

RTCA Special Committee 186, Working Group 3

ADS-B 1090 MOPS

Meeting #2

Additional Identification Squitter

Presented by Vince Orlando

SUMMARY

In order to meet MASPS track Acquisition requirements for long range deconfliction, an additional ID Squitter is required once per five seconds when TCPs are being broadcast. This additional squitter is delivered via the event driven protocol. The net effect is the broadcast of an ID squitter every 2.5 seconds.

The requirement for this additional squitter is included in Appendix A.4.12, but was inadvertently omitted from Section 2.2. This omission was discovered too late to be corrected for the initial publication of DO-260.

This Working Paper proposes the change to Section 2.2.3.3.2.4 needed to add the requirement for an additional ID Squitter. If accepted by the Working Group, a change will also be required to the Test Procedures in Section 2.4.

1. Background

In order to meet MASPS track acquisition requirements for long range deconfliction, an additional ID squitter is required once per five (5) seconds when TCPs are being broadcast. This additional squitter is delivered via the event driven protocol. The net effect is the broadcast of an ID squitter every 2.5 seconds.

The requirement for this additional squitter is included in Appendix A.4.12, but was inadvertently omitted from Section 2.2.3.3.2.4. This omission was discovered too late to be corrected for the initial publication of DO-260.

2. Proposed Changes

The proposed changes/addition to Section 2.2.3.3.2.4 are attached to this Working Paper as the proposed resolution to the requirement in A.4.12 to generate an Identification and Category squitter via the event driven protocol at random intervals that are uniformly distributed over the range 4.8 to 5.2 seconds relative to the previous event driven Identification and Type Message.

Section 2.2.3.3.2.4
Appendix A.4.12

3. Additional Changes

If this change to Section 2.2.3.3.2.4 is agreed upon by the Working Group, then changes to the Test Procedures in Section 2.4.3.3.2.4 must be made accordingly.

A.4.11.10 Surface Operational Capability Status (OM-1)

This 4-bit (37-40) subfield shall be used to indicate the surface operational capability status of the ADS-B transmitting system to other aircraft as specified by the following encoding shown in Table A-20.

Table A-20: Surface Operational Capability Status Encoding

OM-1 ENCODING: SURFACE OPERATIONAL CAPABILITY STATUS		
OM_1 CODING		MEANING
Bit 37, 38	Bit 39, 40	
0 0	0 0	<i>TBD</i>
	0 1	<i>TBD</i>
	1 0	<i>TBD</i>
	1 1	<i>TBD</i>
0 1	0 0	<i>TBD</i>
	0 1	<i>TBD</i>
	1 0	<i>TBD</i>
	1 1	<i>TBD</i>
1 0	0 0	<i>TBD</i>
	0 1	<i>TBD</i>
	1 0	<i>TBD</i>
	1 1	<i>TBD</i>
1 1	0 0	<i>TBD</i>
	0 1	<i>TBD</i>
	1 0	<i>TBD</i>
	1 1	<i>TBD</i>

A.4.12 Additional Identification and Category Transmission

The aircraft identification and category squitter shall be formatted as specified in the definition of register 0,8.

Note: *It is automatically broadcast by the transponder or non-transponder device every 5 seconds as part of the basic ADS-B message broadcast.*

During operations that utilize TCP, TCP+1 and Aircraft Operational Status messages, the Identification and Category message is shall also be transmitted via the event driven protocol in order to improve detection of this message in high interference environments.

A.4.12.1 Transmission Rate

This message shall be broadcast once per 5 seconds for the duration of the operation.

A.4.12.2 Message Delivery

Message delivery shall be accomplished using the event driven protocol (A.4.7).

Note: Pending further study and analysis of surface broadcast rates and their triggering mechanisms by regulatory authorities, it is widely assumed that the “Low” rate will be raised to a nominal rate approaching once per second.

- d. In the event that the transmission device cannot determine the required transmission rate, then the “High” rate shall be used as the default transmission rate.
- e. Exceptions to these transmission rate requirements are defined in subparagraph 2.2.3.3.2.9.

2.2.3.3.2.4 ADS-B Aircraft Identification and Type Message Broadcast Rate

- a. Once started, ADS-B Aircraft Identification and Type Messages shall be broadcast by the transmission device at random intervals that are uniformly distributed over the range of 4.8 to 5.2 seconds relative to the previous Identification and Type Message, when the ADS-B transmitting device is reporting the Airborne Position Message, or when reporting the Surface Position Message at the high rate.
- ~~b.~~ b.—During airborne operations that utilize TCP, TCP+1 and Aircraft Operational Status Messages, the Identification and Category Message shall also be transmitted via the event driven protocol at random intervals that are uniformly distributed over the range of 4.8 to 5.2 seconds relative to the previous event driven Identification and Type Message.
- ~~c.~~ When the Surface Position Message is being reported at the low surface rate, then the Aircraft Identification and Type Message shall be broadcast at random intervals that are uniformly distributed over the range of 9.8 to 10.2 seconds relative to the previous Identification and Type Message.
- ~~ed.~~ When neither the Airborne Position Message nor the Surface Position Message is being transmitted, then the Aircraft Identification and Type Message shall be broadcast at the rate specified in subparagraph a.
- ~~de.~~ Exceptions to these transmission rate requirements are defined in subparagraph 2.2.3.3.2.9.

2.2.3.3.2.5 ADS-B Velocity Information Message Broadcast Rate

- a. Once started, ADS-B Velocity Information Messages shall be broadcast by the transmission device at random intervals that are uniformly distributed over the range of 0.4 to 0.6 seconds relative to the previous Velocity Information Message.
- b. Exceptions to these transmission rate requirements are defined in subparagraph 2.2.3.3.2.9.

intervals that are distributed over the range of 0.4 to 0.6 seconds as specified in subparagraph 2.2.3.3.2.3.b. Also verify that at least 61 seconds after establishing the new data that the ADS-B Surface Position Message is broadcast at intervals that are distributed over the range 4.8 to 5.2 seconds as specified in subparagraph 2.2.3.3.2.3.c.

2.4.3.3.2.4 Verification of ADS-B Aircraft Identification and Type Message Broadcast Rate (subparagraph 2.2.3.3.2.4)

Equipment Required:

Provide a method of loading valid data for ADS-B broadcast messages into the ADS-B equipment under test.

Provide a method of detecting the RF pulses of the ADS-B Broadcast Message for display on an oscilloscope.

Measurement Procedure:

Step 1: Airborne (subparagraph 2.2.3.3.2.4.a)

Ensure that the equipment is set to the “Airborne” condition and that the appropriate valid ADS-B Aircraft Identification and Type data is available. Verify that the ADS-B Aircraft Identification and Type message is broadcast at intervals that are distributed over the range of 4.8 to 5.2 seconds as specified in subparagraph 2.2.3.3.2.4.a.

Step 2: On the Ground (subparagraph 2.2.3.3.2.4.b)

Ensure that the equipment is set to the “On the Ground” condition and that the appropriate valid ADS-B Aircraft Identification and Type data is available. Verify that the ADS-B Aircraft Identification and Type message is broadcast at intervals that are distributed over the range of 9.8 to 10.2 seconds as specified in subparagraph 2.2.3.3.2.4.b.

Step 3: Data Ceases to be Updated (subparagraph 2.2.3.3.2.11)

Establish the broadcast of the ADS-B Aircraft Identification and Type message as in Step 1 above. Then stop the input of data for the ADS-B Aircraft Identification and Type message.

Verify that the ADS-B Aircraft Identification and Type message continues to be broadcast with the same data that existed prior to stopping the data input for up to 60 +/- 1 second after stopping the data input.

Verify that the ADS-B Aircraft Identification and Type message is no longer broadcast 60 +/- 1 seconds after stopping the data input.