Deviation request #109 for an ETSO approval for CS-ETSO applicable to Traffic Advisory System (TAS) Airborne Equipment (ETSO-C147), Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I (ETSO-C118) and Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services (TIS-B) Equipment Operating on the Radio Frequency of 1090 MHz (ETSO-C166bA1)

Consultation Paper

1 Introductory Note

The hereby presented deviation requests shall be subject to public consultation, in accordance with EASA Management Board Decision No 7-2004 as amended by EASA Management Board Decision No 12-2007 products certification procedure dated 11th September 2007, Article 3 (2.) of 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."

2 Deviation Requests

2.1 ETSO-C147#7 Traffic Advisory System (TAS) Airborne Equipment

2.1.1 Summary of Deviation

Deviate from RTCA DO-197A Section 2.2.14 Traffic Advisory Criteria and allow within 3 NM of an airfield to use an estimated height above ground based on the change in pressure altitude since take-off until the 3 NM are left for the first time after take-off or on the difference of GPS altitude and GPS field elevation as a replacement for altitude above ground level to invoke sensitivity level A.

2.1.2 Original Requirements

RTCA/DO-197A Section 2.2.14 specifies:
There shall be two sensitivity levels (SL). SL A shall reduce the tau values used to determine when a TA should be issued. SL A shall be automatically invoked using the following order of precedence:

(1) when the TCAS aircraft is below 2,000 feet above ground level (AGL) (if equipped with a radar altimeter) OR
(2) when the landing gear is extended (no radar altimeter installed) OR
(3) when the ground speed is less than 120 knots (no radar altimeter installed and aircraft has fixed gear).

2.1.3 Industry

For aircraft without a radar altimeter and within 3 NM of the closest airfield the height above ground for the first condition to invoke sensitivity level A shall be replaced by the estimated height above ground. The estimated height above ground is defined as:

1. The current own ship pressure altitude minus the measured own ship pressure altitude while on ground, until the ships distance from the take-off point exceeds 3 NM for the first time after take-off.
2. If the estimated height above ground cannot be determined according to 1, the estimated height above ground is defined as own ship's GPS altitude minus the closest airfield database GPS elevation, if ship's distance from this airfield does not exceed 3 NM. Both GPS altitude and GPS elevation are to the same reference.
3. The estimated height above ground is undefined in all other conditions.

2.1.4 Equivalent Level of Safety

ELOS is provided because the existing MOPS functionality is retained while adding another acceptable source of height above ground level near the airport environment. The additional acceptable source does not add to or modify the existing functionality of sensitivity level selection based on height above ground, but rather adds another source of data that was not generally available to installations at the time the MOPS was created. It is allowed to install the equipment without a radar altimeter. Allowing the alternate means described above to determine the estimated height above ground level is an operational enhancement.

2.1.5 EASA position

We accept the deviation, as it provides an additional means, generally not available at the time of formulation RTCA/DO-197A, to adapt the sensitivity. FAA AIR-130 concurs with the ELOS provided.

2.2 ETSO-C147#8 Traffic Advisory System (TAS) Airborne Equipment

2.2.1 Summary of Deviation

Deviate from RTCA DO-197A Section 2.2.15 Aural Alert to inhibit aural annunciation using estimated height above ground level (as determined using the method listed in ETSO-C147#7) when the ship is not equipped with a radar altimeter.

2.2.2 Original Requirement

RTCA/DO-197A Section 2.2.15 specifies:
The aural annunciation shall be inhibited using the following order of precedence:

(1) Below 400 feet AGL when Active TCAS I is installed on an aircraft equipped with a radio altimeter, OR

(2) When the landing gear is extended (no radio altimeter installed).

Note: When Active TCAS I is installed on a fixed-gear airplane without a radio altimeter, the aural annunciations will never be inhibited.

2.2.3 Industry

A deviation from this requirement allows aircraft without radar altimeter equipage to use an estimated AGL from the method above to inhibit aural annunciation when the estimated height above ground falls below 400 feet. ELOS is provided because the existing MOPS functionality is retained while adding another data source to determine height above ground level near the airport environment. The additional data source does not modify or reprioritize the conditions that trigger aural muting but instead provides an alternate method to identify the need to inhibit aural annunciation using estimated height above ground when a radar altimeter is not available. This deviation adds another source of data that was not generally available to installations at the time the MOPS was created. The current ETSO defines operation without a radar altimeter and allowing the alternate means described above to determine estimated height above ground level provides improved performance and safety for installations without a radar altimeter.

2.2.4 Equivalent Level of Safety

ELOS is provided because the existing MOPS functionality is retained while adding another acceptable source of height above ground level near the airport environment. The additional acceptable source does not add to or modify the existing functionality of sensitivity level selection based on height above ground, but rather adds another source of data that was not generally available to installations at the time the MOPS was created. It is allowed to install the equipment without a radar altimeter. Allowing the alternate means described above to determine the estimated height above ground level is an operational enhancement.

2.2.5 EASA position

We accept the deviation, as it provides an additional means, generally not available at the time of formulation RTCA/DO-197A, to inhibit aural annunciations close to ground. FAA AIR-130 concurs with the ELOS provided.

2.3 ETSO-C118#2 TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS) AIRBORNE EQUIPMENT, TCAS I

See 2.1

2.4 ETSO-C118#3 TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS) AIRBORNE EQUIPMENT, TCAS I

See 2.2

2.5 ETSO-C166bA1#1 - Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services (TIS-B) Equipment Operating on the Radio Frequency of 1090 MHz

2.5.1 Summary of Deviation

Deviate from EUROCAE ED-102A /RTCA DO-260B Section 2.1.10 Integration and Interoperability with a Mode S transponder to meet the transponder requirements specified in EUROCAE ED-73E / RTCA DO-181E instead of EUROCAE ED-73C /RTCA DO-181D.

2.5.2 Original Requirement

EUROCAE ED-102A Section 2.1.10 specifies:

If the ADS-B equipment is integrated into a Mode S transponder, the transponder functions shall meet the appropriate requirements specified in the MOPS for Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment (RTCA DO-181D) (EUROCAE ED-73C).

2.5.3 Industry

In appendix W of EUROCAE ED-102A dated January 2012 it is stated:
In RTCA DO-260B and EUROCAE ED-102A, in section §1.4.2.1, the first paragraph is the initial occurrence of the reference to RTCA DO-181D and EUROCAE ED-73C. Both of these transponder MOPS documents were updated to reflect changes that were made to the ADS-B MOPS with the publication of RTCA DO-260B and EUROCAE ED-102A. For all references to the transponder MOPS in RTCA DO-260B and EUROCAE ED-102A: Change DO-181D to DO-181E and Change ED-73C to ED-73E

ELOS is provided by the usage of a later revision requirement document that is consistent with the Minimum Operational Performance Specification specified under ETSO-C112d Secondary Surveillance Radar Mode S Transponder.

2.5.4 Equivalent Level of Safety

ELOS is provided by the usage of a later revision of the requirement document.

2.5.5 EASA position.

We accept the deviation.