EASA European Union Aviation Safety Agency	**Consultation paper** **Equivalent Safety Finding**	Doc. No.: ESF-ACNS.E.TAWS.030-01 Issue : 1 Date : 05 May 2023 Proposed ☐ Final ☒ Deadline for comments: 04 Apr 2023

SUBJECT	:	Terrain Information Display and Synthetic Vision System
REQUIREMENTS incl. Amdt.	:	CS ACNS.E.TAWS.030 (b)(3), (b)(4), (e) at Initial issue
ASSOCIATED IM/MoC[1]	:	Yes☐ / No ☒
ADVISORY MATERIAL	:	AMC1 ACNS.E.TAWS.030

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[1] Associated Interpretative Material and/or Means of Compliance may be published for awareness only and they are not subject to public consultation.

INTRODUCTORY NOTE:

The following Equivalent Safety Finding (ESF) has been classified as important and as such is subject to public consultation in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) which states:

"*2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency.*"

ABBREVIATIONS:

FPV	Flight Path Vector
PFD	Primary Flight Display
SVS	Synthetic Vision System
TAWS	Terrain Awareness System

IDENTIFICATION OF ISSUE:

Aeroplane avionics system may incorporate both a Terrain Awareness and Warning System (TAWS) and a Synthetic Vision System (SVS) on the Primary Flight Display (PFD), which displays terrain as an additional three-dimensional view superimposed on the attitude and other flight information.

On the other hand, CS ACNS.E.TAWS.030 requires that terrain information displays are such as:

(b) Terrain information is displayed as follows:

(…)

(3) Variations in terrain elevation depicted relative to the aeroplane's elevation (above and below) are visually distinguishable.

(4) Terrain that generates alerts is displayed in a manner to distinguish it from non-hazardous terrain, consistent with the caution and warning alert level.

(…)

(e) Where additional terrain views are provided, they must present information consistent and compatible with (a) to (e) above.

EASA received an application for certification of an avionics system featuring both a TAWS and a PFD incorporating a SVS that displays terrain information in a way that does not comply with CS ACNS.E.TAWS.030 (b)(3) and (b)(4), although this is required by CS ACNS.E.TAWS.030 (e). Indeed, in this SVS implementation, the terrain is colour-coded based on absolute elevation to avoid cluttering primary flight information (attitude, altitude, airspeed and heading scales) and other potential alerts.

The applicant proposed an Equivalent Safety Finding approach as an alternative to compliance with CS ACNS.E.TAWS.030 (b)(3), (b)(4), and (e) based on the availability of additional terrain information displayed on other windows of the PFD. It provides compensating factors allowing to reach an equivalent level of safety per point 21.B.80(a)2 of Part-21 (Annex I to Regulation (EU) No 748/2012).

Considering all the above, the following Equivalent Safety Finding to CS ACNS.E.TAWS.030 (b)(3), (b)(4), and (e) is proposed.

ESF-ACNS.E.TAWS.030-01

Equivalent Safety Finding

Terrain Information Display and Synthetic Vision System

1. APPLICABILITY

This ESF is applicable to all aeroplanes equipped with an avionics system incorporating a TAWS and with a SVS on PFD.

1.1 AFFECTED CS

CS ACNS.E.TAWS.030 (b)(3), (b)(4), and (e) at Initial issue

2. SCOPE

In lieu of direct compliance with CS ACNS.E.TAWS.030 (b)(3), (b)(4), and (e), and provided that the below compensating factors are complied with, the PFD may display SVS using colour codes based on absolute terrain elevation.

3. COMPENSATING FACTORS

a. In addition to SVS , a separate window must display in the maximum field of view a two-dimensional terrain view that complies with CS ACNS.E.TAWS.030 (b)(3) and (b)(4) during Forward Looking Terrain Avoidance (FLTA) alerts or upon crew activation, ensuring that the flight crew is aware of the relative elevation of the surrounding terrain that could become a threat as well as of the areas that generate an alert when present.

b. The Flight Path Vector (FPV) must be displayed on the SVS, which anticipate the future position of the aeroplane, giving an indication of potential collision when overlapping the synthetic terrain and, conversely, showing that the short term flight path remains above any threatening terrain.