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| EASA | COMMENT RESPONSE DOCUMENT |
|  | <p align="center">EASA PAD No. 12-093 [Published on 30 July 2012 and officially closed for comments on 27 August 2012]</p> |

Commenter 1: Bangkok Airways – Anurak – 31/07/2012

Comment # 1

Bangkok Airways just received and reviewed the PAD 12-093 regarding the THALES AOA Sensors PN C16291AA and C16291AB.

In paragraph (2), three months from effective date might be too short for airlines to comply because it might not be possible for THALES to supply the sensors in time. Please review and advise the possibility to extend the compliance period.

For us, it is fine because we have the maintenance records (shop report) showing that all affected sensors had already been embodied SB 007.

EASA response: Comment understood.

In order to help the customers for AOA sensor tracking, Thales issued Service Bulletin C16291A-34-007 Revision 4, which lists all the affected serial numbers. No logistics problems are anticipated by Airbus and Thales for this specific population.

The Final AD has been amended to make reference to Revision 4 of Thales SB C16291A-34-007.

Commenter 2: Air France – Patrick Janiak – 02/08/2012

Comment # 2

Following issue of PAD N°12-093, AFR would like to bring some comments regarding this proposal :

[1] Two different topics are discussed in this document, one in relation with Thales AOA sensors corrupted with oil residue [which] was already linked to the previous EASA AD 2011-0203, the other concerning the installation of new conic plates. For a better understanding and management, it would be interesting to not mix the two subjects which are not connected.

[2] In paragraph (2) of the required actions, the compliance time of 3 months to replace AOA sensors PN C16291AB seems too short for AFR. Indeed AFR A320 Family fleet is today fitted with about 40 AOA sensors listed in VSB C16291A-34-007 Rev 01, today AFR does not know how many AOA sensors will be concerned by the required action of this paragraph (2). The inspection of AFR AOA sensors i.a.w. VSB C16291A-34-007 has been performed by Thales itself and at this time AFR expects an answer from Thales to know if we are affected or not. Consequently a compliance time of 6 months seems better in case of AOA replacement (spare needed).

[3] In paragraph (3) of the required actions, regarding the replacement of the AOA protection covers in the flight kit N°2, AFR considers that the fact to release an aircraft without the fly kit N°2 on board is not an unsafe condition as long as the protection covers are available on ground. Consequently EASA have to allow operators to manage the fly kit N°2 as they please (on board or on ground), the AD should reflect this possibility.

[4] Paragraph (5) of the required actions could be incorporated in paragraph (4) which covers the same subject.

EASA response: Comments partially agreed.

[1] The new AD requires installation of new cover plates on AOA in airworthy conditions: previous AD requirements and with the new affected population as defined in paragraph 2 of this AD is a pre-requisite – refer to paragraphs (4) and (5) of the PAD.

No changes have been made to the Final AD in response to this comment.

[2] Thales VSB C16291A-34-007 has been revised at revision 04 and provides a list of all remaining affected SN with PN –AA and/or -AB. See answer to comment #1 above.

[3] Airbus SB 34-1521 revision 1 has been issued to allow this flexibility. The Final AD has been amended to make reference to this revision 1.

[4] Comment agreed - paragraphs (4) and (5) have been merged in the Final AD.

Commenter 3: Lufthansa Technik – Thomas Dauer – 08/08/2012

Comment # 3

The PAD 12-093 and mandatory SB A320-34-1521 require not only the replacement of the AOA sensor plates but also to replace the AOA protection covers within flight kit#2. The covers are used on ground only.

At DLH we have the situation that the flight kit#2 is not stowed in the aircraft but for fuel saving purposes is stored in the tool store. Presumably not all flight kits#2 have been kept. So for DLH it would not be possible to fulfil the requirements of the PAD and SB 34-1521 with respect to the flight kit#2 for several aircraft. Besides, it seems as the modification of the flight kit#2 has no direct effect on the AOA modification or on the airworthiness of the aircraft.

Although, the PAD requirement (4) tells to replace the AOA protection covers in the flight kit n°2, “as applicable to aeroplane configuration”, this description might lead to some misinterpretation.

In this regard, Airbus already announced to add the following note in the next revision of SB A320-34-1521:

“NOTE: DEPENDING ON AIRLINE INTERNAL POLICY THE FLIGHT KIT NO 2 MAY NOT BE LOCATED IN THE PLACE DEFINED BY FIG. A-FBBAA. REFER TO AIRLINE INTERNAL POLICY FOR EXACT LOCATION FOR FLIGHT KIT NO 2.”

It would be appreciated, if this note could also be added to the upcoming AD Note.

EASA response:

Comment agreed. See comment #2, answer [3] above.

Commenter 4: Orbest Airlines – Yuri Sales – 16/08/2012

Comment # 4

In EASA PAD 12-093 paragraph 4 propose to mandate a modification of AOA plates on A320 (only?) I .A.W the mandatory Airbus SB A320-34-1521. Yet the A330 homologue SB A330-34-3255 was released by Airbus, rendered mandatory as well was already scheduled by IWD (Orbest). This modification will not be included on the future EAD?

EASA response: Comment understood. This AD applies to A320 family aeroplanes only. An equivalent AD for A330 family aeroplanes is expected to be issued separately.

No changes have been made to the Final AD in response to this comment.

Commenter 5: Thales Avionics – Xavier Audouze-Chaud – 24/08/2012

Comment # 5

Thales has reviewed the PAD 12-093 about AOA sensor replacement/modification for AIRBUS Single Aisle family and provides EASA and Airbus with the following comments:

Thales agrees on the fact that this AD will supersede previous AD 2011-0203. However, Thales does not fully agree with two items and would like to introduce the following modifications :

[1] the proposed text for Reason section should firstly point out the real reason of this new AD which is the introduction of the new conic plate on all AoA sensors (both Thales and Goodrich ones) rather than focus on items already covered by EASA 2011-0203.

[2] The burden of inspections required in action (2) is excessive for airlines whereas it can be reduced by a proposed revision of Thales SB C16291A-34-007.

In more details:

[1] The Thales proposed text for Reason paragraph is the following :

This AD is aiming at introducing new conic plates on all AoA sensors which have been developed to improve the protection of AoA sensors from ice crystals and to anticipate compliance with new airworthiness regulations concerning icing. The modification of all AoA sensor plates shall consist in the replacement of the current AoA flat plates with the new conic plates for all Thales Avionics (formerly SEXTANT) Part Number (P/N) C16291AA, P/N C16291AB and Goodrich P/N 0861ED AoA sensors.

Additionally, during Airbus Final Assembly Line flight tests, AoA data from two different aeroplanes was found inaccurate, which was confirmed by flight data analysis.

Investigation conducted by Airbus and Thales on the removed sensors revealed oil residue between the stator and the rotor parts of the AoA vane position resolvers. This oil residue was the result of incorrect removal of machining oil during the manufacturing process of the AoA resolvers. At low temperatures, this oil residue becomes viscous (typically in cruise), causing delayed and/or reduced AoA vane movement. Multiple AoA sensors could be simultaneously affected, providing incorrect indications of the AoA of the aeroplane.

This condition, if not corrected, could lead to erroneous AoA information and consequent delayed activation or non-activation of the AoA protection systems which, if during flight at a high angle of attack, could result in reduced control of the aeroplane.

To address this unsafe condition, EASA issued AD 2011-0203 to require the identification of the serial number (s/n) of each installed Thales Avionics (formerly

SEXTANT) Part Number (P/N) C16291AA AoA sensor and the replacement of all suspect units with serviceable ones. EASA AD 2011-0203 also prohibits the (re)installation of these same s/n sensors on any aeroplane, unless corrective measures have been accomplished.

It then has been discovered that a part of the affected population of AoA sensors may have been modified and re-identified from P/N C16291AA to P/N C16291AB in accordance with the instructions of Airbus Service Bulletin (SB) A320-34-1444 without having passed the inspection in accordance with the instructions of Thales Avionics SB C16291A-34-007 Revision 01.

For the reason described above, this new AD retains the requirements of EASA AD 2011-0203, which is superseded, and requires, for the remaining affected population that was not yet addressed by EASA AD 2011-0203, the replacement of the suspect units with serviceable ones.

Consistently, the AD title should be reworded as follows: Navigation - Angle of Attack (AOA) Sensors installation.

[2] Thales is unaware of C16291AB equipment derived from C16291AA from the S/N batch identified in Thales SB C16291A-34-007 without passing the inspection required per Thales SB C16291A-34-007. However, should such non-conformity exist, it is mandatory that the source of it is identified and specific batches are identified. Indeed, it would be unacceptable to request such an inspection with its induced costs on all applicable C16291AB S/N for a few non-conformities created in very limited quantities. The work induced by such an inspection is huge and unacceptable, as airline would have to request the required document from Thales and Thales would have to retrieve the individual report for 1575 equipment.

Thales maintains a log of the S/N modified according Thales SB C16291A-34-007. On June 22nd, only 194 out of the 1575 applicable S/N are left to be modified.

Accordingly, Thales has initiated a revision of Thales SB C16291A-34-007 to provide this new list of S/N yet to be modified for resolver issue. This revised SB is scheduled for September 28th. This would reduce the burden for airlines to verify only 194 [sensors] instead of 1575.

Action (2) could then be worded as follows :

For aeroplanes fitted with C16291AB AOA sensors with S/N as listed in Thales SB C16291A-34-007 Rev 04, within 3 months after the effective date of this AD, replace the affected sensor unless it can be demonstrated by maintenance records that the affected AoA sensor that it has passed the inspection in accordance with the instructions of Thales Avionics SB C16291A-34-007 Revision 01 or later.

Thales remains available to discuss and coordinate this issue with Airbus and EASA, as soon as main actors are back from holidays.

EASA response: Comments partially agreed.

[1] EASA does not concur; the chronology of AD issuance is maintained in the Final AD. Nevertheless, the Reason section of the Final AD has been slightly amended.

[2] EASA concurs; the Final AD has been amended accordingly.