International Civil Aviation Organization

Sixth Meeting of the Surveillance Implementation Coordination Group (SURICG/6)

Video Teleconference, 24 – 27 August 2021

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

RECENT ADS-B AVIONICS ISSUES OBSERVED 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

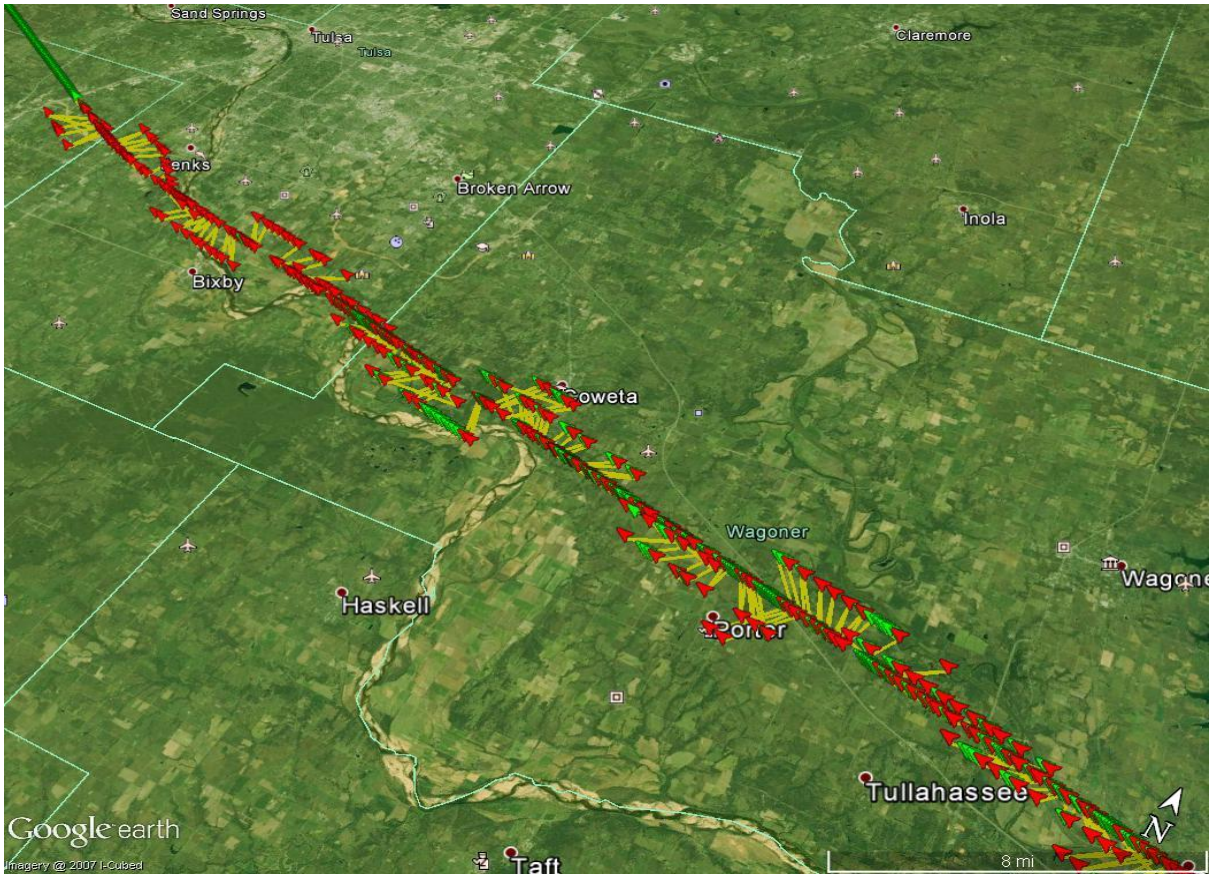
1.1 The Federal Aviation Administration (FAA) monitors all ADS-B Version 2 information received in all airspace covered by FAA-contracted Automatic Dependent Surveillance – Broadcast (ADS-B) ground stations via a tool called the ADS-B Performance Monitor (APM).

1.2 This paper describes issues observed by the FAA for 1090ES systems via the APM. This paper does not include issues for aircraft equipped with Universal Access Transceiver (UAT) (978 MHz) ADS-B systems, since such systems are not used by other ICAO States.

2. DISCUSSION

2.1 Embraer 17x track jumping issue.

2.1.1 In early 2018, FAA monitoring observed ADS-B “track” jumping by an Embraer 175 regional jet equipped with Honeywell Version 2 transponders. As illustrated in the below graphic, the APM will designate green for compliant ADS-B data and red for noncompliant ADS-B Data. The graphic is from a flight on 17 January 2018; the track depicts the aircraft flying from the right side of the graphic to the left. The transponders were removed from this aircraft, and provided to Honeywell engineering for bench testing.



2.1.2 This was not the FAA's first observation of this problem with an Embraer E17x regional jet. In late October 2016, a Skywest E175 was detected exhibiting similar "track jumping" behaviour. FAA Air Traffic Control (ATC) personnel notified FAA Flight Standards, who then contacted the operator and ordered replacement of the aircraft's transponders. Unfortunately, these transponders were returned to a service center without notification to Honeywell engineering, and no "root cause" testing was performed. In late July and early August 2017, FAA detected two E175 aircraft from two different airlines exhibiting "track jumping" behaviour. FAA notified both operators and the transponders were removed from the respective aircraft and sent to Honeywell engineering for additional testing. Bench testing revealed no apparent issues.

2.1.3 In all but one of the observed cases, the issue has never recurred on the same aircraft after the transponders were removed. Bench testing of the removed transponders has revealed no faults or anomalies to date.

2.1.4 The FAA learned from communications with Embraer that the most recent events detected by FAA generated an "ADS-B NOT AVAIL" Crew Alerting System (CAS) message. When flight crews report this message, airline maintenance replaces the transponder(s), which resolves the problem. To date, this has consistently occurred before FAA monitoring detected the problem and FAA personnel could engage with the airline. Occurrence of this issue is rare, as FAA has only observed one recent occurrence of this issue since March 2020. This is the second occurrence in which swapping the transponders has not resolved the issue. Prior to that occurrence, there were no events identified between November 2018 and March 2020, even though over 500 E17x aircraft were operated daily in the U.S. during this period. The root cause for this issue remains unknown.

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. The latest revision of this SIL will be referenced as part of the FAA issued SAIB expected to be released before the end of December 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.

3. CONCLUSION

3.1 The meeting is invited to:

a) note the information about the various avionics issues described; and

b) discuss these matters as appropriate.

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