EASA Safety Information Bulletin

SIB No.: 2011-14

Issued: 04 July 2011

Subject: **Mode S Transponder – Incorrect Setting of ICAO 24-Bit Aircraft Address**

Ref. Publications: Annex 10 to the Convention on International Civil Aviation, Volume III – Communications Systems.
EASA SIB No: 2011-15 - Mode S Transponder: Ground Testing.

Applicability: All owners and operators of aircraft having SSR Mode S transponders installed.

Mode S transponders are known to be installed on, but not limited to, aircraft certificated under (FAR, JAR, CS) Part 22, 23, 25, 27, 29, 31HB, VLA or VLR.

Description: The Mode-S Airborne Monitoring Project (AMP), which is coordinated by Eurocontrol, has identified a significant number of aircraft operating within European airspace with incorrect ICAO 24-bit aircraft addresses.

The provision of air traffic services (ATS) using SSR Mode S relies wholly upon a unique ICAO 24-bit aircraft address for selective interrogation of individual aircraft. The unique 24-bit aircraft address is also an essential element of the airborne collision and avoidance system, ACAS II.

At this time, the airworthiness concern described in this SIB is not considered to be an unsafe condition that would warrant Airworthiness Directive (AD) action under EC 1702/2003, Part 21A.3B.

Nevertheless, when two (or more) aircraft with the same (duplicate) ICAO 24-bit aircraft address are operating within range of a specific Mode S interrogator, then potentially hazardous situations can arise:

- One (or more) of the aircraft involved may be assessed by the Mode S interrogator to be a false or reflected echo, and subsequently ignored. These aircraft will not then be displayed to air traffic controllers.

This is information only. Recommendations are not mandatory.

- In the case of aircraft whose flight paths cross, the identification labels of those aircraft may inadvertently 'swap' (i.e. replace one another) on air traffic controllers displays, thereby presenting controllers with incorrect information and creating the possibility of misidentification.

- The performance of ACAS II systems could be seriously degraded or even <u>disabled</u>.

Any incorrect aircraft address is, potentially, a duplicate address, because it has not been legitimately assigned to that airframe. The potential for duplication rises dramatically in cases of incorrect addresses where values such as all 0's or all 1's have been set.

Recommendations: If you become aware, or are notified, that your aircraft has an incorrect ICAO 24-bit aircraft address, EASA recommends that you take action to ensure that the address, as assigned to your aircraft by the State of Registry or common mark registering authority, is set correctly at the earliest opportunity.

In addition, confirmation that the assigned ICAO 24-bit aircraft address is being transmitted should be obtained.

Aircraft operators/owners will be notified of an incorrect ICAO 24-bit aircraft address via their National Aviation Authority (NAA), or Air Navigation Service Provider. To ensure that the notifying authority can track the resolution of such issues, it is highly recommended that operators/owners promptly advise the notifying authority about any rectification action.

The ICAO 24-bit aircraft address is normally set in the Mode S transponder, but it can be set in other items of interchangeable airborne avionic equipment. In order to ensure that the assigned ICAO 24-bit aircraft address is transmitted, EASA recommends that the operation of installed Mode S transponder systems is verified using appropriate ramp testing equipment at intervals not exceeding 2 years, in accordance with in accordance with appropriate maintenance manual procedures and using calibrated ramp test equipment.

Guidance for the ground testing of transponders can be found in Appendix 1 of this SIB.

Note 1: In case the ramp test equipment indicates an error with the transmission of data, or indicates any other type of failure (e.g. out of frequency, power etc), the problem should be corrected prior to the next flight.

Note 2: Aircraft manufacturers may wish to apply to their NAA for a 'block' of ICAO 24-bit aircraft addresses exclusively for use during development and production acceptance flights.

Contacts: For further information contact the Safety Information Section, Executive Directorate, EASA; E-mail: ADs@easa.europa.eu.

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Appendix 1 - Transponder Ground Testing Guidance

a. When not required, ensure all transponders are selected to 'OFF' or 'Standby'.

b. Before starting any test, contact the local Air Traffic Control Unit and advise them of your intention to conduct transponder testing. Advise the Air Traffic Unit of your start time and test duration. Also inform them of the altitude(s) at which you will be testing, your intended Aircraft Identification (Flight Id) and your intended Mode A code. See para c and d. Note: Certain altitudes may not be possible due to over flying aircraft.

c. Set the Mode A code to 7776 (or other Mode A code agreed with Air Traffic Control Unit). *Note: The Mode A code 7776 is assigned as a test code by the ORCAM Users Group, specifically for the testing of transponders.*

d. Set the Aircraft Identification (Flight Id) with the first 8 characters of the company name. This is the name of the company conducting the tests.

e. Set the on-the-ground status for all Mode S replies, except when an airborne reply is required (e.g. for altitude testing).

f. Where possible, perform the testing inside a hanger to take advantage of any shielding properties it may provide.

g. As a precaution, use antenna transmission covers whether or not testing is performed inside or outside.

h. When testing the altitude (Mode C or S) parameter, radiate directly into the ramp test set via the prescribed attenuator.

i. In between testing, i.e. to transition from one altitude to another, select the transponder to 'standby' mode.

j. If testing transponder parameters other than 'altitude', set altitude to -1000 feet (minus 1000 feet), or over 60000 feet. This will minimise the possibility of ACAS warning to airfield and overflying aircraft.

k. When testing is complete select the transponder(s) to 'OFF' or 'Standby'.

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