European Union Aviation Safety Agency

Comment Response Document (CRD) to Deviation CPTS-000362 Issue 01 on "Flight Crew Alerting"

1. CRD table of comments, responses and resulting text

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

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

(b) **Partially accepted** — it means that 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 and the text will not be changed

(General Comments) -

comment	*1* comment by: *Luftfahrt-Bundesamt* The LBA has no comments.
response	Noted. Thank you.

comment	*2* comment by: *FOCA (Switzerland)* Thank you for the opportunity to comment. We have no questions or remarks on this document and support it as proposed.
response	Noted. Thank you.

IDENTIFICATION OF ISSUE: p. 2

comment	*5* comment by: *DGAC* Applicant frequently refers to 'HUD/EFVS' system (for instance second paragraph page 3/9). Only 'EFVS' could be used instead of 'HUD/EFVS' since EFVS concept implies the use of a HUD.
response	Partially accepted. Thank you for your comment. It is agreed that EFVS implies the use of a HUD. However, HUD encompasses more than just EFVS. For clarification, the Deviation has been updated as follows: "HUD **and** EFVS installation".

comment	*6* comment by: *DGAC* **Page 3/9, first bullet:** it is understood that, discussed design change being not significant, the update of the certification basis was triggered by the need for an adequate certification basis (cf. Step 8 of GM 21.A.101) since applicable EFVS certification guidance was not available in the original certification basis. Also, the

	certification basis update is limited to the scope of the EFVS introductions. Are both of these assumptions correct ?
response	Noted. Thank you for your comment. The comment is related to the certification basis of the design change and is not relevant to this deviation so it will not be discussed in this CRD.

comment	*7* comment by: *DGAC* **page 3/9, second bullet:** 'HUD-specific flags' wording could be improved. As such, it is not clear if it encompasses: - failure flags solely displayed on the HUD(s); and/or - failure flags dealing with HUD-related failures.
response	Accepted. Thank you for your comment. It covers both cases. For clarification, the deviation has been updated as follows: "HUD **and EFVS**-specific flags."

comment	*8* comment by: *DGAC* **page 3/9, third bullet:** 'related to the HUD/EVS' is unclear Based on the consultation paper content, it is understood that EASA refers to the absence of alerting visual indication head-down in case of loss of the HUD display of conformal runway. Such a failure would either be triggered by: - a malfunction/loss of the applicable navigation sensor, or; - a malfunction of the HUD. In both cases, it is not clear why the term 'EVS' should be used. Regarding the first case, it would be expected that a head-down visual indication be pre-existent to the discussed EFVS design change.
response	Partially accepted. Thank you for your comment. For clarification, the deviation has been updated as follows: "HUD **and EFVS**-specific flags." About the first case, the loss of conformal runway would have safety effects just in EFVS operations with credit (e.g. Conformal RWY symbol is used to execute the consistency check of EVS lights in HUD during EFVS-A/-L).

comment	*9* comment by: *DGAC* **ID#3 'LOSS of SVS, EVS, conformal runway during operations with ops credits'** Applicant is addressing both loss of EVS/SVS and loss of conformal runway with the same criticality level (ie. caution for approach down to published minima, then warning for operation down to 100 ft). Other manufacturers did not use the same classification as most of the time the loss of EVS/SVS is obvious to the crew and thus classified loss of EVS/SVS as an advisory, considering the PM monitors the head-down display (repeater). On the other hand, the loss of conformal/synthetic runway may be more critical (caution).
response	Noted. Thank you for your comment. It is not clear if the comment proposes a change therefore it is responded in general terms. It is acknowledged that similar alerts may be classified differently on some other projects but it is design related and assessed & substantiated by the TCH. In this case, the level of alerts as described in the deviation has been defined by the TCH in the different phases of flight and stages of approach. After the loss of EVS, SVS, RWY at or below published DA/MDA in the dimensioning use case of EFVS-A ops in low visibility conditions (lack of other visual cues for landing), the crew must immediately initiate one G/A. No update needed.

comment	*10* comment by: *DGAC* **ID#3, third bullet:** It is understood that SVS feature was introduced and functional before the discussed EFVS design change. Since SVS image was not used during final approach (PF head-up during final approach), loss of SVS was not categorized as a caution during final-approach hence no attention getting through a second sense. Is this correct ? If not, and that loss of SVS was already categorized as caution, it would be expected that an attention getting through a second sense be already available before the discussed EFVS modification.
response	Not accepted. Thank you for your comment. In EFVS-A, EVS imagery consistency check must be conducted by means of part of SVS HUD symbology. In the dimensioning use case of low visibility conditions, the loss of SVS would not allow the crew to perform such task and requires the crew to immediate awareness and reaction. No update needed.

comment	*11* comment by: *DGAC* **ID#3, third bullet:** Shouldn't the delayed triggering of the second sense cue be assessed by HF specialists before being confirmed as a non-compliance ?
response	Not accepted. Thank you for your comment. 25.1322 (c)(2) requests for warning and caution alerts, a timely attention-getting cues through at least two different senses by a combination of aural, visual, or tactile indications. The design has been assessed against this requirement and found not compliant. No update needed.

comment	*12* comment by: *DGAC* **ID#4, second bullet:** Those amber visual are considered as "amber annunciations" and not necessarily caution alert. The main topic should be to **determine the real classification** of the required alert (cf. DGAC comment N°9: *[...] Other manufacturers did not use the same classification as most of the time the loss of EVS/SVS is obvious to the crew and thus classified loss of EVS/SVS as an advisory, considering the PM monitors the head-down display (repeater). On the other hand, the loss of conformal/synthetic runway may be more critical (caution)*).
response	Not accepted. Thank you for your comment. Please refer to answer to comments #9 and #11. No update needed.

3. STATEMENT OF DEVIATION p. 8

comment	*3* comment by: *AIRBUS* Airbus considers that the loss of visual information within the Primary Field Of View in particular with active monitoring through SOP while there is no Second Sense is considered as efficient alerting (Caution).
response	Not accepted. Thank you for your comment. 25.1322 (c)(2) requests for warning and caution alerts, a timely attention-getting cues through at least two different senses by a combination of aural, visual, or tactile indications. No update needed.

4. MITIGATING FACTORS p. 8

comment	*4* comment by: *AIRBUS* Airbus considers that the loss of visual information within the Primary Field Of View in particular with active monitoring through SOP while there is no Second Sense is considered as efficient alerting (Warning).

	Mandatory uses of Autothrottle and Autopilot for mitigation are not understood, clarifications are requested.
response	Not accepted. Thank you for your comment. Please refer to answer to comments #3, #9 and #11. Additionally, as clarification for the temporary mitigation found with mandatory use of A/P and A/T, it is considered that use of such A/P and A/T would be effective to significantly reduce the crew workload in dimensioning use case of EFVS-A. This would raise the pilot's ability to perform a quicker and efficient scan of the HUD to timely detect the eventual just visual EVS, SVS, RWY alerts and immediately react as needed. No update needed.

comment	*13* comment by: *DGAC* **ID#2:** inhibition of CAS only applies to take-off phase. HUD visual clues are not expected to be inhibited. This mitigation only applies to ID#1.
response	Accepted. Thank you for your comment. Thank you for your comment. It is correct - the table was split over two pages but the text provided in column "mitigating factors" covers both ID#1 & #2 (same classification of the alerts (advisory) and same non-compliance to CS25.1322 paragraphs have been identified). No update needed.