CHANGE ISSUE – RTCA/DO-242

MASPS for ADS-B Rev B

Tracking Information (committee secretary only)	
Change Issue Number	81
Submission Date	11/18/09
Status (open/closed/deferred)	CLOSED
Last Action Date	09/15/2010

Short Title for Change Issue:	Redefinition of the SIL parameter

MASPS Document Reference:		Originator Information:	
Entire document (y/n)	n	Name	Dean Miller, Boeing
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Paragraph number(s)		E-mail	dean.c.miller@boeing.com
Table/Figure number(s)	Tables	Other	

Proposed Rationale for Consideration (originator should check all that apply):	
	Item needed to support of near-term MASPS/MOPS development
X	DO-260()/ED-102 1090 MHz Link MOPS / SARPS
X	UAT MOPS / SARPS
	STP/ASAS MOPS
	ASA MASPS
	ADS-B or related TSO's, AC's or other regulatory guidelines
	Item needed to support applications that have well defined concept of operation
	RTCA OSED / SPR/Interop: (Approved/In Progress)
	RFG OSED / SPR/Interop: (Approved/In Progress)
	Has supporting analysis, if candidate stressing application
	Item needed to support Ground Station Requirements/Specifications
	Item identified during recent ADS-B development activities and operational evaluations
	ADS-B MASPS clarifications and/or correction item
	Validation/modification of questioned MASPS requirement item
X	New requirement item (must be associated with traffic surveillance to support ASAS or ATC Services)
	Other: (Explain)

Nature of Issue:		Editorial		Clarity		Performance	X	Functional

Issue Description:

The SIL definition for ADS-B transmit of position quality in DO-242A was originally proposed to cover two functions:

(1) the position source (signal-in-space) containment integrity risk level associated with the broadcast of containment integrity as encoded in the NIC parameter, and

(2) the functional integrity of the source position avionics, e.g., GPS receiver.

Later definitions of SIL in Changes to DO-260A and in Change 1 to DO-242A included yet more functions, i.e.,

(3) SIL could represent the functional integrity of the entire transmit avionics chain from the position source to the ADS-B OUT transmit function including the broadcast message function of the ADS-B transponder.

Under this definition, the SIL value is the minimum integrity indicator of any of the above functions. The issue is that the SIL parameter has become badly overloaded and the receiver cannot tell which of the above functions is the basis of the SIL value transmitted.

From the viewpoint of the ADS-B RAD and NRA ADS-B Out Applications, the SIL parameter is inadequate to be used as the basis of received containment integrity. For these applications, the certification basis is that the containment integrity for Radar-like surveillance standards needs to be equivalent to that of a RAIM GPS unit, i.e., certified to 10^{-7} per hour level or equivalent to SIL=3 level, whereas the functional integrity of the avionics hardware only needs to be SIL=2 level, i.e., certified to major hazard level or 10^{-5} per hour level. The reason for the difference in integrity requirements is that for radar-like separation standards, a 10^{-7} integrity level in position containment is needed to protect against area-wide failures in position integrity affecting more than one aircraft, whereas the avionics integrity level is only needed to protect against integrity failures affecting a single aircraft. As a result, the SIL parameter is inadequate by itself to certify that an aircraft broadcasting a SIL=2 level in fact meets the 10^{-7} integrity level for source position integrity containment, equivalent to that of a RAIM GPS receiver certified to DO-208 standards or better.

Originator's proposed resolution, if any:

In an original Issue Paper presented by Tony Warren to the ADS-B RAD Subgroup, Tony initially presented several possible solutions, which required that the Surveillance Integrity Level (SIL) in DO-242A, DO-260A and DO-282A be split into several components.

Note: Attach additional sheets to capture supporting discussion with source and date.

Issue History:

2009: Tony Warren of Boeing originally presented this issue to the ADS-B RAD Subgroup of the Requirements Focus Group and was asked to present it again as Working Paper 1090-WP24-04. Discussions continued during several WG-3/SG-1 meetings and a revised proposal was presented as 1090-WP26-30 by Jorg Steinleitner as a possible compromise. WG-3/SG-1 Action Item 27-10 was accepted for a group to hold a teleconference on 2 June, and again on 12 June in an effort to try to resolve this issue for a proposal at the Paris Joint meeting. Working Paper 1090-WP28-23 is a report on the two teleconferences and Working Paper 1090-WP28-18R1 documents the agreement in specific changes which were discussed and agreed to for implementation. Further discussion in Meeting #30 and reflected in Working Paper 1090-WP30-23R1 finalized the text for SIL, SIL_{SUPP} and SDA. Several minor editorial changes were made during the FRAC process for DO-260B and the final versions of SIL, SIL_{SUPP} and SDA are published in DO-260B/ED-102A and DO-282B.

2010: Review of DO-242B for the purpose of aligning the SIL and SIL Supplement definitions with the MOPS.

Working Group 6 Deliberations:

9/15/2010 – Meeting #17

The reconvened WG-6 reviewed this Issue Paper and agreed that all of the proposed changes have been made to the respective Link MOPS and to the working draft of DO-242B as it will be combined with DO-289.