

RTCA Special Committee 209

ATCRBS / Mode S Transponder MOPS Maintenance

Meeting #11

**In Joint Session with EUROCAE WG-49
RTCA Headquarters, Washington, DC
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Proposed General Transponder and ADS-B Out Diagnostic Register

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This Working Paper is provided in response to **Action Item 10-05**.

The Working Paper addresses the concern of having a GICB maintenance register to determine what conditions the Transponder is under at the time of extraction.

Introduction / Discussion:

During SC-209/WG-49 Meeting #10, Action Item #10-05 was assigned to research and attempt to define one or more maintenance registers providing a means for the ground-station to extract what conditions the Transponder is under at a given GICB request.

The table below provides a proposed definition for the information that will be provided by the BDS register to the ground-station in regards to the configuration and status of the Transponder at the time of the request.

MB Field: BDS Register E7__General Transponder and ADS-B Out Diagnostic Register				
Bit	Field or Subfield		Comment	
1	1	BDS Register Number __“E7”		
2	1			
3	1			
4	0			
5	0			
6	1			
7	1			
8	1			LSB
9	MSB	“SDI” Code	“00” = Not Used	“01” = Side 1
10	LSB		“10” = Side 2	“11” = Not Used
11		Non-Diversity Transponder	“0” = Diversity	“1” = Non-Diversity
12		Upper Antenna Failure	“0” = Ok	“1” = Failure
13		Lower Antenna Failure	“0” = Ok	“1” = Failure
14		Upper Receiver Failure	“0” = Ok	“1” = Failure
15		Lower Receiver Failure	“0” = Ok	“1” = Failure
16		Transmitter Failure	“0” = Ok	“1” = Failure
17		Upper Squitter Failure	“0” = Ok	“1” = Failure
18		Lower Squitter Failure	“0” = Ok	“1” = Failure
19	MSB	Control Input Selection	“00” = Burst Tune	“01” = Port A or 1
20	LSB		“10” = Port B or 2	“11” = Port C or 3
21		Selected Control Inactive or Failure	“0” = Active	“1” = Inactive or Failure
22		TCAS Input Inactive	“0” = Active	“1” = Inactive or TCAS Bus Failure
23		Altitude Alternate Port Selection	“0” = Port A selected	“1” = Alternate Port Selection is Active, e.g., Port B selected
24	MSB	Altitude Port A Status	“00” = No Data or Not Used	“01” = Active
25	LSB		“10” = Inactive	“11” = Fail
26	MSB	Altitude Port B Status	“00” = No Data or Not Used	“01” = Active
27	LSB		“10” = Inactive	“11” = Fail
28	MSB	MCP/FCU Bus Status	“00” = No Data or Not Used	“01” = Active
29	LSB		“10” = Inactive	“11” = Fail
30	MSB	FMC/GNSS #1 Bus Status	“00” = No Data or Not Used	“01” = Active
31	LSB		“10” = Inactive	“11” = Fail
32	MSB	FMC/GNSS #2 Bus Status	“00” = No Data or Not Used	“01” = Active
33	LSB		“10” = Inactive	“11” = Fail
34	MSB	FMC #1/Gen. In Bus Status	“00” = No Data or Not Used	“01” = Active
35	LSB		“10” = Inactive	“11” = Fail
36	MSB	FMC #2/Gen. In Bus Status	“00” = No Data or Not Used	“01” = Active
37	LSB		“10” = Inactive	“11” = Fail
38	MSB	IRS/FMS/Data Concentrator In #1	“00” = No Data or Not Used	“01” = Active
39	LSB		“10” = Inactive	“11” = Fail
40	MSB	IRS/FMS/Data Concentrator In #2	“00” = No Data or Not Used	“01” = Active
41	LSB		“10” = Inactive	“11” = Fail

MB Field: BDS Register E7 General Transponder and ADS-B Out Diagnostic Register			
Bit	Field or Subfield		Comment
42	MSB	MSP/ATSU/CMU In #1 Status	“00” = No Data or Not Used
43	LSB		“01” = Active
			“10” = Inactive
			“11” = Fail
44		Air/Ground #1 Input Status	“0” = Inactive
			“1” = Active
45		Air/Ground #2 Input Status	“0” = Inactive
			“1” = Active
46		GPS Time Mark #1 Status	“0” = Inactive or Unknown
			“1” = Active
47		GPS Time Mark #2 Status	“0” = Inactive or Unknown
			“1” = Active
48		Extended Squitter Disable Status	“0” = Inactive
			“1” = Active
49		ADS-B Out Status	“0” = Active
			“1” = Failed or Inoperative
50		ADS-B Fail Disable Status	“0” = ADS-B Function Fail Warn via the Transponder Fail Warn Discrete is NOT Enabled
			“1” = ADS-B Function Fail Warn via the Transponder Fail Warn Discrete is ENABLED
51		Transponder in Standby Mode	“0” = Transponder Not In Standby
			“1” = Transponder in Standby
52	MSB	Multiple Air Data Source Reporting Selection (e.g., Source in Use)	“00” = No Data or Not Used
53	LSB		“01” = Source #1 is being Used
			“10” = Source #2 is being used
			“11” = Source # 3 is being Used
54	MSB	Multiple IRS/AHRS Data Source Reporting Selection (e.g., source in Use)	“00” = No Data or Not Used
55	LSB		“01” = Source #1 is being Used
			“10” = Source #2 is being used
			“11” = Source # 3 is being Used
56		RESERVED	

Conclusion / Recommendation:

The proposed Register definition takes into consideration Business Regional Systems and Air Transport Systems requirements minimizing the need for multiple register definitions. The defined Register will be implemented as part of ICAO Doc 9871 for future Transponder implementations; consequently, it will impact industry documents DO-181D and ED-73C.