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RTCA Special Committee 186, Working Group 3

ADS-B 1090 MOPS

Meeting #2

**Review of Proposed Changes to the CC_4 Subfield in the
Aircraft Operational Status Message**

Presented by Gary Furr

SUMMARY

At the June 2000 Plenary which reviewed the final draft of the 1090 MOPS, Bob Hilb requested a change be made to the CC_4 Subfield of the Aircraft Operational Status Message. Upon review of this change after the Plenary and prior to publication of DO-260, WG-3 members made modifications to the Plenary-agreed text of the CC_4 Subfield. Upon review of these changes during the 1st meeting of WG-3 for the Revision A of DO-260, there were further changes agreed.

This Working Paper presents the changes to DO-260 needed to make this change.

1. Background

At the June 2000 Plenary which reviewed the final draft of the 1090 MOPS, Bob Hilb requested a change be made to the CC_4 Subfield of the Aircraft Operational Status Message. Upon review of this change after the Plenary and prior to publication of DO-260, WG-3 members made modifications to the Plenary-agreed text of the CC_4 Subfield. Upon review of these changes during the 1st meeting of WG-3 for the Revision A of DO-260, there were further changes agreed.

2. Suggested Changes

Changes to the CC_4 Subfield of the Aircraft Operational Status Message affect Table 2-54, Table A-13 and the test procedures in Section 2.4.3.2.7.3.3.1. WG-3 suggested altering the entries in Tables 2-54 and A-13, and suggested review of this issue by the Ad Hoc MASPS Committee. Further, changes to Test Procedures in Section 2.4.3.2.7.3.3.1 must be made in DO-260A to reflect the changes to Tables 2-54 and A-13 as follows:

Bits 9,10,11,12	Meaning
0 0 0 0	TCAS not Operational; CDTI not Operational or unknown
0 0 0 1	TCAS not Operational; CDTI Operational
0 0 1 0	TCAS Operational; CDTI not Operational or unknown
0 0 1 1	TCAS Operational; CDTI Operational

3. Proposed Changes

This Working Paper presents the WG-3 agreed upon changes to Table 2-54, Table A-13 and a proposed change to Section 2.4.3.2.7.3.3.1

2.2.3.2.7.3.2 “SUBTYPE” Subfield in Aircraft Operational Status Messages

The “SUBTYPE” subfield is a 3-bit (“ME” bits 6 through 8, Message bits 38 through 40) used to indicate various types of Aircraft Operational Status messages defined in Table 2-53.

Table 2-53: “SUBTYPE” Subfield in Aircraft Operational Status Messages Encoding

Subtype Coding	Meaning
0	Message contains Aircraft Status data as shown in Figure 2-10
1 - 7	Reserved for future Growth

2.2.3.2.7.3.3 “CAPABILITY CLASS (CC)” Subfield in Aircraft Operational Status Messages

The “Capability Class (CC)” subfields (“ME” bits 9 through 24, Message bits 41 through 56) represent 4 subfields with each being comprised of two subfields of 2-bits each.

The Capability Class subfields are used to indicate ADS-B transmitting system capabilities supported by the aircraft to other aircraft as defined in the following subparagraphs.

2.2.3.2.7.3.3.1 “CC_4” Subfield in Aircraft Operational Status Message

The “CC_4” subfield is a 4-bit (“ME” bits 9 through 12, Message bits 41 through 44) field used to indicate En Route Operational Capabilities of the ADS-B transmitting system to other aircraft as defined by the following encoding shown in Table 2-54.

Table 2-54: “CC_4” Encoding (En Route Operational Capabilities)

CC_4 CODING		MEANING
Bit 9,10	Bit 11,12	
0 0	0 0	TCAS not Operational; CDTI not Operational or unknown
	0 1	TCAS not Operational; CDTI Operational
	1 0	TCAS Operational; CDTI not Operational or unknown
	1 1	TCAS Operational; CDTI Operational
0 1	0 0	TBD
	0 1	TBD
	1 0	TBD
	1 1	TBD
1 0	0 0	TBD
	0 1	TBD
	1 0	TBD
	1 1	TBD
1 1	0 0	TBD
	0 1	TBD
	1 0	TBD
	1 1	TBD

Note: In Table 2-54 “TCAS Operational” is meant to represent TCAS II (ACAS) operating in TA/RA mode.

A.4.11.3 En Route Operational Capabilities (CC-4)

This 4-bit (9-12) subfield shall be used to indicate en route operational capabilities of the ADS-B transmitting system to other aircraft as specified by the following encoding shown in Table A-13.

Table A-13: En Route Operational Capabilities Encoding

CC-4 ENCODING: EN ROUTE OPERATIONAL CAPABILITIES		
CC-4 CODING		MEANING
Bit 9,10	Bit 11,12	
0 0	0 0	TCAS not Operational; CDTI not Operational or unknown
	0 1	TCAS not Operational; CDTI Operational
	1 0	TCAS Operational; CDTI not Operational or unknown
	1 1	TCAS Operational; CDTI Operational
0 1	0 0	TBD
	0 1	TBD
	1 0	TBD
	1 1	TBD
1 0	0 0	TBD
	0 1	TBD
	1 0	TBD
	1 1	TBD
1 1	0 0	TBD
	0 1	TBD
	1 0	TBD
	1 1	TBD

Note: In Table A-13 “TCAS Operational” is meant to represent TCAS II (ACAS) operating in TA/RA mode.

**2.4.3.2.7.3.3.1 Verification of “CC_4” Subfield in Aircraft Operational Status Message
(subparagraph 2.2.3.2.7.3.3.1, 2.2.5.1.35)**

Purpose/Identification:

The “CC_4” subfield is a 4-bit field (Message Bits 41 through 44, ME Bits 9 through 12) used to indicate En Route Operational Capabilities of the ADS-B transmitting system to other aircraft.

Measurement Procedure:

Configure the ADS-B Transmitting System to transmit Aircraft Operational Status Messages. Verify that the input to the unit under test indicates that the TCAS and CDTI units are fully operational. Discontinue the TCAS input so that the status is “NOT Operational.” Discontinue the CDTI input so that the status is “Not Operational” or the status of CDTI is “unknown.” Verify that the "CC_4" Subfield is correctly set to ALL ZEROS (binary 0000), in Message Bits 41 through 44.

Reinstate the input that indicates that there is a valid CDTI unit available and that it is fully operational. Verify that the "CC_4" Subfield is correctly set to binary 0001, in Message Bits 41 through 44.

Discontinue Reinstate the input that indicates that there is a valid TCAS unit available. Discontinue the CDTI input so that the status is “Not Operational” or the status of CDTI is “unknown.” Verify that the "CC_4" Subfield is correctly set to binary 0010, in Message Bits 41 through 44.

Input data that indicates that the CDTI unit is fully operational and that the TCAS unit is ~~not~~ operational. Verify that the "CC_4" Subfield is correctly set to binary 0011, in Message Bits 41 through 44.

Only four (4) of the possible sixteen (16) combinations for the use of the “CC_4” Subfield, Message Bits 41 through 44, have been established at this time. Once such meanings are defined, appropriate test procedures will be added to this document in order to verify the settings of the Capability Class subfields.

**2.4.3.2.7.3.3.2 Verification of “CC_3” Subfield in Aircraft Operational Status Messages
(subparagraph 2.2.3.2.7.3.3.2, 2.2.5.1.36)**

Purpose/Identification:

The “CC_3” subfield is a 4-bit field (Message Bits 45 through 48, ME Bits 13 through 16) used to indicate Terminal Area Operational Capabilities of the ADS-B transmitting system to other aircraft.

Measurement Procedure:

The meanings of each of the Capability Class subfields have yet to be defined. Once such meanings are defined, appropriate test procedures will be added to this document in order to verify the settings of the Capability Class subfields.