RTCA Special Committee 209

ATCRBS / Mode S Transponder MOPS Maintenance

Meeting #12

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General Transponder and ADS-B Out Diagnostic Register - Alternate Proposal

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SUMMARY

This working paper is presented in response to SC209-WP11-11 which proposed a definition for a maintenance register to provide a means for ground-stations to extract general transponder operating conditions. This working paper proposes an alternative definition.

Introduction:

During SC-209/WG-49 Meeting #10, SC209-WP10-13 was submitted by AirServices Australia to request that the committee consider adding a single bit in ADS-B transmissions to indicate whether Transponder A or B is transmitting. That Working Paper resulted in Action Item #10-05 which, in turn, resulted in SC209-WP11-11. SC209-WP11-11 proposed a BDS register to provide ground stations with the configuration and status of the Transponder at the time of request. That register proposal included definitions of Side 1/Side 2, fault bits, port and bus status and data source currently in use. While much of the proposed data could indeed be useful for diagnosing issues with a transmitting entity, the definitions do not reflect all installations, and in fact do not include what may be the most important information of all --- information allowing the transponder itself to be identified. Additionally, experience with the development of multiple ADS-B transmit MOPS versions has shown that overly-defined registers may likely be found insufficient in some respect in the future, requiring a redesign.

[GF --- Working Paper SC209-WP11-11 was taken to the ICAO ASP Working Group meeting in Brussels Belgium 4 – 8 October 2010 and presented as Working Paper WP ASP09-20. During discussions, there were suggested revisions and Alex Rodriguez of Rockwell Collins is presenting Working Paper SC209-WP12-09 as the next generation of the proposed diagnostic Register during Meeting #12 of SC-209/WG-49 at EUROCAE.]

Discussion:

This Working Paper therefore proposes an alternative BDS register definition containing the information that was originally requested by AirServices Australia, fields that can be used to identify the transponder equipment, and a field to be used by manufacturers to provide additional data.

MB Field: BDS Register E7__General Transponder and ADS-B Out Diagnostic Register			
Bit	**Field or Subfield**		**Comment**
1 2 3 4 5 6 7 8	1 MSB 1 1 0 0 1 1 1 LSB	**BDS Register Number__"E7"**	
9 10	MSB LSB	"SDI" Code	"00" = Unknown[1] "01" = Side 1 "10" = Side 2 "11" = Not Used
11 12 13 14		Company I.D.	See ARINC 429 definition of Company ID for Label 171

MB Field: BDS Register E7__General Transponder and ADS-B Out Diagnostic Register			
Bit	**Field or Subfield**		**Comment**
15 16			
17 18 19 20 21 22 23 24		Transponder I.D.	Manufacturer defined[2,3]
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40		Configuration/Status Information	Manufacturer defined[2]
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56		Reserved	

Notes:

1. When an integrated flight deck controls the transponder selection, the transponder itself may not know which side it is.
2. Manufacturers can be contacted to 'decode' these fields.
3. The Transponder I.D. field may not be needed if it can be assumed that registers E,3 and E,4 will be populated when E,7 is populated.

The above proposal is put forth as a starting point for discussion. The definition has the advantage of being flexible enough to accommodate variations in how current transponders are integrated into avionics systems. If more specific status/configuration information is required in the future, reserved bits are available for use.

Supplemental Information:

[GF --- The original version of this Working Paper submitted to me had a copy of the original version of the maintenance Register from SC209-WP11-11 copied here. With the permission of Kurt Schueler, that Register definition has been removed from this location, since it has been overcome by events, and thus, we can reference the current proposal for the Register in SC209-WP12-09 for further discussion.]