

RTCA Special Committee 186, Working Group 3

ADS-B 1090 MOPS, Revision A

Meeting #15

Open Issues related to DO-260A

Presented by: Gary Furr

SUMMARY

As we have edited DO-260A, written test procedures and reviewed requirements, we have collected the following set of “Open Issues” that cannot be resolved simply by rewriting a test procedure or a simply editorial change. The following require discussion by Working Group 3 for resolution.

As we have edited DO-260A, written test procedures and reviewed requirements, leading up to the creation of Dtaft-5 of Sections 1 through 4 of DO-260A, we have collected the following set of “Open Issues” that cannot be resolved simply by rewriting a test procedure or a simply editorial change. The following require discussion by Working Group 3 for resolution.

The following list is presented in no particular order, other than the order that they happen to be presented or discussed at the FAA Tech Center, or by other people reviewing the document.

1. During review of “TBD” sections, we realized that §2.4.17.3.3.2 was still TBD. Upon review, this is a subsection of the TIS-B Identification and Category Message and it is entitled “Application.” It essentially states that the TIS-B ID and Category Message shall be used only for aircraft identified with an ICAO 24-bit address. The FAATC Team believes that this is not a testable requirement and that the §2.2.17.3.3.2 should be deleted. The requirement belongs on the Ground TIS-B System to insure that the TIS-B Identification and Category Message only uses the ICAO 24-bit address. *[Section 2.2.17.3.3.2 was deleted and the text changed to be a note. Additionally, all references in 2.2.17 and the same sections of Appendix A were changed to reference a “24-bit Aircraft Address” instead of an ICAO Address.]*
2. The FAATC Team believes that there is currently a discrepancy between the Transponder MOPS (DO-181C) and the Extended Squitter 1090 MOPS (DO-260A) in the broadcast of TYPE Code Zero Messages. DO-181C specifies in §2.2.16.2.6.2.4.2 to clear all 56 bits of the Airborne Position, Surface Position and Velocity registers if not updated within 2 seconds of the previous update. Further, DO-181C §2.2.16.2.6.2.3 specifies that if data is not updated after 60 seconds, that the squitter type will discontinue broadcast.

DO-260A is not totally consistent with this requirement. Appendix A, §A.1.5.2 and §A.1.5.3 specify the transponder timeout requirements exactly, and §A.1.5.4 further indicates that the Non-Transponder-based system must adhere to these same requirements. §A.1.6.3.2 further explains that TYPE Code Zero can result from Airborne Position, Surface Position and Airborne Velocity Messages that are ZEROed after 2 seconds if the register is not updated. In summary, DO-260A, Appendix A appears to be consistent with the Transponder MOPS (DO-181C).

DO-260A levies similar and consistent requirements in §2.2.3.3.2.11 and 12. However, Table 2-11 leads one to believe that TYPE Code Zero could only be due to an Airborne or Surface Position Message. The requirements of sections §2.2.3.2.3.1.3.2 *[changed]*, §2.2.3.2.4.1.3, §2.2.3.2.6.1 *[Tom Pagano will offer and change]*, §2.2.3.2.6.2, §2.2.3.2.6.3 and §2.2.3.2.6.4 need to be reviewed for consistency.

3. The FAATC Team believes that there should be a “**shall**” inserted into the text of paragraph “a” of §2.2.3.2.6.1.3 in order for this to be a testable requirement, as we assume that it was intended. We have already written the test procedure as if the “**shall**”

has been inserted, on the assumption that WG-3 will agree with us. *[WG-3 agreed and a shall will be insterted]*

4. During his review of the ADS-B MASPS Compliance Matrix, Stuart Searight has the following comment on §2.2.3.2.7.2.4.2 entitled “TCAS/ACAS Resolution Advisory Active:”

This section, as currently worded does not completely reflect the ADS-B MASPS requirements for this OM Code. The MASPS requirement is a 3 part requirement which includes setting the bit to ONE if an RA is known to currently be active, or if it is unknown whether an RA is active or not. (The bit is set to ZERO if it is known that an RA is NOT active.) I would propose rewording this section to define the ZERO case (RA not active) and then have an "otherwise the bit shall be ONE" condition at the end.

Proposal: Keep first sentence, but then replace rest of paragraph with the following:

“The ADS-B Transmitting Subsystem **shall** set this code to ZERO (0) so long as a TCAS II or ACAS Resolution Advisory is known **not** to be in effect (i.e. an update has been received within the last two seconds that indicates that a TCAS/ACAS Resolution Advisory is **not** active); otherwise, it **shall** set this OM code to ONE.” *[Agreed]*

5. During his review of the ADS-B MASPS Compliance Matrix, Stuart Searight has the following comment on the Validity Flag for the Altitude Rate specified in §2.2.8.1.1.2:

Table 2.2.8.1.1.2 “ADS-B SV Report Validity Flag Requirements” shows a single validity flag for altitude rate. (DO-260 had separate validity flags for barometric and geometric rates since both were required in DO-242. DO-242A only requires a single rate to be sent.) The problem with a single flag, however, is that the "b." paragraphs in 2.2.8.1.14 (Geo Rate) and 2.2.8.1.15 (Baro Rate) both set the flag according to whether rate from that source is being sent. Depending on the timing of this information being loaded, it would seem quite possible to load a valid rate from one source but then set the flag to ZERO because a rate is not being sent from the second source.

Proposal: Reinsert a second rate validity flag in the SV report so that they are treated only in response to whether there is valid data available from that source. (This combined with the Rate Source bit in MS reports will allow applications to know which rate was sent and if it is valid data.) *[Agreed]*

6. During his review of the ADS-B MASPS Compliance Matrix, Stuart Searight has the following comment on §2.2.3.2.7 “ADS-B On-Condition Messages:”

DO-242A currently has ARV Reports as On-Condition Reports, however it does not define any conditions for which this report is required. (The information within the ARV Report was required in DO-242 under the condition of loss of ground-referenced data.) Due to a limit of 2 velocity squitters per second in DO-181C, it will not be possible to transmit messages supporting ARV reports (Airborne Velocity Subtype 3 or 4) when also supporting SV requirements with ground-referenced velocity data (Airborne Velocity Subtype 1 or 2). It is very likely that conditions will be defined within DO-242B for which both ground- and air-referenced velocity information will be required. **Question:** Should we define an On-Condition message supporting ARV reports that could be transmitted in lieu of Airborne Velocity Subtype 3 messages and at lower rates??
[We will not define an On-Condition message]

7. During his review of the ADS-B MASPS Compliance Matrix, Stuart Searight has the following comment on absence of a paragraph in the 2.2.5.1 (ADS-B Transmission Device Data Processing and Message Formatting) section of DO-260A regarding the “Emergency/Priority Status:”

Proposal: The proposed new subsection would read something like this:

2.2.5.1.35 Emergency / Priority Status Data

The ADS-B Transmitting Subsystem **shall** accept the Emergency / Priority Status (see §2.2.3.2.7.1.3.15) via appropriate data input interfaces and use such data to establish the "Emergency / Priority Status" Subfield (§2.2.3.2.7.1.3.15) in Target State and Status Messages (see §2.2.3.2.7.1) and in Extended Squitter Aircraft Status Messages (TYPE "28") (see §2.2.3.2.7.8) as specified in §2.2.3.2.7.1.3.15. *[Accepted]*

8. In discussions with Australia representatives in ICAO meetings, Vince Orlando has received a request to make a change in DO-260A:

Australia is considering implementing Extended Squitters for General Aviation through the addition of Extended Squitter transmissions to a Mode A/C transponder. For this reason, Australia has requested that the term "**Non-Transponder Device**" as used in the current drafts of the 1090 MHz MOPS (DO-260A) be changed to include this configuration. The term "**Non-Mode S Transponder Device**" would be a more accurate and preferred description. *[WG-3 already defined this in Appendix B]*