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ATCRBS / MODE S TRANSPONDER MOPS MAINTENANCE

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Issues Related to Changing the Mode S Subnetwork Version Number

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Supporting the FAA ATO Organization and FAA SBS Program Office

Summary
This Working Paper points out issues related to the possible changing of the Mode S Subnetwork Version Number in multiple documents, including ICAO Doc 9871, RTCA DO-181D and EUROCAE ED-73C.

1. Introduction

This Working Paper identifies and discusses potential issues related to the update of the Mode S Subnetwork Version Number (MSSVN) in the Transponder MOPS (RTCA DO-181D and EUROCAE ED-73C) and in ICAO Doc 9871, Edition 2.

As per Masoud Paydar during the recent ICAO ASP Working Group meeting in Montreal, in Working Paper ASP08-13, the next SARPs Amendment will be numbered 86 and will become effective in November 2013. This is significant since references to the MSSVN in all of these documents make reference to the SARPs Effective Year and Amendment Number.

2. Details

In RTCA DO-181D and EUROCAE ED-73C reference is made to the Mode S Subnetwork Version Number in at least four places.

First in DO-181D, §2.2.24.3.2.2 [Eurocae ED-73C, §3.29.3.2.2] revisions to the following Table are proposed in Change 1:

Version Number	Year of ICAO Annex 10 Amendment	Edition of ICAO Doc 9871	Comment
0	Mode S Subnetwork Not Available		
1	1996	----	
2	1997	----	
3	2002	----	Annex 10, Amendment 77
4	2007	Edition 1	Annex 10, Amendment 82
<u>5</u>	2013	Edition 2	Annex 10, Amendment 86
<u>6</u> -127	Not Assigned		

Second, in DO-181D and ED-73C Appendix B, Table B-3-16 the format for Register 10₁₆ is defined, and the encoding notes contain the following Table that is proposed in Change 1 to DO-181D/ED-73C:

Version Number	Annex 10 amendment (Year and Edition)		RTCA	EUROCAE
0	Mode-S subnetwork not available			
1	1996	---		
2	1998	---		
3	2002	---		
4	2007	Doc 9871, Edition 1	DO-181D	ED-73C
<u>5</u>	2013	Doc 9871, Edition 2	DO-181D Change 1	ED-73C Change 1
<u>6</u> - 127	Unassigned			

Third, in ICAO Doc 9871, Edition 2, Appendix A, Table A-2-16 the format for Register 10₁₆ is defined, and the encoding notes contain the following Table that is proposed to change in Edition 2:

Version Number	Year of Annex 10 amendment	Edition of this document
0	Mode S subnetwork not available	
1	1996	---
2	1998	---
3	2002	---
4	2007	1st Edition
<u>5</u>	<u>2013</u>	<u>2nd Edition</u>
<u>6</u> - 127	Unassigned	

Fourth, in both DO-181D and ED-73C, Appendix B, Section B.4 is a cut-and-paste copy out of ICAO Doc 9871, Edition 1, Appendix C, section C.2.4 (to become Appendix D.2.4 in Edition 2), which contains “Implementation Guidelines.” Therefore, in Change 1 to DO-181D/ED-73C, §B.4.3.1, and in Doc 9871, Edition 2, §D.2.4.1.3, the following encoding section is proposed to change as follows:

Bits 17 – 23 reflect the Mode S Subnetwork Version Number.

0	=	Mode S subnetwork not available
1	=	Version No. 1 (1996)
2	=	Version No. 2 (1998)
3	=	Version No. 3 (2002)
4	=	Version No. 4 (2007), ICAO Doc 9871, Edition 1
<u>5</u>	<u>=</u>	<u>Version No. 5 (2013), ICAO Doc 9871, Edition 2</u>
5 <u>6</u> - 127	=	Unassigned

Additionally, in these sections of DO-181D/ED-73C and Doc 9871E2, there are several paragraphs below the above encoding which describe the association of SARPs Effective Years and Amendment Numbers with specific encodings of the MSSVN.

3. Problems

- A) Europe wants to use Doc 9871, Edition 2 as a reference in their ADS-B OUT Rule (SPIIR) and they need Doc 9871E2 to be approved by the ASP Working Group during the meeting in October in Brussels. Wouldn't the "effective" date of Doc 9871, Edition 2 then need to become 2010 instead of 2013? If that were true, then we no longer have a SARPs Amendment date to hang our hats on.
- B) As evidenced by all of the proposed changes above, we have too many places where the same item is described. Why did we need a copy of "Implementation Guidelines" in both DO-181D/ED-73C and Doc 9871?

4. Options

- A) Do we update all of these documents using the MSSVN=5 value equated to both Change 1 to DO-181D/ED-73C and to Doc 9871 Edition 2, using the SARPs effective Year 2013 and Amendment #86?
- B) Do we update all of these documents using the MSSVN=5 value but drop references to the SARPs Effective Year and Amendment?
- C) Can we leave the MSSVN=4 and update only the text references to Doc 9871 Edition 2?

5. Conclusions

The TSG is invited to review the materials presented in this Working Paper and make any further recommendations as to how to resolve the issue of updating or not updating the Mode S Subnetwork Version Number as we move forward with Change 1 to DO-181D/ED-73C and ICAO Doc 9871, Edition 2.

6. Solution Agreed to during TSG Meeting:

It was agreed by the ICAO ASP TSG that the following table should be utilized in all locations in ICAO Doc 9871, RTCS DO-181D and EUROCAE ED-73C.

Version Number	ICAO	RTCA	EUROCAE
0	Mode-S subnetwork not available		
1	ICAO Doc 9688 (1996)		
2	ICAO Doc 9688 (1998)		
3	Annex 10, Vol III, Amendment 77		
4	ICAO Doc 9871, Edition 1	DO-181D	ED-73C
<u>5</u>	ICAO Doc 9871, Edition 2	DO-181D Change 1	ED-73C Change 1
<u>6</u> - 127	Unassigned		