

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

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

**Meeting #3**

**ACTION ITEM 2-11**

Clarification of Preamble Retriggering

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**SUMMARY**

At the Melbourne meeting, WP-2-11 identified comments for improvement of clarification of 1090 MOPS Appendix I. Comment 10 of WP-2-11 raised a question on the signal level to be used in the preamble retriggering process. This Working Paper proposes a change to Appendix I to clarify the signal level to be used.

## 1.0 Introduction

At the Melbourne meeting, WP-2-11 identified comments for improvement or clarification for 1090 MOPS Appendix I. Comment 10 of WP-2-11 raised a question on the signal level to be used in the preamble retriggering process.

The specific comment was as follows:

Comment: I.4.1.2.3 (2nd paragraph) Should this section define how to determine the declared level of the existing signal? Should the reference level be used? Or the mean of the amplitude of the 5 data pulses? Discuss

The basis for the comment is that preamble detection in Para I.4.1.2.2 specifically defines a "reference" level for the preamble detection process. Para I.4.1.2.3 defines retriggering in relation to a "declared" level for the existing preamble.

A check with the developer of preamble retriggering (Jeff Gertz of MIT Lincoln Labs) confirmed that Para I.4.1.2.3 should refer to the "reference level."

## 2.0 Proposed Revision

### I.4.1.2.3 Re-triggerable Preamble Detection

It is quite possible for a strong Mode S Extended Squitter to arrive during the time that a weaker signal is being decoded. When that event occurs, it is probably desirable, for two reasons, to shift processing to the new signal: (1) stronger signals represent closer aircraft and hence greater threats; (2) the overlapping stronger signal will most likely prevent proper decoding of the original signal. In order to accomplish re-triggering, the preamble decoding circuitry must be left active during the decoding phase of processing. Then, when a stronger preamble is detected, the processing can be re-started for the new signal.

The preamble detection logic for re-triggering is the same as that specified above with one major exception: the 5 data pulses must all be at least 3 dB above the ~~declared-reference~~ level of the existing signal. The rationale for this rule is that, since the new preamble occurs during a Mode S signal, it is virtually certain that the 5 data pulses will exist (namely as pulses of the existing signal). The revised requirement ensures that the pulses used for the new preamble detection are pulses generated by a stronger signal, and not the existing one.