



Initial Airworthiness Equivalent Safety Findings (ESF)

Equivalent Safety Finding – Terrain Information Display and Synthetic Vision System



Consultation Paper Equivalent Safety Finding UK.ESF.F.0002 Issue 1

Proposed: Final

Deadline for comments: 23 December 2024

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: Yes / No

ADVISORY MATERIAL: AMC1 ACNS.E.TAWS.030

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Introductory Note

The following equivalent safety finding has been raised by the UK CAA in accordance with the provisions of point 21.A.15 of Part-21 (Annex I to UK Regulation (EU) No 748/2012).

In accordance with the UK CAA Design and Certification procedures, such Equivalent Safety Findings shall be assessed by the authority and be subject to a period of public consultation of not less than 2 weeks except if they have been previously agreed and published by the UK CAA.

All interested persons submitted their comments on this Equivalent Safety Finding Proposal online: Equivalent Safety Finding UK.ESF.F.0002 Consultation. The consultation period closed on 23 December 2024.

The final decision shall be published by the UK CAA and is contained in this Final Consultation Paper.

Acronyms and Abbreviations

AFM	Aircraft Flight Manual
CAA	Civil Aviation Authority
CS	Certification Specification
EASA	European Union Aviation Safety Agency
ESF	Equivalent Safety Finding
EU	European Union
FLTA	Forward Looking Terrain Avoidance
FPV	Flight Path Vector
PFD	Primary Flight Display
SVS	Synthetic Vision System
TAWS	Terrain Awareness and Warning System
UK	United Kingdom of Great Britain and Northern Ireland

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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.

UK CAA received an application for validation of an EASA certified 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 UK 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.

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UK.ESF.F.0002 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.