

BGA Airworthiness and Maintenance Procedure

Transponder Maintenance (replacing BGA inspection 052-08 and BGA airworthiness form 284)

Version 1

Effective date 1st February 2018

EASA is moving towards better and lighter regulations for GA. This includes the subject of transponder maintenance. Currently, there are no generic Airworthiness Directives that mandate transponder maintenance in ELA1 aircraft (sub 1200kg). The BGA only has EL1 aircraft in its CAMO.

The previously mandatory transponder maintenance AD no longer applies. EASA now publishes Safety Information Bulletin SIB No.: 2011-15R2 Issued: 19 July 2013 (reproduced below). This bulletin is recommended maintenance and not mandatory.

Most modern transponders have built in test equipment and display the Flight Level that the transponder is transmitting. The worst possible error would be the wrong Flight Level transmitted to ATC or airliner TCAS systems. This could cause problems in surrounding airspace as ATC try and vector people around where your transponder says you are or with TCAS systems on board aircraft. Every year an airborne check with a radar unit would be prudent to ensure it is transmitting and displaying the correct data.

It is recommended you ensure (annually) that the ICAO 24-bit aircraft address (unique to your aircraft) in the transponder has been entered into your transponder correctly. The 24 bit address can be found on the CAA website GINFO when you enter your registration. Link to GINFO below
<https://publicapps.caa.co.uk/modalapplication.aspx?appid=1>

Here is a reproduction of the EASA Safety Information Bulletin. Please note that this was correct at the time of publication of this AMP. Owners and inspectors should check for updated information.

EASA Safety Information Bulletin

SIB No.: 2011-15R2

Issued: 19 July 2013

Subject: Mode S and Mode C Transponder Systems: Ground Testing

Ref. Publications: None.

Revision: This SIB revises EASA SIB 2011-15R1 dated 17 April 2013 to make a correction on page 4.

Applicability: All owners and operators of aircraft having Secondary Surveillance Radar (SSR) **Mode S** transponder or SSR **Mode C** transponder systems installed.

Mode S transponder systems and Mode C transponder systems 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: Accurate and reliable surveillance information (including altitude reporting) and aircraft and/or flight data, transmitted by Mode S and Mode C transponder systems when the aircraft is in flight and on the ground, is crucial for the safe and smooth operation of today's air traffic management environment.

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 Commission Regulation [EU 748/2012](#), Part 21.A.3B.

This SIB is revised to include a reference to Mode C transponder systems and is concurrent with the cancellation of

EASA AD 2006-0265.

Note: AD 2006-0265 applied to Mode C and Mode S Transponder Systems, utilising Gilham code altitude input. This AD was cancelled based on the low number of reports, concerning incorrect altitude indication, due to Gilham code wiring problems.

Nevertheless, incorrect or missing data can lead to an increase in controller and/or flight crew workload, which could develop into a potentially hazardous situation. Some examples have been published in [EASA SIB 2011-13](#) - Mode S Transponder: Loss of Detection (Complete or Intermittent) of Aircraft by Mode EASA SIB No: 2011-15R2

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S Interrogators, and [EASA SIB 2011-14](#) - Mode S Transponder: Incorrect Setting of ICAO 24-Bit Aircraft Address.

Recommendations: If you become aware, or are notified, of a transponder system deficiency affecting your aircraft, EASA recommends that you initiate an unscheduled maintenance action to arrange for any deficiencies to be corrected, at the earliest opportunity.

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 of any rectification action. In order to ensure acceptable transponder system performance, EASA recommends that the correct operation of installed **Mode C or Mode S transponder systems is verified periodically (the interval most frequently used in the past was 24 months)**, using appropriate (and calibrated) ramp testing equipment in accordance with applicable maintenance manual procedures.

1. **For Mode S equipped aircraft**, testing for correct functionality should include the following items (where applicable):

•	The Mode S 24-Bit aircraft address
•	Altitude reporting including the check of the altitude sensor at adequate intervals from ground to the certified altitude ceiling of the aircraft.
•	Mode S Elementary Surveillance (ELS) & Downlink Aircraft Parameters (DAPs):
○	Aircraft Identification

- Capability Report
- Pressure Altitude

○	Flight Status
•	Mode S Enhanced Surveillance (EHS) & Downlink Aircraft Parameters (DAPs)

- Magnetic Heading
- Indicated Airspeed
- Mach No.
- Vertical rate

- Roll Angle
- Track Angle Rate or True Airspeed
- True Track Angle
- Ground Speed
- Selected Altitude (and Barometric Pressure

Setting where appropriate)

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2. For Mode C equipped aircraft, testing for correct functionality should include the following items:

- Correct operation of the Mode A code
- Altitude reporting including the check of the altitude sensor at adequate intervals from ground to the certified altitude ceiling of the aircraft.

3. For Mode C or Mode S equipped aircraft utilising Gilham Code (sometimes referred to as Grey code) to provide altitude input to the transponder the testing for correct functionality should include the following items:

(1) Connect an air data test set to the No. 1 and No. 2 (where applicable) Pitot/Static system.

(2) In the aircraft flight deck/cockpit, select the No. 1 Mode 'C' or Mode 'S' transponder (as applicable) and select Air Data source No. 1.

(3) Select the air data test set to the following altitude reporting values:

1 000 feet;

4 100 feet;

15 700 feet; and

31 000 feet

(4) For each selected altitude, verify that the Mode 'C' or Mode 'S' transponder (as applicable) altitude reporting is within tolerance (± 125 feet), and record the altitude as follows:

1 000 feet = Actual reading (± 125 feet)

4 100 feet = Actual reading (± 125 feet)

15 700 feet = Actual reading (± 125 feet)

31 000 feet = Actual reading (± 125 feet)

(5) In the aircraft flight deck/cockpit, select Air Data source No. 2 (if applicable) and repeat items (3) and (4) above.

(6) In the aircraft flight deck/cockpit, select the No. 2 Mode 'C' or Mode 'S' transponder (if applicable) and select Air Data source No. 1 and repeat items (3) and (4) above.

(7) In the aircraft flight deck/cockpit, select Air Data source No. 2 (if applicable) and repeat items (3) and (4) above.

(8) Where aircraft have the availability of a third air data source, that provides altitude data to the transponder system, then repeat items (3) and (4) above, for No. 1 and/or No.2 Mode C or Mode S transponder systems connected to Air Data source No. 3.

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(9) Confirm by inspection and reference to aircraft and equipment Maintenance Manuals and Wiring Diagrams, that, where dual Air Data sources are used, the transponder altitude data comparator function is enabled. Using appropriate test equipment, demonstrate that the comparator detects altitude data differences between the dual encoders of more than 600 feet.

If the comparator function is not enabled or is unserviceable, rectify before further flight (this requirement is only applicable to aircraft which utilize dual Air data sources and have ACAS II installed). Note: The comparator function is only available when Mode S transponders are installed.

Note 1: Care should be taken, not to disturb the operation of ATC or other aircraft when performing any transponder (or ACAS) related tests. Guidance for the ground testing of transponders can be found in Appendix 1 of this SIB.

Note 2: In case the ramp test equipment indicates an error with the transmission of the data as specified above, 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 3; Detailed information on EHS DAP's may be found in EASA AMC 20-13 - Certification of Mode S Transponder Systems for Enhanced Surveillance.

Note 4: For aircraft which do not provide a full set of DAP's, the testing may be limited to only those declared in their Aircraft Flight Manual.

Note 5: These recommendations do not apply if the aircraft maintenance manual or transponder equipment manufacturer specifically states that periodic testing is not required due to other mitigation means available to detect failures of the transponder system.

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

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