



## Certification Memorandum

### Acceptance of Electronic Flight Instrument Systems that have no equipment approval (ETSO) in Small Aeroplanes (ELA1)

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**Regulatory requirement(s):** CS-LSA.15 (ASTM F2245 8.2, 8.3, 8.4, 8.6)  
CS 22.1301, CS 23.1301, CS 23.1309, CS-VLA 1301, CS-VLA 1309

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## Log of issues

Issue	Issue date	Change description
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## 1. Introduction

### 1.1. Purpose and scope

The purpose of this Certification Memorandum is to provide guidance on the approval of installation of electronic flight instrument systems without own EASA equipment approval in ELA1 aeroplanes operated under Day-VFR conditions.

### 1.2. References

It is intended that the following reference materials be used in conjunction with this Certification Memorandum:

Reference	Title	Code	Issue	Date
Annex I Part 21 to Commission Regulation (EU) No 748/2012	Implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations	---	---	03/08/2012
CS-LSA.15	Applicable Specifications	CS-LSA Book 1	---	---
ASTM F2245 8.2	Flight and Navigation Instruments	---	---	---
ASTM F2245 8.3	Powerplant Instruments	---	---	---
ASTM F2245 8.4	Miscellaneous Equipment	---	---	---
ASTM F2245 8.6	Instruments and other Equipment	---	---	---
CS xx.1301	Function and Installation	CS-22 CS-23 CS-VLA	---	---
CS xx.1309	Equipment, systems and installations	CS-23 CS-VLA	---	---
CS 23.1311 CS 23.1321 CS 23.1323 CS 23.1325 CS 23.1331 CS 23.1337	Electronic display instrument systems Arrangement and visibility Airspeed indicating system Static pressure system Instruments using a power source Powerplant instruments installation	CS-23	---	---
ASTM F3153	Standard Specification for Verification of Avionics Systems	---	---	---



## 1.4. Abbreviations

AFM	Aircraft Flight Manual
ALT	Altimeter
ASI	Airspeed Indicator
ASTM	American Society for Testing and Materials
ATM	Air Traffic Management
CFR	Code of Federal Regulations
CS	Certification Specification
EFIS	Electronic Flight Instrument System
ELA	European Light Aircraft
ETSO	European Technical Standard Order
FAA	Federal Aviation Administration
LSA	Light Sport Aeroplanes
NAV	Navigation
POH	Pilots' Operating Handbook
TC	Type Certificate
VLA	Very Light Aeroplanes
VFR	Visual Flight Rules

## 2. Background

During certification of the first LSA with equipment that did not hold an ETSO authorisation (commonly referred to as “non ETSO'd equipment”) several problems have been identified:

- The information provided by the equipment was presented in a way that could adversely affect the proper control of the aircraft.
- The configuration including limitations could be inadvertently changed by pilots.
- Some information was presented but not calibrated or otherwise verified as accurate.

To address these problems the EASA policy for the acceptance of EFIS without an ETSO installed in ELA1 aircraft flying under Day VFR conditions has been established. This Certification Memorandum is intended to supplement the available standards by identifying those areas that require special attention and providing practical guidance when dealing with them.



## 3. EASA Certification Policy

### 3.1. EASA Policy

The following issues should be taken into account when installing equipment without EASA equipment approval. The policy is applicable to ELA1 aircraft flying under Day VFR conditions when this is agreed on project level within the certification programme.

#### 3.1.1. EFIS without own equipment approval may be installed under responsibility of applicant if

- Installed according to equipment manufacturers limitations and instructions specified for that equipment.
- Applicant has verified that the equipment performs its function as intended. ASTM F3153 Standard Specification for Verification of Avionics Systems is an acceptable means of compliance.
- Information that is displayed is known to be reasonably accurate.  
Note: It is recommended to perform a post-installation ground and flight test to confirm accurateness.
- An assessment is performed showing that EFIS installation potential hazards (e.g., risk of fire and smoke) do not directly compromise the safety of the airplane or its occupants. The assessment can be performed with the use of engineering judgement.
- The configuration of the EFIS and the parameters and limitations it displays are derived from the approved aircraft design and limitations. It includes identification of the appropriate database needed to support the intended operations as well as those that are not required to be under configuration control as part of the approved aircraft design (e.g., operator checklists; aeronautical databases).
- A means to protect the defined configuration from being inadvertently altered is in place.
- A procedure to assess and approve software and/or programmable firmware updates is in place.
- All information is displayed in a way not interfering with normal operation of the aircraft and not violating generally accepted display design conventions (e.g., display principles of standard certified equipment, colour schemes, etc. FAA AC 23.1311-1C is a good reference for generally accepted design conventions).
- Instructions for continued airworthiness for the EFIS are established.

#### 3.1.2. Presentation of airspeed within EFIS is acceptable, when

- Either the aircraft has a very clear stall warning and flight characteristics making it improbable to enter unsafe conditions or a second display of airspeed information is provided.
- Single failures of non ETSO'd electronic equipment (e.g., display, air data sensor) do not cause complete loss of airspeed information and stall warning. Note that it is not required to provide a full independent system (e.g. dual pitot-static).
- The AFM/POH describes how to detect malfunctions and how to react. This should include scenarios like "frozen" or "black" screen and information provided could include e.g., recommended power-/flap setting to stay safely within the certified envelope.

#### 3.1.3. Equipment or systems that should be verified to assure function and quality of displayed data on the EFIS

- **Airspeed, Barometric Altitude**
  - Instruments should be calibrated against a reference.
  - When airspeed and/or barometric altitude is provided by more than one instrument, their indications should be consistent.



- **Engine instruments**
  - All indications should be verified for accuracy.
- **Flap/Trim setting indications**
  - Indications should be verified for accuracy by ground test.

### 3.1.4. Equipment required for communication with ATM

- If equipment for VHF communication or surveillance (including antenna, altitude encoder, user interface, ...) is installed it should be approved in accordance with the appropriate ETSO standards.
- Proper functioning of ATM equipment especially new antenna types and positions should be verified.
- The user interface should be approved in accordance with the appropriate ETSO standards. A secondary, non-ETSO'd user interface may be used in addition.

## 3.2. Who this Certification Memorandum affects

This Certification Memorandum affects applicants who want to install EFIS or similar equipment without own EASA equipment approval in ELA1 aeroplanes operated under Day VFR conditions.

## 4. Remarks

1. Suggestions for amendment(s) to this EASA Certification Memorandum should be referred to the Certification Policy and Safety Information Department, Certification Directorate, EASA. E-mail [CM@easa.europa.eu](mailto:CM@easa.europa.eu).
2. For any question concerning the technical content of this EASA Certification Memorandum, please contact:

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