'analysis supported by test(s)'. As any analytical method needs to be properly validated, inserting the word 'validated' does add a value to the proposed text.
comment	*66* comment by: *De Havilland Aircraft of Canada Limited* consistentcy use "planned emergency landing on water" throughout section b-1,b-2,b-3, currently draft only uses it in b-3 PROPOSED TEXT (1)(2)(3) "planned or unplanned ditching" in lieu of "planned emergency landing on water".
response	Partially accepted. CS 25.801(b)(1) and (2) have been updated to be consistent with CS 25.801(b)(3), i.e. to read 'planned emergency landing on water'.
comment	*67* comment by: *De Havilland Aircraft of Canada Limited* "and enters rafts" does not apply when operating within 400 NM of land..does that mean no requirements under 25.801(b-3) consider 25.801(a) egress rates higher, with no requirement for life rafts of flotation devices PROPOSED TEXT

(3) … the floatation time and trim of the aeroplane will allow the occupants to safely leave the aeroplane.

response

Not accepted.

CS-25 provides certification specifications independently from operational regulations requirements. CS 25.801 (b)(3) addresses the planned emergency landing on water for aeroplanes that are certified with ditching provisions. Therefore, rafts are required and the occupants must be able to enter the rafts.

comment

98 comment by: *Dassault-Aviation*

CS 25.801(b)(2) §3.1 page 13

Comment:The possibility to investigate the behavior of the aeroplane landing on water by “comparison with airplanes of similar configuration for which ditching characteristics are known” has been removed from the rule. Until now, this method has been widely used by OEMs and has proven to provide an acceptable level of safety. Even if the opportunity is still referenced in the guidance, Dassault Aviation believes it would be more comprehensible to keep this similarity compliance option within the rule.

Proposal: Not deleting : “comparison with airplanes of similar configuration for which ditching characteristics are known” as in the previous rule

response

Please refer to the response to comment 22.

AMC 25.563 Structural ditching provisions p. 14

comment

1 comment by: *GGM*

a. - Background: CS 25.563 addresses "*planned ditching*" while CS 25.801 addresses "*planned*" and "*unplanned ditching*". CS 25.563 requires a variation of parameter for "*planned ditching*".
b. - Potential issue: AMC 25.563 Section "*6 Variation of Parameters*" presents the guidance "*The following apply for planned and unplanned ditching evaluations for all aeroplanes*". Guidance for "*unplanned ditching*" within the section "*Variation of Parameters*" of guidance material for CS 25.563 might seem misplaced and could mislead applicants.
c. - Proposal: For clarity, please consider concentrating guidance for "*unplanned ditching*" in AMC 25.801. If deemed appropriate in AMC 25.563, please consider presenting guidance for "*unplanned ditching*" outside Section "*Variation of Parameters*".

response

Partially accepted.

Section 6 of AMC 25.563 has been updated to better distinguish what applies to planned or unplanned ditching.

	Concentrating the guidance on unplanned ditching in AMC 25.801 has been considered, but it has been determined that this would lead to additional confusion.

comment	*2* comment by: *GGM* a. - Background: CS 25.563 addresses "*planned ditching*" while CS 25.801 addresses "*planned*" and "*unplanned ditching*". b. - Potential issue: AMC 25.563 Section "*6 Variation of Parameters*" is presented the guidance "*The following apply for planned and unplanned ditching evaluations for all aeroplanes:*". Bullet (1) states, "*(…)Structural damage need not be considered for unplanned ditching condition*". Bullet (4) states, "*Local damage may occur, but the airframe structural integrity should be maintained. Any leakage should be accounted for in the flotation analysis. Additionally, breakaway or loss of large items (e.g., gear doors, belly fairing, flaps, and engines) and its effect on flotation and hydrodynamic behaviour should be considered.*" These sentences might be misinterpreted as contradicting guidance. c. - Proposal: Please consider rewriting this guidance. For clarity, please consider concentrating guidance for "*unplanned ditching*" in AMC 25.801.
response	Please refer to the response to comment 1 above.

comment	*28* comment by: *AIRBUS* **PAGE / PARAGRAPH / SECTION :** **Page 15,** **AMC 25.563 Structural ditching provisions** **§ 2.6 Ditching (d) & (e)** **PROPOSED TEXT / COMMENT:** **(d) The "Flotation" phase addresses the depth and attitude of the aeroplane in the water over time;** **(e) The "Evacuation" subphase addresses the time it takes to fully evacuate the aeroplane.** **RATIONALE / REASON :** **"Evacuation" takes place during the "Flotation" phase.**
response	Partially accepted. A note has been added after the 5 phases to mention that these phases overlap.

comment	*29* comment by: *AIRBUS* **PAGE / PARAGRAPH / SECTION :** **Page 15,** **§ 2.7 Planned Ditching** **PROPOSED TEXT / COMMENT:**

The last sentence of the definition *"Planned ditching events may also involve reduced power/no power conditions, as defined below."* should be removed.

RATIONALE / REASON :
This sentence is not in the ARAC report, and is misleading because it seems to classify "reduced power/no power ditching cases'' in the planned ditching category, where structural substantiation is required. However, as discussed during Crash & Ditching ARAC (and mentioned in the ARAC report), for the reduced power/no power condition the a/c cannot be reasonably prepared and particularly with regard to impact speed control, therefore the loads experienced by a/c structure cannot be minimized. Reduced power/no power ditching should be without structural substantiation required. Please update the definition of "planned ditching" by removing the sentence, in accordance with the ARAC report recommendations.

response

Accepted.

The sentence was added for clarification of the definition at stake, but apparently introduces some unintended confusion. It is confirmed that no structural substantiation is required for the reduced power or thrust/no power or thrust condition.

comment *30* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
Page 16
§ 2.8 Reduced Power/No Power ditching conditions

PROPOSED TEXT / COMMENT:
"This condition is addressed by AFM procedures (see section 9). For such an event, the applicant may focus on the approach phase of the ditching event (defined above) when showing compliance with ditching certification specifications. The definition of the structural impact loads and the structural capability assessment are not required."

RATIONALE / REASON :
It is in line with the ARAC report.

response

Partially accepted.

Section 2.8 has been updated by adding a sentence at the end stipulating that other ditching phases, as well as the definition of the structural impact loads and the structural capability assessment, need not be considered.

comment *31* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
Page 16
AMC 25.563 Structural ditching provisions

PROPOSED TEXT / COMMENT:
Replace "2.8 Unplanned Ditching" by "2.9 Unplanned Ditching"

RATIONALE / REASON :
Typo correction. Section numbering 2.8 was repeated. It must be changed as "2.9 Unplanned Ditching".

response: Accepted.

comment *32* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.563 Structural ditching provisions
Page 17.
§ 5. Accepted Methods for Developing Ditching Pressures and Loads.
First paragraph, last sentence

PROPOSED TEXT / COMMENT:
The hydrodynamic loads act directly on the lower skins of the fuselage and/or on lower wing structure.

RATIONALE / REASON :
On high wing configuration, the hydrodynamic loads act only on fuselage lower skin whereas on low wing configuration both lower wing and fuselage skins are exposed to these loads.

response: Accepted.

comment *33* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.563 Structural ditching provisions
Page 20
Section 6. Variation of Parameters

PROPOSED TEXT / COMMENT:
Repeated subsection a). The second should be b)

RATIONALE / REASON :
Typo correction

response: Accepted.

comment *34* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.563 Structural ditching provisions
Page 20
Section 6. Variation of Parameters

PROPOSED TEXT / COMMENT:

The objective is to find conditions which show:

a) Smooth (hydro)dynamic behavior (no nose-dive or re-bounce)

b) ~~Accelerations less or equal to the inertia forces specified in CS 25.561(b). Higher load factors may be acceptable provided the structural components are designed for the higher loads and also provided it can be shown that the occupants are protected from serious injury under these loads.~~

b) Accelerations comparable to §25.561(b).

RATIONALE / REASON :
Typo, a) is repeated, should be b).

- **This wording is the ARAC report one.**

This point was discussed in a recent certification project with the EASA, and they agreed to not refer to CS 25.561, but instead to include an indication of the load factors encountered during a planned ditching.

response

Not accepted.

The proposed text is considered adequate and appropriate.

comment

35 comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.563 Structural ditching provisions
Page 21
Section 6. Variation of Parameters (continued)
Paragraphs (1), (2) and (3)

PROPOSED TEXT / COMMENT:
(1) An aeroplane vertical descent rate and a forward aeroplane speed consistent with the optimum conditions defined from a structural aspect that fully accounts for likely variation over the value established under the preferred AFM ditching procedure, and confirmed reasonably achievable by a HQ assessment taking into account the defined AFM ditching procedure.

(2) An aeroplane attitude increased by at least 1 degree (nose up) (compared to the attitude established under the preferred AFM ditching procedure) and, separately, decreased by at least 1 degree (nose down) (compared to the attitude established under the preferred AFM ditching procedure).

(3) To be deleted

RATIONALE / REASON :
The same proposal was made by EASA in a recent certification project and rejected by Airbus. Finally it has been agreed to change these paragraphs as given above.

response

Not accepted.

	The proposed text is considered adequate and appropriate.

comment	*68* comment by: *De Havilland Aircraft of Canada Limited* why introduce new terms.."inadvertent, unplanned, planned" ..harmonizse with own documents as in in "Rules for Air operations"..--> example "(105) 'safe forced landing' means an unavoidable landing or ditching with a reasonable expectancy of no injuries to persons in the aircraft or on the surface;" PROPOSED TEXT 2.5 "Minor Crash" under 25.561 in lieu of "Inadvertent Water Entry"
response	Not accepted. The definitions proposed in the NPA have been the subject of considerable debate within the ARAC TACDWG and are considered adequate and appropriate.

comment	*69* comment by: *De Havilland Aircraft of Canada Limited* Note: spelling "diching" --> "ditching"
response	Accepted.

comment	*70* comment by: *De Havilland Aircraft of Canada Limited* if ditching without life rafts, is it always "unplanned", previously flotation assessment was done under the structural ditching requirements….now that is only done when provision the aircraft with life rafts?? So for occupants leaving the aircraft we have varying rates, at <50 NM, 50-400 NM, life jackets or equivalent flotation device, liferafts >400 NM (ditching requirement only). Why is there a difference between planned and unplanned in terms of evacuation time? A definition for safely leaving the airplane could be added to include: enters raft or leaves aeroplane with a personal floatation device. PROPOSED TEXT 2.3 … "enters raft" to become "safely leaves the aeroplane" and "enters a slide/raft, the water, or steps on the wing" to become "safely leaves the aeroplane"
response	Not accepted. Please refer to the response to comment 67.

comment	*71* comment by: *De Havilland Aircraft of Canada Limited* Inadvertant water entry - overshoot/undershoot is in fact a minor crash as outlined in CS25.561. Unplanned ditching is also a CS25.561 event, except now defined to be in deeper water.

	PROPOSED TEXT 2.5 "Minor Crash" under 25.561 in lieu of "Inadvertent Water Entry"
response	Not accepted. Please refer to the response to comment 68.

comment	*72* comment by: *De Havilland Aircraft of Canada Limited* New terminology of “Planned” and “Unplanned” emergency landings on water are introduced under the definition of ditching. Typically, these events have been referred to as "Ditching" and "Forced Landing on Water" in the past. It is believed there is no safety advantage to creating new terminology when weighed against the potential confusion introduced by use of differing terms. Replace the terminology Planned and Unplanned with: "An emergency landing on water, either pre-planned or as a result of a forced landing,"
response	Not accepted. The terms and the definitions proposed in the NPA have been the subject of considerable debate within the ARAC TACDWG and are considered adequate and appropriate.

comment	*73* comment by: *De Havilland Aircraft of Canada Limited* New terminology of "Reduced Power" and "No Power" have been introduced. In the context of "Planned Ditching", the following comments are provided: a) The term "reduced power" is ambigous as to the intended impact upon the aircraft ditching event. It is believed the primary intent is to describe a situation where there is insufficient power/thrust to control rate of descent during the approach phase of the event. In this condition, there is no longer absolute control of the approach phase of the ditching or impact point and as a result the event has become a sub-case of a "forced landing"; b) Typically, loss of propulsive power is described as "All Engines Inoperative". It is believed there is no safety advantage in creating new terminology when weighed against the potential confusion introduced by use of differing terms. Again, in this condition, there is no longer absolute control of the approach phase of the ditching or impact point and as a result the event has become a sub-case of a "forced landing". Replace last sentence with the following: "Ditching events may also involve an emergency landing on water under conditions of insufficient engine power/thrust to control rate of descent or with all engines inoperative (Forced Landing)."
response	Not accepted.

The terms and the definitions proposed in the NPA have been the subject of considerable debate within the ARAC TACDWG and are considered adequate and appropriate.

comment *74* comment by: *De Havilland Aircraft of Canada Limited*

a) The term "power" may not be appropriate for non turbo-propeller aircraft which typically use the term "thrust" to describe engine propulsive output;
b) The term "power" may also be ambiguous when considering aircraft systems dependant upon the engine operation and could refer to not only propulsion system output but also electrical power or hydraulic power for operation of flight controls and high lift devices. It is believed the proposed “Reduced Power” case is meant to cater to a situation where at least one engine is operating but not able to produce sufficient power/thrust to control rate of descent. Full availability of hydraulic and electrical power to operate flight controls and flaps would remain. Likewise, the “No Power” case is meant to reflect the all engine inoperative situation with the resulting partial or full loss of dependant systems. Clarification of the assumptions behind the "Reduced Power" and "No Power" design cases is required.

Combine this section with Para 2.8 with the following title:
"Forced Landing on Water"

Add additional language to define the operating state associated with the new “Reduced Power” condition:
i. “Insufficient power or thrust available to control aircraft rate of descent during the approach phase of the diching event”; and
ii. “Normal hydraulic and electrical system power remains available to operate flight control systems and high lift devices”.

Add additional language to define the operating state associated with the new “No Power” condition:
i. “All engines are inoperative and providing either zero thrust/power or "windmill drag" as appropriate to aircraft type and ditching configuration; and
ii. “Normal engine-derived hydraulic and electrical system power are unavailable to operate flight control systems and high lift devices” unless emergency power sources are available and addressed by AFM procedures.

response Partially accepted.

The term ‘thrust’ has been added as proposed; however, the two proposed definitions are not added as they are not deemed necessary. The terms and the definitions proposed in the NPA have been the subject of considerable debate within the ARAC TACDWG and are considered adequate and appropriate.

comment *75* comment by: *De Havilland Aircraft of Canada Limited*

There are two paragraphs numbered Para 2.8: "2.8 Reduced Power/No Power condition ditching conditions" on Page 15 and " 2.8 Unplanned Ditching" on Page 16.

	PROPOSED TEXT: 2.9 Unplanned Ditching on Page 16.
response	Accepted. The numbering has been corrected.

comment	*76* comment by: *De Havilland Aircraft of Canada Limited* New terminology “unplanned ditching” is introduced. Typically, this event has been referred to as a "forced landing on water" in the past. It is believed there is no safety advantage to creating new terminology when weighed against the potential confusion introduced by use of differing terms. Replace title with the following: "Forced Landing on Water"
response	Not accepted. The terms and the definitions proposed in the NPA have been the subject of considerable debate within the ARAC TACDWG and are considered adequate and appropriate.

comment	*77* comment by: *De Havilland Aircraft of Canada Limited* Under proposed changes, the aircraft DAH not requesting ditching certification will only have to meet CS25.807(i) and CS25.801(a). It would seem that this lowers the design requirement threshold of that class of aircraft wrt to CS25.563 over the currently published rules. Items related to the currently written sections, CS25.801(e) and by reference back to CS25.801(c) & CS25.801(d) will no longer be required. Was this the intent to ease the certification burden on this class of aircraft? Under 3 General after Item 4, incude the following: Under proposed changes, the aircraft DAH not requesting ditching certification will only have to meet CS25.807(i) and CS25.801(a). Items related to the currently written sections, CS25.801(e) and by reference back to CS25.801(c) & CS25.801(d) will no longer be required.
response	Not accepted. The proposed changes to CS 25.801 are meant to clarify the specifications applicable to planned and unplanned ditching, but they do not introduce a lowering of the standards relative to the current practices. CS 25.801(a) (new) provides the objective to be demonstrated: following an unplanned ditching, the flotation time and trim of the aeroplane will allow the occupants to leave the aeroplane. This applies to all aeroplanes whether or not ditching certification is requested. AMC 25.801, paragraph 1 provides acceptable means of compliance with CS 25.801(a).

	The amended CS 25.801 and corresponding AMC will cover the intention of the previous specifications.

comment	*78* comment by: *De Havilland Aircraft of Canada Limited* It suggests that planned ditching is at MLW as it is for unplanned..inadvertent is at MTOW at worst… Correct the numbering in Item (6) - there are two item (a). Decent rate of 5 fps should allow for rational analysis for lower decent rate.
response	Partially accepted. Assuming MLW for planned ditching and MTOW for unplanned ditching is considered appropriate. The proposed text of the NPA in Section 6 already allows for a lower value of descent rate than 5 fps if properly justified. The numbering has been corrected.

comment	*79* comment by: *De Havilland Aircraft of Canada Limited* a) In alignment with the changes introduced in Sect 2.7 and 2.8 above, recommendations to provide separate procedures for planned Emergency Landing on water and Reduced Power/No Power Condition emergency landing on water have been specified in the draft AMC. To align with our previous comments made against Para 2.6, 2.7 and 2.8 regarding introduction of new terminology to describe emergency landing on water events, we believe AFM procedures should continue to reflect "Planned Ditching" and "Forced Landing on Water" events. Reduced Power (insufficient power or thrust available to control aircraft rate of descent) or No Power (all engines inoperative) conditions should be considered as sub-procedures under Forced Landing on Water. Replace the second sentence with the following: For ditching, the AFM should include, as a minimum, procedures for a planned emergency landing on the water and procedures for a forced emergency landing on water with insufficient power or thrust to control rate of descent or all engines inoperative."
response	Not accepted. The terms and the definitions proposed in the NPA have been the subject of considerable debate within the ARAC TACDWG and are considered adequate and appropriate.

comment	*99* comment by: *Dassault-Aviation* AMC 25.563 §2.7 page 15

Text: ..."Planned ditching events may also involve reduced power/no power conditions, as defined below"

Comment: Sentence confusing. Planned emergency landing on water ("planned ditching") and reduced power or no power emergency landing on the water are different events leading to different substantiation activities, and to different AFM procedures as indicated in section §9 of the AMC.
From what Dassault understands:
-- Planned emergency landing on water is conducted according to an AFM procedure defining optimum ditching conditions, aircraft powered (all engines operative), and in coherence with conditions used to demonstrate structural integrity and associated variation of parameters as per the revised CS 25.563 and associated new AMC. This AFM procedure should be verified for practicality and effectiveness as required by AMC 25.1309 Chapter 9, paragraph b.(5).
-- Reduced Power / No Power emergency landing on water is conducted according to an AFM procedure which should be verified for practicality and effectiveness as required by AMC 25.1309 Chapter 9, paragraph b.(5) and CS 25.671(d) and associated AMC. No structural substantiations apply.
Therefore these two events should be dissociated.
The revised CS 25.563 and new AMC 25.563 about structural ditching provisions cover by definition the planned emergency landing on water (as indicated in the content of the CS 25.563).
Reduced Power / No Power emergency landing on water is not relevant in the new AMC 25.563. It already exists in CS 25.671(d) and associated AMC as revised in CS 25 amendment 24 and therefore should be kept out of CS/AMC 25.563.
In addition, ARAC Working Group on Crash and Ditching has recommended to clearly separate Reduced Power/No Power conditions and associated requested demonstrations from planned ditching conditions.

Proposal: Remove references to Reduced Power/No Power conditions from the revised CS 25.563 and new AMC 25.563

response

Not accepted.

Completely removing the reduced power or thrust/no power or thrust condition from AMC 25.563 is not considered appropriate as this condition is part of the set of definitions of possible ditching events. However, the commented sentence is removed from section 2.7 to avoid any confusion.

comment *100* comment by: *Dassault-Aviation*

§2.8 page 15/16

Comment:
"2.8 Reduced Power/No Power condition ditching conditions"

Section about reduced power/no power ditching conditions not relevant in the new AMC 25.563. Refer to comment #2

Proposal:

	refer to proposal of comment 99
response	Not accepted. Please refer to the response to comment 99.

comment	*101* comment by: *Dassault-Aviation* §4 page 17 Text:..."Consequently, applicable fleet history may also be used by the applicant to supplement test and simulation data if acceptable to EASA." Comment: The proposed AMC does not provide clarification on what makes the use of the applicable fleet history "acceptable to EASA". Proposal: Clarify what makes the use of applicable fleet history, in service experience, or comparison with airplanes of similar configuration for which ditching characteristics are known, "acceptable to EASA" in this AMC
response	Noted. Applicable fleet history may, for example, include the evaluation of successful ditching events of similar aeroplane(s). Defining further guidance is not considered appropriate. It is expected that the applicant makes a proposal for EASA review.

comment	*102* comment by: *Dassault-Aviation* §6 page 21 Text: "The following apply for planned and unplanned ditching evaluation for all aeroplanes: (…) (4) Withstanding ditching loads implies an airframe assessment that needs to account for local loads (skin, stringers) and load factors for the fuselage and establish distributed pressures. Local damage may occur but the airframe structural integrity should be maintained. Any leakage should be accounted for in the flotation analysis. Additionally, breakaway or loss of large items (e.g. gear doors, belly fairing, flaps, and engines) and its effect on flotation and hydrodynamic behaviour should be considered. Comment: Part of the subparagraph (4) about structural withstanding capabilities does not apply to unplanned ditching substantiations. Proposal: Clarify/separate what is applicable to the planned ditching evaluation and what is applicable to the unplanned ditching evaluation in each subparagraph
response	Accepted.

A sentence has been created as a fourth bullet point to specify that any leakage should be accounted for in the flotation analysis.

The NPA bullet points (4) and (5) are renumbered, and for these items the statement 'For planned ditching' has been added.

comment *103* comment by: *Dassault-Aviation*

§6 page 21

Text: "Variation of Parameters
(…)
The following apply for the assessment of the variation of parameters:
(…)
(2) A forward aeroplane speed along the flight path not less than VREF (as defined in CS 25.125(b)(2)(i)) established for the aeroplane assessment weight and corresponding to the flap setting established under the preferred AFM ditching procedure, unless a lower value is justified that fully accounts for likely variation over the value established under the preferred AFM ditching procedure. "

Comment: Unclear if subparagraph (2) must be applied to the approach phase (2.6(a)) or the impact phase (2.6(b)).
In case it relates to the impact phase, it is not relevant to take VREF /CS 25 125(b)(2)(i) as the reference. Ditching (i.e. emergency landing on water) is a very specific situation. Main objectives are to impact water with the aircraft in the appropriate attitude and the lowest energy possible in order to maximize airframe structural integrity and ditching survivability. It is very likely that instead of VREF , lower speeds will be considered, each time requiring discussions between EASA and applicants.

Proposal: Clarify the scope of applicability of subparagraph (2).
Modify reference to VREF in case it is the reference for the forward speed at the impact phase

response Not accepted.

The variation of parameters addressed in Section 6 of AMC 25.563 is related to the impact phase. The reference to VREF is considered appropriate, and the proposed text already allows for a lower value of forward aeroplane speed if properly substantiated.

comment *104* comment by: *Dassault-Aviation*

§9 page 22

Comment: Part of the section about AFM procedures dealing with reduced power/no power emergency landing on water is not relevant in the new AMC 25.563. Redundant with existing section §8 of AMC to CS 25.671(d) EVALUATION OF ALL-ENGINES-FAILED CONDITION — CS 25.671(d)) already asking applicants to define AFM procedures for such events.

Refer to comment #2

Proposal: Remove references to Reduced Power/No Power conditions from the revised CS 25.563 and new AMC 25.563

response Not accepted.

Please refer to the response to comment 99.

AMC 25.801 Ditching p. 22

comment *23* comment by: *Airbus DS*

In AMC 25.801(a), new text added (in **bold** underlined):

"(1) In order to simplify compliance determinations for an unplanned ditching scenario, no aeroplane damage should be considered **and water should be considered calm (flat surface)**. As such, the dynamics of entry into the water should not be considered, including analysis of dynamic pressures resulting from the aeroplane coming to rest; it may be assumed that the aeroplane is resting in the water immediately after an unplanned ditching."

The reason is that the state of see (or water surface in general) is a parameter difficult to manage. Flat surface has been used by default up to now, so making explicit mention would be for clarification purposes. This is in line with page 21 paragraph (2) of AMC 25.563 about planned and unplanned ditching evaluation for all aeroplanes. Airbus DS consider that calm water assumption should appear not only in AMC 25.563 but also in AMC 25.801.

response Accepted.

comment *36* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
Page 23
Section 1. CS 25.801(a) – Evacuation after an unplanned ditching
Paragraphs (5) and (7)

PROPOSED TEXT / COMMENT:
It is to be clarified if the AMC only applies to the calm sea scenario with all exits usable only.

RATIONALE / REASON :
The guidance proposed by EASA on ditching should clarify the scenario (calm sea scenario with all exits usable only or if it is valid for the severe case / rough sea with exits on one side only available and loss of the biggest raft); The cross-reference to the FAA AC 25-17A does not help clarifying the EASA position on the matter.

Accepted.

Section 1, Paragraph (1) has been amended to mention that the applicant may assume calm water states.

comment *37* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.801 Ditching
Page 25
Paragraph 3. CS 25.801(d) - Flotation time and trim of the aeroplane

PROPOSED TEXT / COMMENT:
3. CS 25.801~~(d)~~(b)(3) - Flotation time and trim of the aeroplane

EASA accepts the relevant parts of Federal Aviation Administration (FAA) AC 25-17A 'Transport Airplane Cabin Interiors Crashworthiness Handbook', of 24 May 2016, as an acceptable means of compliance with CS 25.801~~(d)~~(b)(3).
Note: 'relevant parts' means the AC 25-17A parts that address the applicable Federal Aviation Regulation (FAR)/CS-25 paragraph(s).

RATIONALE / REASON :
CS25.801(d) is now replaced by CS25.801(b)(3). However the proposed AMC still refers to 25.801(d).

response Partially accepted.

The comment is valid; however, this section has been deleted because the reference to FAA AC 25-17A is not required anymore.

comment *80* comment by: *De Havilland Aircraft of Canada Limited*

Why 1.5 time as long as the 10 seconds as demonstrated by 25.809(b2)

PROPOSED TEXT
(9) For the purposes of preparing an evacuation timeline, the longest full-scale evacuation demonstration (FSED) exit preparation time for an exit of that type, for that aeroplane as deomnstrated under 25.809(2), should be assumed prior to the initial occupant evacuation from the aeroplane.

response Not accepted.

It is assumed that the preparation and opening of an exit requires more time in a ditching scenario than in the case of an emergency evacuation on land.

comment *107* comment by: *Heart Aerospace AB*

The proposed AMC 5.801 Ditching, 1. CS 25.801(a) – Evacuation after an unplanned ditching states that:

(4) Since not all aeroplanes are required to carry ditching equipment associated with overwater flights, it is not necessary to account for the time to retrieve and launch rafts.

And

(8) For non-overwing ditching exits, it is acceptable to assume that passengers will exit the aeroplane by entering slide/raft (if provided), or by jumping into the water and swimming away from the exit. For the overwing exits, it is acceptable to assume that passengers will exit onto the wing and, depending on the circumstances, either remain on the wing or jump into the water. No credit should be taken for aeroplane weight reduction resulting from evacuees exiting the aeroplane through overwing exits.

Heart would like to clarify if, following (4), we do not need to consider launch rafts for unplanned ditching. On the other hand, (8) states that a raft (if provided) must be considered during evacuation time. If raft is installed do we have to consider the time for the passenger to operate and enter in it?

response

Noted.

Section (4) refers to raft that has to be launched and inflated. Section (8) refers to slide/raft that is a slide able to also be used as a raft in case of ditching.

comment

109 comment by: *Embraer S.A.*

Embraer S.A. is pleased to offer comments on NPA 2022-07, about "Regular update of CS-25".

Page 23 - Item (6)

The NPA has proposed to extend flotation time even if a ditching exit goes below the waterline.
A showing of conservatism should include an assessment of the number of persons expected to be remaining in the aeroplane when the ditching exit sill(s) goes below the waterline, the number of ditching exits remaining above the waterline and the attitude of the aeroplane.

Regarding the number of persons expected to be remaining in the aeroplane when the ditching exit sill(s) goes below the waterline, what would be an acceptable number? Not more than 20%? 30%?
Regarding the number of exits remaining above the waterline, what would be an acceptable number? majority?

response

Partially accepted.

EASA does not consider it appropriate to provide specific numbers on this topic. The response to these questions depends on the design under consideration.

However, a note has been added at the end of paragraph 1.(6) of AMC 25.801 to specify that if it can be shown to still be conservative, an exit may qualify as a ditching

exit if it does not remain above the waterline for the full duration of the evacuation. The substantiation of conservatism should include an assessment of how long the ditching exit remains above the waterline, the number of persons expected to be remaining in the aeroplane when the ditching exit(s) sill goes (go) below the waterline and the number of other ditching exits remaining above the waterline.

Please note that in any case the 'flotation analysis' will have to show that all occupants can evacuate the aeroplane safely after a ditching.

comment *110* comment by: *Embraer S.A.*

Page 23 - Item (7)

The NPA has proposed to extend flotation time even if a ditching exit goes below the waterline. A lower passenger seat-to-exit ratio may be sought provided the exit remains above the waterline for the majority (greater than 50%) of the total aeroplane evacuation time.

Requiring clarification if passengers are allowed to use the ditching exit that goes below the waterline even provided the exit remains above the waterline for the majority (greater than 50%) of the total aeroplane evacuation time for the assessment of lower passenger seat-to-exit ratio. In addition, an example would be helpful to understand an acceptable assessment to use lower passenger seat-to-exit ratio.

response Please refer to the response to comment 109.

comment *111* comment by: *Embraer S.A.*

Page 25 - Item (8)

The NPA has proposed for the purposes of preparing an evacuation timeline, evacuation rates obtained from the aeroplane FSED are acceptable for preparing a ditching evacuation analysis if the evacuees exit in the same or similar manner as the FSED and the assist means (if deployed) does not block the emergency exit opening.

Requiring clarification if evacuation timeline is required considering the loss of the largest rated raft is assumed according to the § 25.1411 (b)(1).

response Noted.

From a conservative approach, the loss of the largest rated raft needs to be considered.

Note: we understand that you intended to refer to CS 25.1415(b)(1).

CS 25.1302 Installed systems and equipment for use by the flight crew p. 27

comment *38* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
CS 25.1302
Page 27
Paragraph (d)

PROPOSED TEXT / COMMENT:
Re-instate “To the extent practicable” in paragraph CS 25.1302 (d).

RATIONALE / REASON :
"(d) The installed systems and equipment must enable the flight crew to manage the errors that result from the kinds of flight crew interactions with the systems and equipment that can be reasonably expected in service, assuming the flight crew acts acts in good faith."

Compared to the current CS 25.1302 (d) amdt 27, the heading condition of the paragraph has been removed: “**To the extent practicable**” whereas this is an important aspect in the safety objective definition.
The ARAC, Human Factors— Harmonization Working Group (HFHWG) Final Report, dated June 15, 2004 stipulates that this flexibility provision is intended to address both economic and operational practicability. The intent is to avoid imposing requirements without considering the economic feasibility and commensurate safety benefit. In addition, it is intended to address operational practicability, i.e., to avoid introducing error management features into the design that would inappropriately impede flight crew actions or decisions in normal and non-normal conditions.
The management of crew errors cannot always be exhaustively demonstrated and the safety objective, as set in 25.1302(c), is to minimize crew errors. This minimization aspect has to be reflected in 1302(d) by re-introducing at least the “To the extent practicable” in the text.

response

Not accepted.

The term ‘To the extent practicable’ has been removed because this statement is ambiguous and criteria are missing for its applicability. The extent of the requested investigation is anyway limited to the HF errors that can be ‘reasonably’ expected in service. GM1 25.1302 provides additional clarifications regarding the interpretation of ‘reasonably’.

Please note that the deletion of ‘To the extent practicable’ does not have an impact on the EASA expectation regarding the demonstration of compliance with this subparagraph.

comment *82* comment by: *De Havilland Aircraft of Canada Limited*

These changes appear to be editorial in nature with no impact on the practical application of the regulation. They do however result in the wording of the regulation diverging from that of FAR 25.1302.

Propose to keep the existing wording.

response

Not accepted.

Most of the changes are intended to provide additional guidance, specifically about the methodological aspects of the demonstration of compliance with CS 25.1302. Some of them will necessarily impact the practical application of the regulation.

comment

83 comment by: *De Havilland Aircraft of Canada Limited*

The qualifier "To the extent practicable" has been deleted from the existing requirement.

“To the extent possible, the installed systems and equipment must enable the flight crew to manage
the errors that resulting from the kinds of flight crew interactions with the systems and equipment
that can be reasonably expected in service.”

This could be interpreted as broadening the required scope of protections to be designed into a system to address or prevent crew errors.
Additionally, it is now inconsistent with FAR 25.1302(d) and the objective of rule harmonization.

Propose to keep the existing wording.

response

Not accepted.

The term ‘To the extent practicable’ has been removed because this statement is ambiguous and criteria are missing for its applicability. The extent of the requested investigation is anyway limited to the HF errors that can be ‘reasonably’ expected in service. GM1 25.1302 provides additional clarifications regarding the interpretation of ‘reasonably’.

Please note that the deletion of ‘To the extent practicable’ does not have an impact on the EASA expectation regarding the demonstration of compliance with this subparagraph.

comment

112 comment by: *Embraer S.A.*

Page 27 - letter (a)

It is not clear the reason for excluding “Flight deck” from letter (a). The first paragraph clearly states that this requirement “applies to installed system and equipment intended to be used by the flight crew members when operating the aeroplane from their normally seated positions in the flight deck.” The words “flight deck” in letter (a) might be redundant, but they are already written in the requirement and surely reinforces that controls and information mentioned are limited to the flight deck.
Also, it is not clear the reason for the word “intended” in the phase “… intended necessary for the accomplishment…”. This word might be interpreted as the controls

	and information designed by the manufactures for the accomplishment of flight crew tasks may be judged as not necessary or not sufficient by the certification authorities. The suggestion is to do not exclude “Flight deck” and do not include “intended” in regulation (a), such that the final text is: “(a) Flight deck controls and information necessary for the accomplishment of the tasks must be provided.”
response	Partially accepted. The term ‘Flight deck’ was purposely removed in order to provide a CS that is adapted to potential future situations where part of the controls and/or information may be located outside the flight deck. The word ‘intended’ has nevertheless been removed and the associated text improved.

comment	*113* comment by: *Embraer S.A.* Page 27 - letter (b) It is not clear the reason for excluding “Flight deck” from letter (b). The first paragraph clearly states that this requirement “applies to installed system and equipment intended to be used by the flight crew members when operating the aeroplane from their normally seated positions in the flight deck.” The words “flight deck” in letter (b) might be redundant, but they are already written in the requirement and surely reinforces that controls and information mentioned are limited to the flight deck. The suggestion is to do not exclude “Flight deck” from regulation (b), such that the final text is: “(b) Flight deck controls and information required by paragraph (a), which are intended for use by the flight crew, must:”
response	Not accepted. Please refer to the response to comment 112 above.

comment	*114* comment by: *Embraer S.A.* Page 27 - letter (b)(2) It is not clear the reason for removing the word “consistent” and replacing it by “appropriate”. Consistent has a defined meaning in the AMC, while appropriate is subjective to interpretation. The suggestion is to do not exclude “consistent with” and do not include “appropriate to” in regulation (b)(2), such that the final text is: “(2) Be accessible and usable by the flight crew in a manner consistent with the urgency, frequency, and duration of their tasks; and”

response

Not accepted.

The word 'consistent' has been removed because it was not deemed fully appropriate. It is frequently used in CS-25 with a different meaning as intended in CS 25.1302 (consistency as a design criteria). It was therefore decided to replace it by the word 'appropriate' to avoid any misinterpretation.

comment

115 comment by: *Embraer S.A.*

Page 27 - letter (b)(3)

It is not clear the reason for removing the word "Enable" and replacing it by "Make the". Flight crew awareness depend on several factors besides the design. The design must provide means to enable flight crew awareness, but not replace flight crew's ultimate responsibility in obtaining the awareness.

The suggestion is to do not exclude "Enable" and do not include "Make the" in regulation (b)(3), such that the final text is:
"(3) Enable flight crew awareness of the effects their actions may have on the aeroplane or its systems, if they require awareness for the safe operation of the aeroplane."

response

Not accepted.

The word 'awareness' in that specific context does not refer to the concept of situation awareness. EASA would tend to agree that situation awareness can be allowed by multiple sources, including the design items. However, this paragraph requires that the design makes the crews aware of the effect of their actions, which is different from general considerations on situation awareness. The proposed wording is confirmed to reflect the actual EASA intent.

comment

116 comment by: *Embraer S.A.*

Page 27 - letter (d)

It is not clear the reason for removing the term "To the extent practicable". The AMC still recognizes the need for avoiding "imposing requirements without considering their economic feasibility or the commensurate safety benefits", as per GM1 section 2 item (c)(10)(iv) on page 78. However, removing this term from the requirement and maintaining its explanation only on the Guidance Material is, in practical terms, removing this need from the regulation.

The suggestion is to do not exclude the term "To the extent practicable" from regulation (d), such that the final text is:
"To the extent practicable, the installed systems and equipment must enable the flight crew to manage the errors that result from the kinds of flight crew interactions with the systems and equipment that can be reasonably expected in service, assuming the flight crew acts in good faith."

response	Not accepted. The term 'To the extent practicable' has been removed because this statement is ambiguous and criteria are missing for its applicability. The extent of the requested investigation is anyway limited to the HF errors that can be 'reasonably' expected in service. GM1 25.1302 provides additional clarifications regarding the interpretation of 'reasonably'. Please note that the deletion of 'To the extent practicable' does not have an impact on the EASA expectation regarding the demonstration of compliance with this subparagraph.

AMC 25.1302 Installed systems and equipment for use by the flight crew p. 28

comment	*6* comment by: *DGAC FR (Mireille Chabroux)* Could EASA confirm if/which newly-introduced requirements from AMC 1302 will also be cascaded into CS-23?
response	Noted. Since Amdt 5, CS-23 includes a Subpart G on 'Flight crew interface and other information'. EASA will investigate if there is a need to introduce elements from CS/AMC 25.1302 in CS-23 and/or the related ASTM standards.

comment	*7* comment by: *DGAC FR (Mireille Chabroux)* 1- The use of "/malfunction" throughout the proposed NPA is not deemed as necessary (wouldn't a malfunction condition requiring to apply procedures different from the normal procedures also be an abnormal condition) and potentially confusing. Proposal to solely state "Abnormal condition" **Proposal** "1.3_Definitions For the purposes of this AMC, the following definitions apply: — Abnormal/malfunction condition: For the purposes of this AMC, abnormal~~/malfunction~~ or emergency operating conditions" 2-DGAC-FR would like to know the rationale for removing the "non-normal" aspect of the condition which is stated in the CS 25-1322 definition for "Alert". It is recommend to harmonize wordings to avoid misinterpretation?
response	Noted.

1. EASA tends to agree with the comment. However, a general harmonization at CS level is needed (CS 25.1302, 1309, 1322, 1329). Therefore, the comment will not be addressed in the context of this regular update.

2. The term 'Non-normal' has been reintroduced in the definition of Alert so that the definition is harmonised with the CS 25.1322.

comment *8* comment by: *DGAC FR (Mireille Chabroux)*

In the table, DGAC-FR suggests to modify as follow:

CS 25.1321 Arrangement and Visibility of instruments Integration, 4.6.
rationale:Arrangement aspect is very relevant for crew error aspects

CS 25.1322 Warning, caution and advisory alerts ~~lights~~ Integration, 4.6., 4.5-b
rationale:4.5-b refers significantly to alerts

CS 25.1329 and Appendix B VII ~~Automatic pilot~~ Autopilot, Flight director and Autothrust systems System behaviour, 4.4.
~~CS 25.1335 Flight director systems System behaviour~~

"autopilot, flight director and autothrust system" could also be replaced by "Flight guidance system"

(it could be checked in Appendix 1 (Related regulatory material and documents) where it is correctly stated)

response Partially accepted.
Corrections have been made to better reflect the titles of the references.

comment *9* comment by: *DGAC FR (Mireille Chabroux)*

3.2.2_The intended function of the equipment and the associated flight crew tasks

(c) The applicant should describe the intended function(s) and associated task(s) for: (1) each design item affected by the modification and its integration;

This statement should also be valid for an initial design certification, hence proposal to reword as follows:

"each design item and its integration"

4.3_The presentation of information

1) The presentation of information to the flight crew can be visual (for instance, on a display), auditory (a 'talking' checklist), or tactile (for example, control feel). The presentation of information in the integrated flight deck, regardless of the medium

used, should meet all of the requirements bulleted above. For visual displays, this AMC addresses mainly display format issues and not display hardware characteristics. The following provides design considerations for the requirements found in CS 25.1301(a), CS 25.1301(b), CS 25.1302, and CS 25.1543(b).

It is proposed to add, at the end of the paragraoph above, the following sentence : "AMC 25-11 contains specific guidance for the presentation of information on Electronic Flight Deck displays."

(...)

(d) Colour (CS 25.1302) (1) The use of many different colours to convey meaning on displays should be avoided. However, if thoughtfully used, colour can be very effective in minimising the workload and response time associated with display interpretation. Colour can be used to group functions or data types in a logical way. A consistent ~~common~~ colour philosophy across the flight deck is desirable.

5.3.2_ Representativeness of the test article Means of compliance MC4, MC5, MC6 and MC8 require the use of a test article (benches, mock-ups, the actual aeroplane, or a simulator). As explained in paragraph 3.3.1, in order to ~~the~~ achieve

response

Partially accepted.

1. 'affected by the modification' has been deleted.

2. AMC 25-11 is already quoted and referenced in 4.3(d)(4) and in Appendix 1. It is not deemed necessary to duplicate the reference in 4.3(a)(1).

3. 'Common' has been replaced by 'consistent' colour philosophy.

4. The typographical error has been corrected.

comment

39 comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.1302
Page 29
Paragraph 1.2. Applicability

PROPOSED TEXT / COMMENT:
Re-instate the applicability : "It applies to those aeroplane and equipment design considerations within the scope of CS-25 for type certificate and supplemental type certificate (STC) projects."
Or clarify why it has been removed.

RATIONALE / REASON :
Compared to the current AMC 25.1302 amdt 27, the following sentence has been removed: "It applies to those aeroplane and equipment design considerations within the scope of CS-25 for type certificate and supplemental type certificate (STC) projects."
This paragraph clearly specifies the scope, that is no more the case in this NPA.

response | Not accepted.

This sentence was removed as the applicability of CS and AMC is addressed by Part 21 (Annex I to Regulation (EU) No 748/2012) and is therefore not relevant in this AMC.

comment | *40* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.1302
Page 29
Paragraph 1.3. Definitions

PROPOSED TEXT / COMMENT:
For the definition of “Alert”, please re-use AMC-25.1322 Appendix 5 definition of "Alert" or refer to it.

RATIONALE / REASON :
"Alert: A flight deck indication that is meant to attract the attention of the crew, and identify to them an operational or aeroplane system condition. Warnings, cautions, and advisories are considered alerts."

The definition of "Alert" provided in this section differs from the definition provided in CS-25 AMC-25.1322 Appendix 5 Definitions: "Alert: A generic term used to describe a flight deck indication meant to attract the attention of and identify to the flight crew a **non-normal** operational or aeroplane system condition. Alerts are classified at levels or categories corresponding to Warning, Caution, and Advisory. Alert indications also include non-normal range markings (for example, exceedances on instruments and gauges.)"
Only one definition should be provided.

response | Accepted.

comment | *41* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.1302
Pages 32-33
Paragraph 2.1
Table 1

PROPOSED TEXT / COMMENT:
Refine the list of specifications, in accordance with CS-25 context.

RATIONALE / REASON :
Table 1 contains a list of specifications related to flight deck design and flight crew interfaces for which this AMC provides additional design guidance. Table 1 content differs from the current CS-25 amdt 27, with new and removed references (e.g. 25.771(c), 25.777(c), 25.1303, Appendix D).

response | Accepted.

comment | *42* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.1302
Page 34
Paragraph 3.1
Figure 1

PROPOSED TEXT / COMMENT:
"ANALYSE":
Replace "Cockpit and Cabin controls information and system behaviour that involve crew member interaction" by : "Flight deck controls, information and system behaviour that involve flight crew member interaction".

RATIONALE / REASON :
"ANALYSE":
Only flight deck should be considered.

response | Accepted.

comment | *43* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.1302
Page 37
Paragraph 3.2.5 (b)

PROPOSED TEXT / COMMENT:
Clarify the use of the compliance matrix.

RATIONALE / REASON :
"(b) The expected output of this step is a compliance matrix that links the design items and the HF design requirements that are deemed to be relevant and applicable so that [...]. GM2 25.1302 provides one possible example of this matrix."

Link with GM2 25.1302 Examples of compliance matrices (Pages 78-83).

This paragraph, located between "§3.2.4 Determining the level of scrutiny" and "§3.2.6 Selecting the appropriate means of compliance", mixes different steps. The kind of information provided in GM2 25.1302 is not available in this early step. The applicant can provide the link between the design items and the HF design requirements, but providing detailed assessment objectives is not possible at this step, and is not necessary to define the appropriate means of compliance. The applicant can provide assessment objectives at a later step.

response | Not accepted.

The demonstration of compliance with CS 25.1302 requires an iterative process, and the compliance matrix is a living document that can be updated once the required information is available.

comment *44* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.1302
Page 39
Paragraph 3.3.2 (a)

PROPOSED TEXT / COMMENT:
Replace the sentence:
"(a) The scenario-based approach [...] is based on a methodology that involves a sample of various flight crew members that are representative of the **future users**, being exposed to **real** operational conditions in a test bench or a simulator, or in the aeroplane."
by:
"(a) The scenario-based approach [...] is based on a methodology that involves a sample of various flight crew members that are representative of the **end-users**, being exposed to **representative** operational conditions in a test bench or a simulator, or in the aeroplane."

RATIONALE / REASON :
During the scenario-based approach in a test bench or a simulator, the applicant should be able to expose flight crew members that are representative of the end-users, to operational conditions that are as representative as possible.

response Partially accepted.

'End user' is considered as equivalent to 'future user', therefore no modification is made.

'Representative' instead of 'real' operational conditions is accepted.

comment *45* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.1302
Page 41
Paragraph 3.3.2 (j)(2)

PROPOSED TEXT / COMMENT:
"(j)(2) The HF assessment should be **systematically** video recorded (both ambient camera and displays). Records **may be used** by the applicant as a complementary observation means, and by the authority for **verification purposes, when required**."

Clarify this paragraph, in particular:
- Could EASA confirm that a video recording of the HF assessment is not mandatory?
- What are the verification purposes for which EASA may request the access to

records, when and where (e.g. in applicant facilities)?
- What if a selected crew refuses to be recorded?
- How EASA consider the General Data Protection Regulation (GDPR) for these records?

RATIONALE / REASON :
The current CS 25.1302 does not require the use of video.
The primary mean for collecting data remains a direct human observation.
A flight crew member may refuse to be recorded.
A systematic video recording would create a huge amount of unnecessary data to be stored for a potential future use.

response

Partially accepted.

The video recording cannot be made mandatory by the AMC. However, should the video recording not be used, the quality of data collection should be such that the applicant can demonstrate that the data collected by the observers is exhaustive and that no complementary means is needed.

Please note that in any case the video recording may be needed if EASA questions the comprehensiveness and the quality of the data collection, and also in case a specific event requires to be double checked.

However, EASA agrees to remove the term 'systematically'.

Should a crew member refuse to be video recorded, he or she should be excluded from the assessment.

Regarding the GDPR, it is acknowledged that there are several possible GDPR legal bases that must be complied with when using the video recording. The video recording may be anonymised before transmission to EASA to facilitate the compliance with the applicable regulations.

comment

46 comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
AMC 25.1302
Page 55
Paragraph 4.5 (a) (4)

PROPOSED TEXT / COMMENT:
Clarify the paragraph:
"When demonstrating compliance, the applicant should consider the flight crew' tasks in **all** operating conditions [...]"
In particular, could EASA confirm that "all operating conditions" means "normal, non-normal and abnormal operating conditions"?

RATIONALE / REASON :
Whereas AMC 25.1302 Amdt 27 deals with "normal and non-normal conditions", this paragraph considers "all operating conditions".

response	Not accepted. The clarification is provided in the sentence right after the quoted one, with the reference to 'abnormal/malfunction or emergency conditions'.

comment	*49* comment by: *Dassault-Aviation* §1.2(b) Applicability - §1.2(b) This AMC applies to flight crew interfaces and system behaviour for all the installed systems and equipment used by the flight crew while operating the aeroplane in normal, abnormal/malfunction and emergency conditions. **flight crew** Comment: typo ? something is missing?
response	Accepted. 'flight crew' has been deleted.

comment	*50* comment by: *Dassault-Aviation* §2.1 The relation of CS 25.1302 to other specifications (a) This AMC provides dedicated acceptable means for demonstrating compliance with CS 25.1302. Comment:The CS 25.1335 requirement has been added in this AMC although it is no longer present in the CS25 amdt 27. To be removed from this section
response	Accepted.

comment	*51* comment by: *Dassault-Aviation* §4.5(a)(3)(ii) page 54 **call for means of compliance that are methodical and complementary to, and separate and distinct from**, aeroplane system analysis methods such as system safety assessments. Comment: Clarification is needed on the type of compliance method expected.
response	Noted. This paragraph provides details on the kind of method that should not be used to show compliance with CS 25.1302(d). The acceptable means of compliance are described in other and multiple sections of the AMC. Please note that further wording enhancements may be brought in the future to the entire chapter 4.

comment	*52* comment by: *Dassault-Aviation* § 4.5(d)(1)(ii) page 59 (ii) do not adversely impact on safety. Comment: Same remark as previous comment, the term not adversely impact safety should be better defined and frame in term of severity
response	Not accepted. The impact on safety in the context of CS 25.1302 has to be understood with a qualitative and engineering judgement mindset. The severity definition is addressed in CS/AMC 25.1309.

comment	*53* comment by: *Dassault-Aviation* §3.1 figure 1 page 34 Comment: In §3.1, figure 1 the task bloc “analyse” mention “cockpit and cabin controls”. This seems contradictory with the scope of applicability of the 1302 « when operating the aeroplane from their normally seated positions on the flight deck ». Cabin controls wording should be removed as it can be understood as “passenger cabin”
response	Accepted.

comment	*54* comment by: *Dassault-Aviation* §3.2.6(a) page 38 Text:...with higher levels of scrutiny (e.g. by **using multiple means** of compliance ...) Comment: There is no demonstrated relationship between the use of multiple MoC or multiple HF assessment with a relevant increase in the level of scrutiny with regards to safety benefits. A fully appropriate means can be more adapted that numerous partially representative means. ”using multiple means” to be removed
response	Not accepted. EASA confirms that the use of multiple means of compliance may be required in case of high level of scrutiny. The use of the term ‘in general’ at the beginning of the sentence leaves room for deviations from this principle.

comment	*55* comment by: *Dassault-Aviation* §3.2.8(b) and 3.3.3(f) Text: : If EASA has retained the review of the assessment report as part of its LoI, then the applicant should deliver **it following every HF assessment.**

	Comment: Some HF assessment are done in an iterative process of design during the development of flight deck equipment. It is not relevant at early stage of the process to provide such report since the design is very far from an acceptable design. The delivery of the report during the development should not be systematic. We propose to rephrase “should deliver it following every HF assessment” by “should be shared upon case by case request of the agency”
response	Not accepted. Paragraph 3.2.8(b) describes what is expected by EASA for the HF assessments that are used for compliance demonstration, even if the assessment is conducted early in the development process. The identification of the HF assessments that are part of the compliance demonstration or not is agreed through the LOI and is dealt with at project level, and there is no need for the applicant to deliver a test report or a preliminary analysis presentation in case the assessment is not identified as being part of the certification strategy.

comment	*56* comment by: *Dassault-Aviation* §3.3.2(f) page 40 Text: In addition to the assessment report, and in order to reduce the certification risk, it is recommended that the preliminary analyses resulting from recorded observations and comments **should be presented by the applicant to EASA soon after the simulator/flight sessions in order to allow expert discussions to take place** Comment: Can agency precise what is expected from this phase? what kind of deliverable should be shared at this step ? This seems to more likely address programmatic considerations that could be delt on a case by case basis with the applicant rather than formally requesting this activity for all certifications.
response	Noted. No deliverable is expected, rather a presentation of the preliminary analyses, as clearly mentioned in the commented sentence.

comment	*57* comment by: *Dassault-Aviation* §3.3.2(j)(3) and (4) page 41 Comment: The definition and qualifications expected of an HF observer should be clearly defined in §1.3
response	Not accepted. EASA does not consider AMC 25.1302 as the appropriate means to address the competence and qualifications of the personnel used as observer by the applicant.

comment	*58* comment by: *Dassault-Aviation*

§4.3 (f)(1)(i) page 50
Text: .... The applicant should specifically assess what information is necessary in those conditions...

Comment: The minimum set of Information needed for continued safe flight and landing should be established by EASA. The starting point could be the flight and navigation information required in 1303

response

Not accepted.

This paragraph describes the general principle that under an abnormal condition it should be ensured that the minimum necessary information for continued safe flight and landing is provided to the flight crews. The nature of this information cannot be described in more detail since it is by definition dependent on the context and the kind of failure condition.

comment *59* comment by: *Dassault-Aviation*

§4.5(a)(2)(ii) page 54
Text: (ii) ensure that the effects of crew errors on the aeroplane functions or capabilities are evident to the flight crew, and **continued safe flight and landing** is possible (see 4.5(d));

Comment: in the scope of showing compliance with 1302(d) and 1309 (c) can agency define the precise scope and definition of the error impacting safety , and/or continued safe flight and landing and/or unsafe. What range or severity of the associated unwanted event should be addressed (CAT only ? CAT + HAZ?). A better definition should be provided with considered severity to the following terms:
- continued safe flight and landing
- error impacting safety
- unsafe system operating conditions

response

Not accepted.

The approach used in CS/AMC 25.1302 does not consider the severity of the consequences of human errors. Any error deserves a proper analysis and possible mitigations provided that it has or may have operational consequences.

— ‘Continued safe flight and landing’ is referenced in AMC 25.1309.

— ‘Unsafe system operating conditions’ is defined in AMC 25.1309, section 9 c.

— ‘Error impacting safety’ is considered self-explanatory.

comment *60* comment by: *Dassault-Aviation*

§4.6(b)(1) page 60
Text: ...reduction in the safety margins...

	Comment: Same remark as above, what is a significant reduction of safety margin ? should safety margin be understood as it is in 1309 ? is a significant reduction of safety margin something that raise the severity by at least 1 step ?
response	Accepted. The text has been revised to clarify its meaning; it now considers the notion of significant adverse operational consequences.

comment	*61* comment by: *Dassault-Aviation* §5.3.1 page 64 Text: ...As a general principle, no certification credit can be claimed when the design item installed on an aeroplane was certified by another design organisation or when it was not certified by EASA. Comment: Certification credit should be granted for very similar design (same cockpit design philosophy) for aircraft certified before EASA creation in 2003 as it was the case in previous certification programs. The safety level of such similar design is proven by the duration of in service experience. Those previously certified aircraft should not be excluded per se of the scope of similarity. Suggestion to remove the sentence " as a general principle" and following.
response	Not accepted. The Agency leaves room for the granting of certification credits from other programmes developed by the same applicant. Since all the applicants do not share the same processes and methodologies, there cannot be any transfer of certification credits, which is particularly true when EASA was not involved in the past certification.

comment	*81* comment by: *De Havilland Aircraft of Canada Limited* General comment: The AMC has been extensively re-written and re-formatted in its entirety. While a line-by-line comparison was not carried out, it appears to generally contain the material in the current AMC and in FAA AC 25.1302-1 as well as further elaborations. The proposed changes appear to be in violation of the objective of regulation harmonization.
response	Noted. An EASA AMC should not remain unchanged for extensive time periods simply for the sake of not creating a dis-harmonisation with other aviation authorities, including the FAA. In the present case, it is anticipated that the FAA will make a similar revision of its corresponding AC in the near future.

comment	*84* comment by: *De Havilland Aircraft of Canada Limited*

The AMC has been extensively re-written and re-formatted in its entirety.
Notable in its absence, and in-line with the deletion of the term "To the extent practicable" from the base regulation, the material contained in FAA AC 25.1302-1 Sect 5-2 c. (10) (b) and (i) explaining the meaning of the term is not presented.
(b) “To the extent practicable” refers to the implementation of error management capability within the one or more of those means, as provided within the equipment design.
(i) The intent of requiring errors to be manageable only “to the extent practicable” is to address both economic and operational practicability. It is meant to avoid imposing requirements without considering economic feasibility and commensurate safety benefits. It is also meant to address operational practicability, such as the need to avoid introducing error management features into the design that would inappropriately impede flightcrew actions or decisions in normal or non-normal conditions. As an example, we do not intend to require so many guards or interlocks on the means to shut down an engine that the flightcrew would be unable to do this reliably in a timely manner commensurate with the severity of the situation.

Propose to keep the existing wording.

response

Not accepted.

‘To the extent practicable’ has been removed as this statement is ambiguous and does not provide any criteria for its applicability (such wording is not used within other CSs). The extent of the requested investigation is anyway limited to the HF errors that can be ‘reasonably’ expected in service. The GM1 provides additional clarifications regarding the interpretation of the term ‘reasonably’.

Please note that the deletion of ‘to the extent practicable’ does not have an impact on the EASA expectation regarding the demonstration of compliance with this subparagraph.

comment *86* comment by: *Garmin*

Reference: AMC 25.1302 Section 3.3.1(a)

Rationale:
Provide for reassessment of design changes in later phases of the development process via assessments that are similar enough to the original assessment to determine the effectiveness of the design change without requiring re-running exactly the same assessment unless the cost of doing so is warranted by the novelty, complexity, and level of integration of the design item.

Proposed Text:
Sentence 2, following "where appropriate" add "and warranted by the level of scrutiny being applied to the given design item". Sentence 2, following "several iterations of the same", add "or substantially similar". Full proposed Sentence 2: "Consequently, where appropriate and warranted by the level of scrutiny being applied to the given design item, there may be several iterations of the same or

substantially similar system-specific assessments allowing the applicant to reassess the system if the previous campaigns resulted in design modifications."

response

Not accepted.

Considering that the level of scrutiny is not the only driver that should be considered to assess the need for a reassessment, EASA considers that the wording 'where appropriate' provides the appropriate level of flexibility.

Please note that a reassessment may also be conducted following a training or procedure modification; this has been added to the commented sentence.

comment *87* comment by: *COMAC*

Page 41, Section 3.3.2, Paragraph (j)
Further information/clarification on experience (as pilot or not?)/qualifications/training/HF background of acceptable "HF observers" would be helpful. Including information on what EASA deems adequate regarding HF observers selected by the applicants.

response

Not accepted.

EASA does not consider AMC 25.1302 as the appropriate means to address the competence and qualifications of the personnel used as observer by the applicant.

comment *88* comment by: *COMAC*

Page 41, Section 3.3.2, Paragraph (j)(1)(i)(B)
The paragraph reads: *Subjective data: ...The debriefing should be led using a neutral and critical positioning from the observer.* Further clarification on the word critical would be helpful. One would assume that being "critical" involves trying to find fault and judge the pilot's actions, but this seems to contradict with the previous statement on initial briefing "*...the purpose of the assessment is to assess the design of the flight deck, not the performance of the pilot.*" Further clarification would be helpful.

response

Noted.

Critical positioning involves questioning assumptions, evaluating evidence, considering different perspectives. It is not directed towards pilots' performance.

comment *89* comment by: *COMAC*

Page 37, Section 3.2.5;
Page 78, GM2
Paragraph (b) of 3.2.5 talks about a compliance matrix that links the design items and the HF design requirements. There are some doubts here:

1. What does the *HF design requirements* refer to, certification specifications (CS rules) or the design standards as given in Chapter 4? If it refers to the latter, then it appears that the *design requirements* here is not consistent with the example given in GM2, as GM2 continues to say "the applicable *certification specifications*", and uses CS25.777(c), CS25.1302(a), CS25.1302(b)(1) in the compliance matrix as examples, which are CS rules.
2. Paragraph (b) of 3.2.5 also says that "*...so that a detailed assessment objective can be derived from each pair of a design item and a HF design requirement.*" The wording here implies that each pair would generate <u>one</u> detailed HF assessment objective. Again, comparing to the example given in GM2, it looks like the "assessed dimension" in the tables are test objectives (i.e. "detailed HF assessment objective"). That then means each pair may generate more than one detailed HF assessment objectives, because CS rules can often be broad and covers requirements on multiple aspects.

It would be helpful if the wording in Section 3.2.5 and GM2 on *HF design requirements* and *detailed HF assessment objectives* be clarified or made consistent, or they may create confusion.

response

Accepted.

EASA updated Figure 1 of AMC 25.1302 making clear that design items have to be analysed in relation to both Certification Specifications and design principles of chapter 4 of this AMC.

comment

90 comment by: *COMAC*

Page 55, Section 4.5, Paragraph (a)(5)(i);
Page 77, Section 2, Paragraph (c)(10)(ii)
On Page 77, the paragraph reads: *The term 'reasonably expected in service' means errors that have occurred in service with similar or comparable equipment.* If an aircraft type being certified is entirely new and does not have a predecessor, it does not yet have in-service experience, then how can the applicant address "errors that have occurred in service?" If errors that occurred in other aircraft types with similar or comparable equipment can be considered, then the data obtained will be limited as such data of aircraft types of other manufacturers is only possible via publicly available sources such as accident/incident investigation reports. Further clarification on this point would be helpful.

response

Not accepted.

§4.5(a)(5)(i) is condidered by EASA as self-explanatory because it states 'applicants may also use in service data to identify errors known to occur for similar flight crew interfaces or system behaviours'.

The same answer applies to GM1 section 2(10)(ii).

comment	*91* ❖ comment by: *COMAC* Page 11, Section 2.3, Item 3, point 3; Page 38, Section 3.2.8, Paragraph (b)(3) & (5); Page 43, Section 3.3.2, Paragraph (m) The CRI F-01 implied that HF issues are at the high level, and need to be translated into detailed HF test objectives for substantiation. In this proposed AMC25.1302, the phrases "HF findings" and "(design-related) human performance issues" are used, do they refer to specific design issues (as contrary to high level HF issues)? Because it looks like the word *issue(s)* can refer to different things, one is at the high level and need to be translated into detailed HF test objectives for substantiation; and one is specific design issues observed or reported, known as HF findings or HP issues, and would require analysis to determine the way forward. Further clarification of HF issues, human performance issues, HF findings would be helpful or adding them in the Definitions section as appropriate.
response	Partially accepted. The term 'HF findings' has been replaced by 'Human performance issue' in two instances. The term 'HF issue' is not present in the proposed AMC 25.1302.

comment	*92* comment by: *COMAC* Page 56, Section 4.5, Paragraph (a)(5), (6), (7) In these paragraphs, the phrases "potential error opportunities" "probability of flight crew errors" "error possibilities" "frequency of errors" are used. How to understand the differences between them? Further clarification would be helpful.
response	Not accepted. 'Opportunities' and 'possibilities' are synonymous, 'frequency' is self-explanatory, and 'probability of error' is used to explain that there cannot be any probabilistic approach in HF.

comment	*93* comment by: *COMAC* Page 55, Section 4.5, Paragraph (a)(3)(ii); Page 55, Section 4.5, Paragraph (a)(5)(iii) Paragraph (a)(3)(ii) of Section 4.5 reads: *call for means of compliance that are methodical and complementary to...* Stating types of acceptable methods to predict possible errors and determine the likelihood or the errors would be helpful to avoid uncertainty. Also, if the error prediction work can be done based on experience and knowledge of pilots and cockpit design engineers (as implied in Page 77, Section 2, Paragraph (c)(10)(ii)), then information on the general requirements of the qualifications and background of the persons performing the analysis would be helpful.
response	Not accepted.

	EASA does not consider AMC 25.1302 as the appropriate means to address the competence and qualifications of the personnel used as observer by the applicant.

comment	*94* comment by: *COMAC* Page 55, Section 4.5, Paragraph (a)(5) The paragraph talks about references related to understanding the occurrence of errors. It would be helpful if some specific references could be provided.
response	Not accepted. The methods are further described in the rest of the paragraph 4.5(a)(5). EASA is not willing to prescribe any specific reference as it is the applicant's responsibility to build its own knowledge and competence.

comment	*95* comment by: *COMAC* Page 35, Section 3.2.2, Paragraph (a) & (e) Paragraph (a) of 3.2.2 reads: *...In order to demonstrate compliance with CS25.1302, the intended function of a system and the tasks expected to be performed by the flight crew must be known.* Does this imply that the output as described in Paragraph (e) of 3.2.2 would essentially be sufficient to show compliance to CS25.1302(a)? Clarification of this would be helpful.
response	Not accepted. Paragraph 3.2.2 addresses the intended function. The intended function is required to demonstrate compliance with CS 25.1302(a), but it is not considered as sufficient.

comment	*96* comment by: *COMAC* Page 55, Section 4.5, Paragraph (a)(5)(iii) This paragraph states that "Calulation and engineering analysis" is one possible means to demonstrate compliance with CS 25.1032(d). The paragraph reads: *...an applicant may document the means of error management through the <u>analysis</u> of controls, indications, system behaviour, and related flight crew tasks. This would need to be done in conjunction with an understanding of the potential error opportunities and the means available for the flight crew to manage those errors.* Is such analysis supposed to be performed during the design process (so to show that possible errors were considered and appropriate error management means were applied to the design), OR is it performed at a later stage, with frozen (or nearly frozen) HMI design proposals, to show that the proposed final design would support management of possible errors? Some additional clarification or information on using "error analysis" as an acceptable MoC would be helpful.
response	Noted.

Error analysis as part of a calculation and engineering analysis is useful and can be used during both the design process and the compliance demonstration phases.

The intent of the two last sentences of the paragraph is to discourage the use of probabilistic approach as it is not considered feasible by EASA.

comment *97* comment by: *Yang Zhou*

Page 41, Section 3.3.2, Paragraph (j), (k), (l), (m)
It looks like that apart from making observations, the HF observer would also need to lead the interview (debriefing), and be responsible for the subsequent HF analysis. Does the HF observer have to come from a pilot background? As pilots are more familiar with flight operations and SOPs, they could make more accurate observations regarding flight crew performance and error; on the other hand, though, the general pilots are usually not very familiar with human factors concepts and methods related to cockpit design. To have them (HF observers who are pilots) lead the interview independently and perform HF analysis seems not very practical. Some clarification on this point would be helpful.

response Noted.

It is not the purpose of the AMC to identify the requirements regarding the competence and qualifications of applicant personnel.

However, EASA recommends that the role of HF observers is taken by duly trained HF professionals.

comment *105* comment by: *Heart Aerospace AB*

5.3.1 - Credit from previous compliance certification processes

As a general principle, no certification credit can be claimed when the design item installed on an aeroplane was certified by another design organisation or when it was not certified by EASA.

Previous experiences during several HF evaluations have shown that the applicant had to re-demonstrate everything on a design item that was already certified and flying on many aircraft types.
For instance, if the aircraft is using a crew oxygen mask model which had already been EASA HF certified and that had been in use on many aircraft types for several years or months, applicants should be able to take some credit for this and avoid to re-demonstrate, for example, the ease of use of the mask or the error risk when operating it. Of course, the type specific differences like reachability, legibility of the label should still be evaluated. Since it is very difficult to dictate a general rule for this, Heart Aerospace suggests the following rewording:
"As a general principle, no certification credit can be claimed when the design item installed on an aeroplane was not certified by EASA. However, when the design item installed on an aeroplane was certified by another design organisation under EASA rules, the applicant may request certification credit on some features of the design item, provided they are not specific to the aircraft type"

response	Not accepted. The Agency leaves room for the granting of certification credits from other programmes developed by the same applicant. Since all the applicants do not share the same processes and methodologies, there cannot be any transfer of certification credits, which is particularly true when EASA was not involved in the past certification.

comment	*117* comment by: *Embraer S.A.* Page 29 - Subsection 1.2 item (b) The term “flight crew” in the end of the paragraph seems to be a typo. The suggestion is to remove the term “flight crew” from the end of the paragraph, such that the final text is: “(b) This AMC applies to flight crew interfaces and system behaviour for all the installed systems and equipment used by the flight crew while operating the aeroplane in normal, abnormal/malfunction and emergency conditions.”
response	Accepted.

comment	*118* comment by: *Embraer S.A.* Page 29 - Subsection 1.3 The definition of “Abnormal/malfunction condition” contains the phrase “abnormal/malfunction or emergency operating conditions”. It might create a misunderstanding that those terms are synonyms when they are not. As per AMC 25.1581, section 3, letter “f” emergency and abnormal procedures (which might be also applicable to conditions) have different meanings. Is summary, emergency is related to “immediate flight crew action”, while abnormal is related to “flight crew action”. The suggestion is to remove the term “or emergency operating” from the definition of abnormal/malfunction condition and include a separated definition for emergency conditions, and also adhere to the definition of emergency and abnormal in AMC 25.1581, such that the final text is: “Abnormal/malfunction condition: For the purposes of this AMC, abnormal/malfunction conditions refer to conditions that do require the flight crew to apply procedures to maintain an acceptable level of airworthiness for continued safe flight and landing.” “Emergency condition: For the purposes of this AMC, emergency conditions refer to conditions that do require the flight crew to immediately apply procedures to protect the aeroplane and occupants from serious harm.”
response	Partially accepted. In order to avoid any confusion, the term ‘or emergency operating conditions’ has been in the title of the definition.

comment	*119* comment by: *Embraer S.A.* Page 29 - Subsection 1.3 The definition of "Alert" is in contradiction with regulation CS 25.1322 and the definition of alert in AMC 25.1322. The regulation CS 25.1322 "Flight Crew Alerting" (a) (1) (i) clearly states that "Flight crew alerts must provide the flight crew with the information needed to identify non-normal operation or aeroplane system conditions". The AMC 25.1322 Appendix 5 defines alert as: "A generic term used to describe a flight deck indication meant to attract the attention of and identify to the flight crew a non-normal operational or aeroplane system condition.". The definition of alert in the present NPA removes non-normal from alerts definition. This creates incompatibility between AMC 25.1302 and CS 25.1322. It is not clear the intent of changing the definition of alert in AMC 25.1302, since the regulation CS 25.1322 takes precedence over the AMC, resulting in no practical effect of this change. The suggestion is to remove the definition of alert from the AMC 25.1302 or make it compatible with the definition in AMC 25.1322, such that the final text is: "A generic term used to describe a flight deck indication meant to attract the attention of and identify to the flight crew a non-normal operational or aeroplane system condition."
response	Accepted. The definition has been updated and aligned with the one in AMC 25.1322.

comment	*120* comment by: *Embraer S.A.* Page 29 - Subsection 1.3 The definition of "Assessment" states that the term may refer to both evaluations and tests. However, assessments can be performed using other Means of Compliance, such as mockups, design reviews, evaluations, etc. Reword the definition of assessment such as it includes other Means of Compliance, such as the final text is: "For the purposes of this AMC, the term 'assessment' may refer to a range of Means of Compliance, such as mockups, design reviews, lab reviews, analysis, evaluations, tests, etc."
response	Accepted.

comment	*121* comment by: *Embraer S.A.* Page 29 - Subsection 1.3 The definition of "Automation" contains "decision-making" which is a human activity normally associated with autonomous systems. Automatic systems are normally

	associated with pre-defined algorithms or actuation authority performed under bounded conditions. The suggestion is to remove “decision-making” from automation definition, such that the final text is: “The technique of controlling an apparatus, a process or a system by means of electronic and/or mechanical devices.”
response	Partially accepted. EASA recognises that the proposed definition is not fully adequate and decided to revert to the former definition: ‘The autonomous execution of a task (or tasks) by aeroplane systems started by a high-level control action of the flight crew.’

comment	*122* comment by: *Embraer S.A.* Page 30 - Subsection 1.3 The definition of “Design item” is too generic. Item is defined in SAE ARP4754 as “A defined and bounded set of either (one or more) hardware elements or (one or more) software elements which are treated as a single entity for analytical purposes.”. The suggestion is to remove the definition of item from the AMC 25.1302 or make it compatible with the definition in SAE ARP4754, such that the final text is: “Design item: A defined and bounded set of either (one or more) hardware elements or (one or more) software elements which are treated as a single entity for analytical purposes.”
response	Accepted.

comment	*123* comment by: *Embraer S.A.* Page 30 - Subsection 1.3 The definition of “Design-related human performance issue” is too generic and includes characteristics such as “hesitations, doubts, difficulties in finding information, suboptimal strategies…” that are subjective and do not have defined criteria for demonstrating compliance. The suggestion is to remove the definition of design-related performance issue from the AMC 25.1302 or to define it such that the final text is: “Design-related human performance issue: A deficiency that results from the interaction between the flight crew and the system, related to human errors.”
response	Not accepted. HF-related material is by essence of a subjective nature and EASA confirms that the current definition well reflects its intent.

comment	*124* comment by: *Embraer S.A.* Page 30 - Subsection 1.3 The definition of “Emergency condition” is pointing to the definition of “Abnormal condition”. It might create a misunderstanding that those terms are synonyms when they are not. The suggestion is to remove the reference to “abnormal condition” and include the definition of emergency condition, such that the final text is: “Emergency condition: Emergency condition is a condition that must be addressed immediately to prevent or remedy a hazard.”
response	Partially accepted. Taking into account comment 118, the title of the definition for ‘abnormal/malfunction condition’ has been modified to avoid any confusion.

comment	*125* comment by: *Embraer S.A.* Page 30 - Subsection 1.3 The proposed definition of flight deck states that it is the area of the aircraft where the primary flight controls are located. Typically, this definition includes both controls and displays. The suggestion is to add “primary flight displays” to the definition, such as the final text is: “Flight Deck: The area of the aircraft where the flight crew work and where the primary flight controls and primary displays are located;”
response	Accepted.

comment	*126* comment by: *Embraer S.A.* Page 31 - Subsection 1.3 The definition of “System function allocation” indicates it is a human factors method. However, the allocation of functions to systems is also considered a process involving the system development team, besides human factors specialists. Function allocation is present in system development guidelines, such as ARP 4754 and human factors literature, such as “Neville Stanton - Human Factors Methods - A Practical Guide for Engineering and Design (2005)”. The suggestion is to change the term “System function allocation” to “Allocation of functions between human and system” and define it as: “A iterative process jointly performed by systems and human factors specialists to determine whether jobs, tasks, functions etc., are properly defined to be performed by humans or systems, considering their capabilities and limitations.”.

response	Partially accepted. In the light of this comment, EASA reconsidered the benefit of this definition and concluded that it does not bring additional value to the AMC. Therefore, the definition has been removed.

comment	*127* comment by: *Embraer S.A.* Page 32 - Subsection 2.1 Table 1 Reference to CS 25.771 letter (b) should be (c). The suggestion is to change from “CS 25.771 (b)” to “CS 25.771 (c)”.
response	Accepted.

comment	*128* comment by: *Embraer S.A.* Page 33 - Subsection 2.1 Table 1 Reference to CS 25.777 letter (b) should be (c). The suggestion is to change from “CS 25.777 (b)” to “25.777 (c)”.
response	Accepted.

comment	*129* comment by: *Embraer S.A.* Page 33 - Subsection 2.1 Table 1 Reference to CS 25.1303 was removed. However, letter (a) is related to visibility of flight crew instruments from each pilot station. The suggestion is to include reference to CS 25.1303 (a).
response	Accepted.

comment	*130* comment by: *Embraer S.A.* Page 33 - Subsection 2.1 Table 1 Reference to “Appendix B VII” was included. However, it is not clear from what document does “Appendix B VII” refer to. The suggestion is to clarify reference to “Appendix B VII” or remove it.
response	Accepted. The reference to Appendix B VII has been removed.

comment	*131* comment by: *Embraer S.A.* Page 33 - Subsection 2.1 Table 1 Reference to CS 25.1335 was included. However, it is not part of latest CS regulation. The suggestion is to remove reference to CS 25.1335.
response	Accepted.

comment	*132* comment by: *Embraer S.A.* Page 34 - Subsection 2.1 Figure 1 The Figure includes references to “cabin” controls and uses the term “cockpit” instead of Flight Deck. This appears to be an inadvertent carry-over from AMC 29.1302. The suggestion is to delete “Cabin” Controls and to replace “Cockpit” with “Flight Deck”, so that the figure is consistent with definitions stated on the document.
response	Accepted.

comment	*133* comment by: *Embraer S.A.* Page 38 - Subsection 3.2.8 The word “test” is used throughout this section. However, some of the HF assessments typically occur using non-conformed articles. To avoid misinterpretation, we suggest replacing the term “test” with “evaluation/test”.
response	Partially accepted. The word ‘test’ has been replaced by ‘assessment’.

comment	*134* comment by: *Embraer S.A.* Page 39 - Subsection 3.3.2 item (a) The proposed text states that the scenario-based approach “is based on a methodology that involves a sample of various flight crew members that are representative of the future users”. However, there is no definition for what is representative of the capabilities of the future users. On Section 1.3, EASA defines Flight Crew Member as: “Flight Crew Member: A licensed crew member charged with duties that are essential for the operation of an aircraft during a flight duty period.”

The suggestion to remove mention of “future users” on the proposed text, such that the final text is:

“It is based on a methodology that involves a sample of various flight crew members”.

response

Not accepted.

‘Future users’ means flight crew members that are representative of the pilots that will operate the aeroplane in service. ‘End users’ has been replaced by ‘future users’ for consistency.

comment

135 comment by: *Embraer S.A.*

Page 41 - Subsection 3.3.2 item (j)(1)(i)(A)

The description of objective and subjective data is based on the definitions of direct and indirect observations, which have different meanings.
Also, collection of objective data should focus on human errors and do not include data subject to interpretation, such as: hesitation, suboptimal or unexpected strategies. These data are more suitable to indirect data collection and should be accessed during debriefing by the observer.

The suggestion is that data be classified as direct and indirect observable data. Another suggestion is that data related to behavioural indicators be classified as indirect observable data, thus, removed from letter (A) and included in letter (B), such that the final text is:
“(i) In order to substantiate compliance with CS 25.1302, it is necessary to collect both direct and indirect observable data.”
“(A) Direct observable data should be collected through direct observation of flight crew performance. The HF observers should participate co-located with the flight crew under observation. The observables should focus on human errors.”
“(B) Indirect observable data should be collected during the debriefing by the observer through an interactive dialogue with the observed flight crew. The observables should include pilot verbalizations in addition to behavioural indicators such as hesitation, suboptimal or unexpected strategies, catachresis, etc.

The debriefing should be led using a neutral and critical positioning from the observer. This indirect data is typically data that cannot be directly observed (e.g. pilot intention, pilot reasoning, etc.) and facilitate better understanding of the direct observed data from (A).”

response

Not accepted.

EASA disagrees with the Embraer position and confirms that the commented text is in adequation with the EASA intent.

comment

136 comment by: *Embraer S.A.*

Page 41 - Subsection 3.3.2 item (j)(2)

Requires that “HF assessment [scenario-base approach] should be systematically video recorded” and that “Records may be used … by the authority for verification purposes, when required.”. This may create an unnecessary volume of data that needs to be recorded and maintained for future consultation by the certification authorities. The minimum characteristics on the quality of the data is not defined.

The suggestion is that HF assessments using scenario-based approach in which video recording may be considered are agreed with the certification authorities in the HF evaluations proposals, such that the final text is:
“(2) The identification of the set of HF assessments that should consider the use of video recording, as well as the necessary recording characteristics, should be defined in the HF evaluations proposals and agreed with the certification authorities.”

response

Not accepted.

The video recording is defined as a basic principle; therefore, EASA deems that there is no need to add the proposed amendment.

comment *137* comment by: *Embraer S.A.*

Page 42 - Subsection 3.3.2 Item (k)

The proposed text requires that HF-related concerns that are not directly related to the objective of the assessment be nevertheless recorded, investigated, and analysed in the assessment reports.

However, the assessments are designed to address a specific Human Factors objective. Additional comments may be related to improvements or evaluations outside of the project scope. There is no limit or control on the nature of comments that may appear.

The suggestion is to reword this paragraph such that it is not mandatory to address these comments in the same way as comments related to the assessment’s objective, such that the final text is:

“If HF-related concerns are raised that are not directly related to the objective of the assessment, they may be recorded, adequately investigated and analysed in the assessment report, to the extent practicable.”

response

Not accepted.

EASA disagrees with this position.

HF objectives are created to assess specific areas of the proposed design. Nevertheless, any finding made during HF assessments must be addressed as they may reveal human performance issues. It is the applicant’s responsibility to process those findings in the frame of compliance demonstration.

comment *138* comment by: *Embraer S.A.*

	Page 42 - Subsection 3.3.2 item (l) The sentence “Every design-related human performance issue observed or reported by the flight crew should be analysed following the assessment.” may lead to the need to analyse issues that are not part of the HF objectives. The suggestion is to clarify the need to analyse issues related to HF objectives, such that the final text is: “Every design-related human performance issue observed or reported by the flight crew related to the HF objectives should be analysed following the assessment.”
response	Not accepted. Please refer to the response to comment 137.

comment	*139* comment by: *Embraer S.A.* Page 42 - Subsection 3.3.2 Item (n)(4) The proposed text states that no direct conclusion should be made from the results of workload rating scales about compliance with CS 25.1302. While it is understood that 25.1302 evaluations should not be limited to considering workload, CATA Worklist Item (CWI) EASA-003 – 25.1302 (2018) states that these ratings could be used in conjunction with other data. To avoid misinterpretation, we recommend harmonizing the text between these two documents. The suggestion is to reword this statement so that it is clear that the data from workload rating scales could be used, as long as it is used in conjunction with other data, such as the final text is, for example: “The techniques used to collect data in the context of the CS 25.1302 evaluations could make use of workload rating scales, but in that case, no direct conclusion about compliance with 25.1302 should be made using **only** the results of workload rating scale.”
response	Not accepted. EASA considers that paragraph 3.3.2(n)(3) clarifies that workload rating scales should be used as a complement to other data from observation of flight crew behaviour. CATA Worklist Item (CWI) EASA-003 is consistent with this position.

comment	*140* comment by: *Embraer S.A.* Page 44 - Section 4 Item (d)(2)(ii) The proposed texts include ICAO Doc 8400 ‘Procedures for Air Navigation Services (PANS) - ICAO Abbreviations and Codes’ as an acceptable basis for selecting labels.

	To provide additional guidance, we suggest also including ARP 4105 “Abbreviations, Acronyms and Terms for Use on the Flight Deck” as an acceptable basis for selecting labels. The standard was developed to specifically address flight decks.
response	Accepted.

comment	*141* comment by: *Embraer S.A.* Page 48 - Subsection 4.3 item (d)(3) Removed the term “Extensive” from sentence “The use of the red and amber colours for other than alerting functions or potentially unsafe conditions is discouraged.”. This is in contradiction with CS 25.1322(f) which allows the use of red and amber for non-alerting function, provided it is limited and does not adversely affect flight crew alerting. It is not clear the intent of changing the reference to the use of red and amber for other than alerting functions in AMC 25.1302, since the regulation CS 25.1322 takes precedence over the AMC, resulting in no practical effect of this change. The suggestion is to return the term “Extensive” in the sentence, so that it remains as: “Extensive use of the colours red and amber for other than alerting functions or potentially unsafe conditions is discouraged.”
response	Not accepted. The proposed text is aligned with CS 25.1322(f).

comment	*142* comment by: *Embraer S.A.* Page 51 - Subsection 4.4 item (b) The title of this item could be compatible with the definition in section 1.3. The suggestion is to change item title to “Allocation of functions between human and system”.
response	Noted. The definition in question has been removed, so this comment is not applicable anymore.

GM1 25.1302 Explanatory material p. 72

comment	*62* comment by: *Dassault-Aviation* Comment: lack of guidance concerning 1302(d) compliance method, in particular how to define the scope of error “reasonably expected in service” to be presented to the authority. Should the scope be defined by severity of non-recovered error (eg compromising continued safe flight and landing) ?

response | Not accepted.

The term 'reasonably expected in service' means errors that have occurred in service with similar or comparable equipment. It also means errors that can be predicted to occur based on general experience and knowledge of human performance capabilities and limitations related to the use of the type of controls, information or system logic being assessed. Please refer to paragraph 2.(c)(10)(ii) of the proposed AMC 25.1302.

comment | *143* comment by: *Embraer S.A.*

Page 77/78 - Subsection (c) item (10) (iii)

The reference to paragraph 5.1 seems to be a typo.

The suggestion is to change "the beginning of paragraph 5.1 above" to "the beginning of section 2 above".

response | Accepted.

The reference is not deemed necessary and has been removed.

GM2 25.1302 Examples of compliance matrices p. 78

comment | *47* comment by: *AIRBUS*

PAGE / PARAGRAPH / SECTION :
GM2 25.1302. Examples of compliance matrices
Pages 78 to 83

PROPOSED TEXT / COMMENT:
Please refer to AIRBUS comment on AMC 25.1302, Paragraph 3.2.5 (b) Page 37.

RATIONALE / REASON :
"The compliance matrix developed by the applicant should provide the essential information in order to understand the relationship between the following elements: [...].
The two matrices below are provided as examples only. The applicant might present the necessary information through any format that meets the above objectives."

Link with AIRBUS comment on §3.2.5 (b) Page 37.

response | Not accepted.

The demonstration of compliance with CS 25.1302 requires an iterative process, and the compliance matrix is a living document that can be updated once the required information is available.

comment	*63* comment by: *Dassault-Aviation* Comment: - In the exemples of compliance matrix shown in the GM, it is not clear what set of requirement should be presented in such format with such level of granularity in term of function / sub-function breakdown. Should it be done for the req cited in AMC 25.1302 §2 ?
response	Noted. EASA updated Figure 1 of AMC 25.1302 making clear that design items have to be analysed in relation to both Certification Specifications and design principles of chapter 4 of this AMC. Furthermore, it is expected that the applicant should define and propose the most appropriate level of granularity for the compliance matrix.

comment	*89* ❖ comment by: *COMAC* Page 37, Section 3.2.5; Page 78, GM2 Paragraph (b) of 3.2.5 talks about a compliance matrix that links the design items and the HF design requirements. There are some doubts here: 1. What does the *HF design requirements* refer to, certification specifications (CS rules) or the design standards as given in Chapter 4? If it refers to the latter, then it appears that the *design requirements* here is not consistent with the example given in GM2, as GM2 continues to say "the applicable *certification specifications*", and uses CS25.777(c), CS25.1302(a), CS25.1302(b)(1) in the compliance matrix as examples, which are CS rules. 2. Paragraph (b) of 3.2.5 also says that "*...so that a detailed assessment objective can be derived from each pair of a design item and a HF design requirement.*" The wording here implies that each pair would generate <u>one</u> detailed HF assessment objective. Again, comparing to the example given in GM2, it looks like the "assessed dimension" in the tables are test objectives (i.e. "detailed HF assessment objective"). That then means each pair may generate more than one detailed HF assessment objectives, because CS rules can often be broad and covers requirements on multiple aspects. It would be helpful if the wording in Section 3.2.5 and GM2 on *HF design requirements* and *detailed HF assessment objectives* be clarified or made consistent, or they may create confusion.
response	Accepted. EASA updated Figure 1 of AMC 25.1302 making clear that design items have to be analysed in relation to both Certification Specifications and design principles of chapter 4 of this AMC.

comment	*106* comment by: *Heart Aerospace AB* As illustrated in the EASA example (tables on pages 79, 80 and 81 of 93), it takes a 3 page matrix to describe the MoCs and regulations for the Electronic Checklist Quick Access Keys. If the applicant were to go to that level of detail, the final aircraft matrix will be a 1000+ page document, which would take more time to produce than to perform the actual HF analysis itself. Heart Aerospace therefore recommends to remove the "Sub-function" column and to limit the "Focus" column content to the few points that have been identified early in the design as requiring a special HF attention. The matrix should be kept at the Function level. The Human Factors Analysis, Human Factors Test Plans and Test Reports will get into the appropriate level of detail, but that should not be reflected in the Matrix. In addition, it is the Human Factors Analysis (MoC2) which will determine if an additional MoC (4,5,6 and/or 8) is required as well as if there are any additional HF Focus points. Heart Aerospace acknowledges that this only a guidance material and an example provided by EASA, but it is recommended that the example is changed and simplified.
response	Noted. As mentioned by Heart Aerospace, this table is provided as an example. The granularity is considered appropriate by EASA for some situations. However, it is up to the applicant to propose any format that is deemed more appropriate.

AMC 25.21(g) Performance and handling characteristics in icing conditions p. 83

comment	*144* comment by: *Bombardier Inc.* Page 83/93 NPA itself has a typo in the section describing the amended text. The actual AMC as written does not have this typo, and it is not in the area of change from the NPA, but we are pointing it out to avoid the typo being copied over into the final version. last line of 4.6.5 "...procedures and speeds to be usedfollowing the failure condition." Add space between "used" and "following"
response	Accepted.

AMC 25.735 Brakes and Braking Systems Certification Tests and Analysis p. 84

comment	*25* comment by: *Airbus-Regulations-SRg* **PDF page 85, AMC 25.735 4. a. (5) (a) and (b)** **General Comment:** **Airbus acknowledges that Brakes are added to the paragraph 4. a. (5) (b) related to major changes.**

However, can EASA provide further clarification on the limits allowed by the OEM's CMM vs the brake friction elements changes as mentioned in 4. a. (5) (a) Minor Changes?

RATIONALE:
Airbus would like EASA to define further criteria for classification of the brake element's classification.
This is to clarify the classification for cases where a change to the friction elements are within the limits allowed by the OEM's CMM.

response

Noted.

CS-ETSO C135a paragraph 4.2 requires the submission of a CMM to cover the 'maintenance, calibration and repair for continued airworthiness of installed wheels and wheel and brake assemblies'. The CMM forms part of the ETSO approval, and any change to the friction elements — or any other part of the brake — which is not included in the CMM, is therefore considered as Major.

AMC 25.1443(e) Minimum mass flow of portable oxygen equipment p. 86

comment *13* comment by: *Airbus-Regulations-SRg*

Page 86/93, AMC 25.1443 (e)
Quote:
"Cabin crews are part of the 'crew members'. Therefore, CS 25.1443 (e) is applicable to portable oxygen equipment (POE) used by cabin crews.
This means that *the POE must comply with the minimum mass flow specified by CS 25.1443(a) or (b), as applicable*."
UNQUOTE

PROPOSED TEXT:
Please modify that passage to read as follows:
"Cabin crews are part of the 'crew members'. Therefore, CS 25.1443 (e) is applicable to portable oxygen equipment (POE) used by cabin crews.
This means that *the minimum mass flow provided to the Portable Oxygen Dispensing Unit of the POE must comply with the minimum mass flow required to fulfill the mean tracheal oxygen partial pressure requirements specified by CS 25.1443(a) or (b),* as applicable."

RATIONALE:
A large amount of portable oxygen equipment as requested by Airline customers comprises two separate part numbers, e.g.
- the first part number defines the oxygen source and regulator part e.g. PNR 9700C1ABF23A.
- the second part number defines the Portable Oxygen Dispensing Unit e.g. PNR 174097-11.

	the combination of both part numbers together is needed to show compliance to 25.1443 (e) To cover this situation the proposal should make a distinction between the minimum mass flow as provided by the oxygen source and regulating part and the minimum mass flow as needed by the Portable Oxygen Dispensing Unit to fulfill the mean tracheal partial pressure requirements as defined by 25.1443 (a) or (b) as applicable.
response	Accepted.

comment	*85* comment by: *De Havilland Aircraft of Canada Limited* DHC aircraft, notably the Dash 8, all series, have a maximum operating altitude of 25,000ft. The AMC is now re-classifying "Cabin Crew Members" as "Crew Members" and thus the oxygen requirement must now meet that of the Flight Deck Crew. We have clearly demonstrated that our aircraft can descend to 13,000ft in under 4 mins. We have not had any reports of Cabin Crew Members being unable to carry out their duties during a decompression event. While I can see some justification for this change for aircraft that operate at substantially higher altitudes, those with 25,000ft maximum operating altitude should be exempt. The current requirement in the FAA Part 25 has been in place since in 1964 and adopted world-wide. No evidence has been provided that shows the need for this new requirement. It is also interesting to note that proposed revision to AMC 25.1447(c)(4) on Pgs 87 and 88 of this NPA still refer to cabin crew member! PROPOSED TEXT AMC 25.1443(e) Minimum mass flow of portable oxygen equipment. Para, 1 For aircraft with a maximum operating altitude greater than 25,000 ft, or for an aircraft with a maximum operating altitude of 25,000 ft that cannot descend to or below 13,000 ft within 4 minutes, ~~C~~cabin crews are designated part of the 'crew members'. Therefore, CS 25.1443 (e) is applicable to portable oxygen equipment (POE) used by cabin crews. This means that the POE must comply with the minimum mass flow specified by CS 25.1443(a) or (b), as applicable. For aircraft with a maximum operating altitude of 25,000 ft and that can descend to or below 13,000 ft within 4 minutes, the "cabin crew members" are not designated as "crew members". This means that the POE need comply with the minimum mass flow specified by CS 25.1443(c).
response	Not accepted. EASA did not modify the certification specification. EASA CS-25 and FAA FAR 25 are harmonised on this subject. FAA Policy Statement PS-ANM-25.1447-01 as well, issued in 2017, clarifies the requirements applicable to portable oxygen equipment.

AMC 25.831(a) Ventilation p. 86

comment	*24* comment by: *Airbus DS* In AMC 25.831(a) Ventilation, a wording change is proposed (in **bold** underlined): "The following provisions should be considered for the limited time periods, such as during takeoff, during which the air conditioning system **may be** "off"." The reason is that selecting the air conditioning pack off during the takeoff is not part of the definition of the takeoff itself. It is normally an option given to the flight crew to optimize energy availability from the engine to the flight manouvre. Keeping the current wording may induce to understand that the AiR Conditioning should be off during the takeoff, feature which is not desired from the Air conditioning Pack survivability point of view as this type of operation (if recurrent) may lead to early degradation of the Air Conditioning Pack bearings and failure of the pack itself.
response	Not accepted. This part of the text is not modified by NPA 2022-07. Additionally, the commented text does not suggest that the air-conditioning must be 'off' for take-off; the proposed wording is simply resulting from the assumption of the paragraph 3 regarding operations with the air conditioning 'off'.

AMC 25.1447(c)(4) Equipment standards for portable oxygen equipment dispensing units p. 87

comment	*10* comment by: *Vincent Kinket KLM DOA* By changing the AMC 25.1447(c) (4) title from: 'Equipment standards for oxygen dispensing units' to: 'Equipment standards for portable oxygen equipment' The existing point 3 (unchanged per the NPA) becomes interpretable: This point 3 states: 'Where a cabin crewmember's work area is not within easy reach of the equipment provided at his seat station, an additional unit should be provided at the work area.' But with the words 'dispensing units' being removed from the title the question comes up: 'what exactly is meant with 'an additional unit'? Can it still be an oxygen dispensing unit or must it be a portable oxygen equipment device? In our opinion the wording 'additional unit' should be clearly defined in this AMC to prevent any misunderstanding.
response	Accepted. Point 3 of the commented text is modified to specify that the additional unit may be either an oxygen dispensing unit or portable oxygen equipment.

comment	*14* comment by: *Airbus-Regulations-SRg* Page 87, AMC 25.1447 (c) (4) Sub para 3. 1., third sentence quote "It should be assumed that cabin crew members will move around in the cabin only when they are notified by the flight crew that a safe flight level has been reached (designated as 'level-off altitude')" UNQUOTE and Sub para 3. 1, last Sentence, quote *The reaching of such safe altitude should be announced by the flight crew, unless other appropriate means of information exist.* unquote **PROPOSED TEXT:** To delete the sentence "~~The reaching of such safe altitude should be announced by the flight crew, unless other appropriate means of information exist~~" **RATIONALE:** The sentence seems to indicate an operational requirement and not a requirement for CS 25.
response	Accepted.

comment	*15* comment by: *Airbus-Regulations-SRg* Page 87, AMC 25.1447 (c) (4), sub para 3, 2nd sentence, quote: "[...] (25 000 ft) after a depressurisation event (typically passenger oxygen gaseous system *or long duration* chemical oxygen generators) the following applies:" UNQUOTE **PROPOSED TEXT:** Please modify the text within the brackets to read as follows: "[...] after a depressurisation event (typically passenger oxygen system with gaseous oxygen source or with chemical oxygen generators) the following applies: **RATIONALE:** The proposed new wording is more general and covers all passenger oxygen system designs. In addition the term "long duration chemical oxygen generators" is not understood as the duration is not relevant to demonstrate compliance to 25.1443(e).
response	Partially accepted. The commented text has been modified as proposed regarding the first term (gaseous oxygen source). However, regarding the second term dealing with chemical oxygen generators, the term 'long duration' has been replaced by 'with sufficient

capacity' to clarify its meaning. The reason behind the proposed text is that short (insufficient) duration chemical oxygen generators do not permit levelling off at an intermediate altitude, and therefore in this case cabin crew mobility should not be allowed.

The last sentence of AMC 25.1443(e) has also been modified accordingly.

AMC 25.1449 Means for determining use of oxygen p. 88

comment *16* comment by: *Airbus-Regulations-SRg*

Page 88, new AMC 25.1449,
quote:
"A flow indicator should be provided, unless it can be shown that the inflation of the economiser system,
or another appropriate means, provides an effective indication.
A system using a simple rebreathing bag would not be considered as an acceptable means of indication."
UNQUOTE

2. PROPOSED TEXT / COMMENT: Suggested change
Adapt the first sentence to read as follows:
"A means to indicate oxygen flow should be provided, unless it can be shown that the inflation of the economiser system,
or another appropriate means, provides an effective indication.
A system using a simple rebreathing bag would not be considered as an acceptable means of indication."

3. RATIONALE / REASON for comment: Justification
Generally there are different means of flow indication available.

response Not accepted.

The proposed text of this comment does not clarify the AMC text.

The AMC text proposed in the NPA already allows some other means to provide an effective indication.