International Civil Aviation Organization

Eighth Meeting of the Surveillance Implementation Coordination Group (SURICG/8)

Bangkok, Thailand, 6 – 9 June 2023

Agenda Item 7: Report on surveillance ground system and avionics performance monitoring and improvement in compliance

Recent ADS-B Avionics Issues in the United States

(Presented by United States/Federal Aviation Administration)

SUMMARY

This paper provides a description of recent ADS-B avionics issues observed in the U.S. with DO-260B/ED-102A systems.

1. INTRODUCTION/BACKGROUND

1.1 The Federal Aviation Administration (FAA) monitors all ADS-B information received in all airspace covered by FAA-contracted Automatic Dependent Surveillance – Broadcast (ADS-B) ground stations via a tool called the ADS-B Performance Monitor (APM).

1.2 Since the US has an ADS-B mandate in effect (i.e., 14 CFR 91.225 and 91.227), this paper describes only those issues observed by the FAA for 1090ES Version 2 systems via the APM.

2. DISCUSSION

2.1 Collins Aerospace TDR-94/94D Issue

2.1.1 On October 2016, Airbus Canada published Service Letter (SL) CS-SL-34-40-0002 to inform Operators of possible nuisance messages related to the ADS-B function on the BD-500-1A10/BD-500-1A11 (A220-100/300) aircraft.

2.1.2 The issue occurs when the on-board TDR transponder detects a nuisance fault, ceasing the ADS-B reporting function. The nuisance fault is created when the aircraft begins to report an incorrect Navigation Accuracy Category for Velocity (NACv) of 0.

2.1.3 After conducting a root cause analysis, Collins Aerospace determined that the issue exists in the software for all TDR model transponders. Although this issue affects all TDR-94/94D transponders, the FAA has only noted the occurrence of the failure on the Airbus

A220 aircraft platforms. These platforms are known to be equipped with the Collins Traffic Surveillance System (TSS)-4100 and TDR-94D transponder combinations.

2.1.4 If the annunciation is detected by the active transponder, the flight crew will receive one of the following CAS messages; ADS-B 1 OUT FAIL (C) or ADS-B 2 OUT FAIL (C).

2.1.5 Annunciation of this failure will cause the flight crew to transfer to the standby transponder, and the initial caution message is replaced with an AVIONIC FAULT (A) and the related INFO message and ADS-B reporting function in the TDR recovers.

2.1.6 If the nuisance fault is detected by the standby TDR, then only an AVIONIC FAULT (A) is posted along with the related INFO message. The flight crew is unaware of the issue, and there is no loss of ADS-B reporting functionality.

2.1.7 Utilizing the APM Avionics Trend Analysis Tool (ATAT), FAA Flight Standards personnel identified a number of aircraft failing to comply with 14 CFR 91.227 by broadcasting NACv = 0.

2.1.8 After additional investigation, the FAA found that aircraft would remain in the failure condition reporting NACv = 0 until a pilot action was taken (e.g., switching to standby transponder).

2.1.9 On April 2021, the FAA began coordinating with operators to identify the problem aircraft and inform them of the non-compliance to the ADS-B regulation.

2.1.10 In March 2021, Airbus Canada issued an updated SL providing additional information on the issue, and providing operator actions to mitigate the issue until a Service Bulletin is available.

2.1.11 As of June 2022, Flight Standards has identified 3 operators with a total of 64 aircraft exhibiting the NACv = 0 issue operating in U.S. airspace.

2.1.12 Service Bulletin (SB) 523-0833673 implementing the nuisance alert fix was released by Collins Aerospace in October 2022. It is important to note, Airbus Canada and Collins Aerospace have determined that the service bulletin **will not** be mandatory and implementation of this fix will be accomplished via attrition.

Note: For those interested in obtaining a copy of the service bulletin, please contact Collins Aerospace.

2.2 **Honeywell Primus II RCZ issue.**

2.2.1 As the U.S. ADS-B Mandate drew closer and Air Traffic Controllers began utilizing ADS-B functionality, ATC observed that a number of operators equipped with the Honeywell Primus II integrated system were filing flight plans as ADS-B equipped, but not transmitting ADS-B.

2.2.2 The FAA Air Traffic Organization reported the issue to the appropriate FAA Flight Standards personnel. It was learned that Honeywell had identified an issue where the ADS-B Out capable RCZ transponder and Radio Management Unit (RMU) components of the Primus II system will not broadcast ADS-B data if powered on under specific conditions. In addition to the lack of ADS-B transmissions from the RCZ transponder, the Radio Management Unit (RMU) will fail to notify the flight crew that ADS-B Out functionality is disabled. Due to lack of flight crew awareness, an aircraft may depart the airport without active ADS-B transmissions.

2.2.3 In October 2015, Honeywell released a Service Information Letter (SIL) Publication Number D201507000061 in an attempt to notify customers of these power up conditions, the effect it would have on the Primus II equipment, and a potential work around to address the problem. In December 2019, Honeywell released Service Bulletin (SB) Publication Number A21-2254-148 providing required modifications for the RMU to correct the ON/OFF logic for the ADS-B Out functionality.

2.2.4 The FAA has been working in collaboration with Honeywell to update the existing SIL to emphasize the importance of updating the RMU with the latest SB, to include implementing the option of configuring the ADS-B Out installation through a strap setting to provide indication of the ON/OFF control of ADS-B to the flight crew.

2.2.5 The latest revision of the SB and SIL is referenced in the Safety Airworthiness Information Bulletin (SAIB) AIR-21-15 R1 issued by the FAA on 16 September 2021. The SAIB will bring further awareness to the problem, its impacts, and inform the aviation community of the resolutions available to ensure aircraft compliance when operating in ADS-B required airspace. In addition, FAA Flight Standards personnel have begun a campaign to reach out to aircraft owners, operators, and certificate holders that operate this equipment in order to inform them of the Service Bulletin available to correct the issue.

Note - *The SAIB can be found by searching for AIR-21-15R1 on the FAA's new regulatory website (https://drs.faa.gov).*

3. CONCLUSION

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

– – – – – – – – – – – – – –

– – – – – – – –