

# European Aviation Safety Agency

## European Technical Standard Order

Subject: STAND-ALONE AIRBORNE NAVIGATION EQUIPMENT USING THE GLOBAL POSITIONING SYSTEM (GPS) AUGMENTED BY THE WIDE AREA AUGMENTATION SYSTEM (WAAS)

### 1 - Applicability

This ETSO gives the requirements that new models of stand-alone airborne navigation equipment using the Global Positioning System (GPS) augmented by the Wide Area Augmentation System (WAAS) that are manufactured on or after the date of this ETSO must meet in order to be identified with applicable ETSO marking.

The standards of this ETSO apply to equipment intended to provide position information to a navigation management unit that outputs deviation commands referenced to a desired flight path. These deviations will be used by the pilot or autopilot to guide the aircraft. These standards do not address integration issues with other avionics, such as the potential for the sensor to inadvertently command an autopilot hardover. These standards also do not address the use of position information for other applications such as automatic dependent surveillance.

### 2 - Procedures

#### 2.1 - General

Applicable procedures are detailed in CS-ETSO Subpart A.

#### 2.2 - Specific

None.

### 3 - Technical Conditions

#### 3.1 - Basic

##### 3.1.1 - Minimum Performance Standard

Airborne navigation sensors using GPS augmented by WAAS that are to be so identified must meet the minimum performance standards for Class Gamma or Class Delta equipment set forth in Section 2 of RTCA/DO-229B, "Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Equipment", dated October 5, 1999, as amended and supplemented by this ETSO. Class Gamma and Class Delta equipment are defined in Section 1.4 of RTCA/DO-229B.

##### 3.1.2 - Environmental Standard

See CS-ETSO Subpart A paragraph 2.1.

##### 3.1.3 - Computer Software

See CS-ETSO Subpart A paragraph 2.2.

#### 3.2 - Failure Condition Classification.

Failure of the function defined in paragraph 1 of this ETSO has been determined to be:

- a major failure condition for loss of function and malfunction of en route, terminal, or nonprecision approach position data ;
- a major failure condition for loss of function of precision approach position data ;
- and a hazardous failure condition for the malfunction of precision approach position data.

The applicant must develop the system to at least the design assurance level commensurate with this hazard classification.

3.3. - Functional qualifications.

The required performance shall be demonstrated under the test conditions specified in RTCA/DO-229B, Section 2.5. The use of test procedures other than those specified in Sections 2.5.2 through 2.5.9 of RTCA/DO-229B constitutes a deviation to this ETSO.

**4 - Marking**

4.1 - General

Marking is detailed in CS-ETSO Subpart A paragraph 1.2.

4.2 - Specific

In addition, the following requirements apply to all separate components of equipment that are manufactured under this ETSO :

- The operational equipment class as defined in Section 1.4.2 of RTCA/DO-229B (e.g., Class 2). A marking of Class 4 indicates compliance to Delta-4 requirements. The functional equipment class defined in Section 1.4.1. of RTCA/DO-229B (e.g. Gamma, Delta) is not required to be marked.
- When applicable, identification that the article is an incomplete system or that the article accomplishes additional functions beyond that described in paragraph 1 of this ETSO.

**5 - Availability of Referenced Document**

See CS-ETSO Subpart A paragraph 3.