ETSO-C195b
Date: 19.12.2016

European Aviation Safety Agency

European Technical Standard Order

Subject: Avionics Supporting Automatic Dependent Surveillance - Broadcast (ADS-B) Aircraft Surveillance Applications (ASA)

1 - Applicability

This ETSO gives the requirements which Avionics Supporting Automatic Dependent Surveillance - Broadcast (ADS-B) Aircraft Surveillance Applications (ASA) that are designed or manufactured on or after the date of this ETSO must meet in order to be identified with the applicable ETSO marking.

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

Standards set forth in Section 2 of EUROCAE ED-194A, dated June 2014 Radio Technical Commission for Aeronautics (RTCA) DO-317B, dated June 17, 2014, Minimum Operational Performance Standards for Aircraft Surveillance Applications System as modified by Appendix 1 of this ETSO.

Functional equipment classes for this ETSO are defined by the avionics equipment functionality they provide for one or more of the applications listed in Table 1. The four equipment functionalities are Cockpit Display of Traffic Information (CDTI) (Surface Only), CDTI, Airborne Surveillance and Separation Assurance Processing (ASSAP) and ADS-B Traffic Advisory System (ATAS) Annunciator Panel. Applicable performance standards for these classes are identified per equipment class in Appendix L of ED-194A/DO-317B and are based on Section 2 of ED-194A/DO-317B. The functional equipment classes are shown in table 1.

	Criticality		Equipment Class			
Application	**Loss of Function**	**Hazardous & Misleading Information**	**CDTI (Surface Only) (A)**	**CDTI (B)**	**ASSAP (C)**	**ATAS Annunciator Panel (D)**
(1) Enhanced Visual Acquisition (EVAcq)	Minor	Major	Not Permitted	B1	C1	Not Applicable
(2) Basic Surface (Runways)	Minor	Major (> 80 Knots) Minor (< 80 Knots)	A2	B2	C2	Not Applicable
(3) Basic Surface (Runways + Taxiways)	Minor	Major (> 80 Knots) Minor (< 80 Knots)	A3	B3	C3	Not Applicable
(4) Visual Separation on Approach (VSA)	Minor	Major	Not Permitted	B4	C4	Not Applicable
(5) Basic Airborne (AIRB)	Minor	Major	Not Permitted	B5	C5	Not Applicable
(6) In-Trail Procedures (ITP)	Minor	Major	Not Permitted	B6	C6	Not Applicable
(7) ADS-B Traffic Advisory System (ATAS)	Minor	Major	Not Permitted	B7	C7	D7
(8) CDTI Assisted Visual Separation (CAVS)	Minor	Major	Not Permitted	B8	C8	Not Applicable

Table 1 – ASA Functional Equipment Classes (per ED-194A/DO-317B)

The in-trail procedures (ITP) application (item 6 in Table 1) supports a new separation standard in procedural airspace. ITP application enables aircraft that desire flight level changes in procedural airspace to achieve these changes on a more frequent basis, thus improving flight efficiency and safety. The ITP achieves this objective by permitting a climb-through or descend-through maneuver between properly equipped aircraft, using a new distance-based longitudinal separation minimum during the maneuver.

ASSAP equipment authorised under this ETSO must contain or support an interface to an ADS-B receiver. If the receiver is embedded in the equipment, it must meet ETSO-C154c, *Universal Access Transceiver (UAT) Automatic Dependent Surveillance-Broadcast (ADS-B) Equipment Operating on Frequency of 978 MHz* or ETSO-C166b, *Extended Squitter Automatic Dependent Surveillance - Broadcast (ADS-B) and Traffic Information Service - Broadcast (TIS-B) Equipment Operating on the Radio Frequency of 1090 Megahertz (MHz)*. If the receiver is not embedded, the installation manual must have a requirement to interface to an ETSO-C154c or ETSO-C166b approved ADS-B receiver.

If intended for installation on aircraft with traffic advisory system (TAS) or traffic alert and collision avoidance system (TCAS) equipment, ASSAP equipment authorised under this ETSO must contain or support an interface to equipment complying with ETSO-C147(), Traffic Advisory System (TAS) Airborne Equipment, ETSO-C118(), *Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I*, or ETSO-C119(), *Airborne Collision Avoidance System II (ACAS II)*. If the ASSAP

equipment does not support this functionality, the installation manual must prohibit installation on an aircraft equipped with TAS or TCAS.

Class A and B equipment authorised under this ETSO must comply with ETSO-C165a *Electronic Map Systems For Graphical Depiction Of Aircraft Position* when implementing surface applications. This ETSO shall take precedence where it differs from ETSO-C165a. Databases used to support moving maps integrated with the SURF application must meet at least 5 meter accuracy and 1 meter resolution. Databases used to support moving maps integrated with the SURF application must meet EUROCAE ED-76/RTCA DO-200A Data Process Assurance Level 2 for state-provided data with essential integrity as defined in RTCA DO-272B.

Equipment authorised under this TSO may include or interface with airborne multipurpose electronic display equipment complying with ETSO-C113 a.

Equipment authorised under this ETSO must contain or support an interface to position sources that meet one of the following ETSOs: ETSO-C129(), ETSO-C145(), ETSO-C146(), ETSO-C196() or equivalent.

3.1.2 - Environmental Standard
See CS-ETSO Subpart A paragraph 2.1. The system performance to be demonstrated during the environmental testing is defined in EUROCAE ED-194A/RTCADO-317 section 2.4.
Explosion testing in accordance with EUROCAE ED-14( )/RTCA DO-160( ) section 9 is considered optional.
Electrostatic discharge testing in accordance with EUROCAE ED-14( )/RTCA DO-160( ) Section 25 is required for all equipment having control elements and are expected to be touched during operation.

3.1.3 – Computer Software
See CS-ETSO Subpart A paragraph 2.2.

3.1.4 - Electronic Hardware Qualification
See CS-ETSO Subpart A paragraph 2.3.

3.2 - Specific

3.2.1 Failure Condition Classification
See CS-ETSO Subpart A paragraph 2.4.
Failure of the function defined in paragraph 3.1.1 of this ETSO has been determined to be a major failure condition for malfunctions causing the display of hazardously misleading information in airborne aircraft and aircraft on the ground greater than 80 knots. Failure of the function defined in paragraph 3.1.1 of this ETSO has been determined to be a minor failure condition for malfunctions causing the display of hazardously misleading information in aircraft on the ground less than 80 knots groundspeed. Loss of function has been determined to be a minor failure condition.

4 - Marking

4.1 - General
Marking as detailed in CS-ETSO Subpart A paragraph 1.2.

4.2 - Specific
None.

5 - Availability of Referenced Document

See CS-ETSO Subpart A paragraph 3.

APPENDIX 1.

Amendment to ED-194A/DO-317B

A2.1 - Introduction

This Appendix amends ED-194A/DO-317B to address specific issues raised since publication of the document.

A2.2 - TCAS II Integration with TSAA

TCAS integration is addressed in ED-194A/DO-317B section 2.2.4.5.3.3, titled 'TSAA Traffic Caution alerts on Correlated TCAS Tracks'. Replace the current section 2.2.4.5.3.3 with the following text:

The TSAA application may be integrated with TCAS I, TCAS II, or TAS systems.

If an ADS-B/ADS-R/TIS-B track is correlated with a TCAS track, then the alerts shall (2223) only be presented from either the TSAA application or the TCAS system (i.e., not both).

If TSAA and TCAS II are installed on the same aircraft, TCAS II resolution advisories (RAs) shall (####) have priority over all other alerts.

If TSAA and TCAS II are installed on the same aircraft, TCAS II traffic advisories (TAs) shall (####) be generated for the TCAS tracks by the TCAS II TA function. TSAA may generate traffic alerts for ADS-B only traffic not correlated with a TCAS track.

TSAA alerts should take precedence over TCAS I or TAS traffic alerts (TAs) when the TCAS track is correlated with an ADS-B or ADS-R track; but, TCAS traffic alerts should take precedence over TSAA alerts when the TCAS track is correlated with a TIS-B track.

A2.3 - TCAS Validation of ITP Traffic

TCAS validation of ITP traffic is addressed in ED-194A/DO-317B section 2.2.4.4.2.1, titled 'Validation of Traffic Position with TCAS Data'. Add the following text to the end of the second paragraph.

ASSAP is not required to support ADS-R or TIS-B traffic for use with the ITP application.

A.2.4 - TCAS Validation of CAVS Traffic

TCAS validation of CAVS traffic is addressed in ED-194A/DO-317B section 2.2.4.6.2.1, titled 'Validation of Traffic Position with TCAS Data'. Remove all instances of the text '/ADS-R' from this section and add the following text to the end of the second paragraph.

ASSAP is not required to support ADS-R or TIS-B traffic for use with the CAVS application.