

**RTCA Special Committee 186, Working Group 3**

**ADS-B 1090 MOPS, Revision A**

**Meeting #3**

**Additional Identification Squitter Test Procedures**

**Presented by R.H. “Bob” Saffell**

**SUMMARY**

Working Paper 1090-WP-2-04, dated 30 January 2001, modified section 2.2.3.3.2.4 by adding subparagraph b. to add the requirement to use the Event Driven Protocol to broadcast an additional Aircraft Identification and Type Message when TCP, TCP+1 and Aircraft Operational Status Messages are being utilized.

This working paper provides the necessary test procedure modifications to Section 2.4.3.3.2.4 needed to address the change approved with WP-2-04, and should thereby satisfy the obligations to Action Item 2-3.

## 1. Background

Working Paper 1090-WP-2-04, dated 30 January 2001, modified Section 2.2.3.3.2.4 by adding subparagraph b. to add the requirement to use the Event Driven Protocol to broadcast an additional Aircraft Identification and Type Message when TCP, TCP+1 and Aircraft Operational Status Messages are being utilized.

This working paper provides the necessary test procedure modifications to Section 2.4.3.3.2.4 needed to address the change approved with WP-2-04.

## 2. Proposed Changes

Change Section 2.4.3.3.2.4, step 1, as follows:

FROM: “Step 1: Airborne (subparagraph 2.2.3.3.2.4.a)”

TO: “Step 1: Airborne with No TCP, TCP+1, and Aircraft Operational Status (subparagraph 2.2.3.3.2.4.a)”

Change Section 2.4.3.3.2.4, step 2, to read as follows:

Step 2: Airborne with TCP, TCP+1, and Aircraft Operational Status (subparagraph 2.2.3.3.2.4.b)

Ensure that the equipment is set to the “Airborne” condition and that the appropriate valid ADS-B Aircraft Identification and Type data is available.

Provide the equipment with valid Trajectory Intent Data necessary to establish TCP Trajectory Intent Broadcast Messages (see subparagraphs 2.2.3.2.7.1 and 2.2.3.3.2.6.1).

Provide the equipment with valid Trajectory Intent Data necessary to establish TCP+1 Trajectory Intent Broadcast Messages (see subparagraphs 2.2.3.2.7.1 and 2.2.3.3.2.6.1).

Provide the equipment with valid Operational Status Data necessary to establish Aircraft Operational Status Messages (see subparagraphs 2.2.3.2.7.3 and 2.2.3.3.2.6.3).

~~Wait for 30 seconds.~~

Verify that TCP, TCP+1, and Aircraft Operational Status Messages are being broadcast.

**NOTE:** *It is not necessary to verify the rate of the broadcast for the intent messages at this time since direct verification of the broadcast rates for these messages is verified in procedures provided later in this document.*

Verify that the ADS-B Aircraft Identification and Type Message is broadcast at ~~intervals that are uniformly distributed over the range of 2.4 to 2.6 seconds relative to the previous Aircraft Identification and Type Message~~ an average rate of one message per 2.5 seconds over a time period of 60 seconds.

Change section 2.4.3.3.2.4, step 2, -to- Step 3.

Change section 2.4.3.3.2.4, step 3, -to- Step 4.

**End of Proposed Procedure Changes.**

## **PROBLEMS**

The requirements change requested looks rather simple at first. But, upon inspection of the existing test procedures, one readily sees the problem. The requirements are written on the basis of the **AND** condition, inferring that TCP, TCP+1, **AND** Operational Status must be active before the additional Identification and Type message is required. Consequently, the above Test Procedure changes are provided accordingly.

If such is not the case, i.e., the additional Identification and Type message should be initiated if either of the TCP, TCP+1, or Operational Status messages are active, then an **OR** condition is implied and the required Test Procedures will be significantly more complicated, or as once stated by G.T. Ligler on the Florida beach, “bi-furcated”.

At this point, consideration of the operational conditions being considered by the author of the requirements change, I suspect that it is safe to stay with the **AND** condition. In that case the above Test Procedure modifications should suffice.

**NOT SO QUICK!** There is another subtle problem created by the rather simple proposed requirements change. The timer that establishes the normal Aircraft Identification and Type broadcast is mutually exclusive from the timer that establishes the Event Driven Aircraft Identification and Type broadcast. Therefore, I have allowed 30 seconds before checking the distribution of the Aircraft Identification and Type broadcasts in the procedure modifications provided above. I suspect that this will suffice, but without doing several months of analysis on this trivial issue, my forever heuristic gut tells me that this one could get sticky if someone wants to be nit-picky. I realize that the real intent here is an average of 2.5 seconds, but be aware that we may have to open the windows a bit to compensate for the nits, particularly if they get hung up on the distribution over a short period of time. Remember that you have two counters beating against each other now.