

**RTCA Special Committee SC-209**

**Transponder MOPS**

**Meeting #2**

DO-181D Section 2.2 Proposed Revision  
of the Document Structure

**Revision 1**

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**SUMMARY:**

This working paper presents a proposed revision to the structure of DO-181D, Section 2.2: Minimum Performance Standards. Revision 1 was created after Meeting #2 and during the actual implementation of the suggested changes into the current draft of DO-181D. Some of the changes in Revision 1 were typographical corrections, and others involved corrections to section numbers, and the actual ordering of sections in their target locations.

## Section 2.2 **Minimum Performance Standards**

- 2.2.1 Definition of Standard conditions
- 2.2.2 Receiver Characteristics
- 2.2.3 Transmitter Characteristics
- 2.2.4 Reply Pulse Characteristics
- 2.2.5 Sidelobe Suppression Characteristics
- 2.2.6 Pulse Decoder Characteristics
- 2.2.7 Desensitization and Recovery Characteristics
- 2.2.8 Response in Presence of Interference
- 2.2.9 Undesired replies
- 2.2.10 Self Test and Monitor(s)
- 2.2.11 Response to Mutual Suppression Pulses  
add Supp IN/Out electrical characteristics – ARINC 718?
- 2.2.12 Diversity
- 2.2.13 Data Handling and Interfaces
- 2.2.14 Description of Mode S Signal Formats
- 2.2.15 Antenna – *moved forward from old 2.2.18*
- 2.2.16 Power Interruption – *moved forward from old 2.2.19*
  
- 2.2.17 Mode S Transponders needs help

### **2.2.18 Level 1 Mode S Transponder**

- 2.2.18.1 Mode S Formats
- 2.2.18.2 Mode S Protocols
  - 2.2.18.2.1 Error protection
  - 2.2.18.2.2 Interrogation Acceptance
  - 2.2.18.2.3 Interrogation Reply Coordination
  - 2.2.18.2.4 Lockout Protocols
  - 2.2.18.2.5 Multi-site lockout Protocol
  - 2.2.18.2.6 Acquisition Squitter Protocols  
*Move (Extended Squitter sections 2.2.16.2.6.2 – 2.2.16.2.6.2.9) to 2.2.23.1  
New Table 2.2.16-1 needed  
Move (ES/NT sections 2.2.16.2.6.2.3 – 2.2.16.2.6.2.5) to 2.2.23.3 – 2.2.23.5*
  - 2.2.18.2.7 Flight Status, Alerts and Vertical Status Protocols
  - 2.2.18.2.8 Capability reporting
  - 2.2.18.2.9 All-Call Reply Protocol
  - 2.2.18.2.10 Reply Content
  - 2.2.18.2.11 Data handling and Interfaces

### **2.2.19 Minimum Level 2 Transponder**

- Old 2.2.17 (except as noted for moving materials to Level 3 & 4)  
Fix Comm-A to SARPs  
Delete old 2.2.17.1.1; fix Figure 2-16*
- 2.2.19.1 Minimum Level 2 Transponder Requirements  
*Old 2.2.17.1.12.7: Coding of DLCR: insert format from ICAO 77?*

2.2.19.2 Multi-site Message Protocol  
*Old 2.2.17.6: Additional features - can it go away – redundant??*

**2.2.20 Level 3 & Level 4 Transponder - Extended Length Message (ELM) Protocols**

2.2.20.1 Level 3 Uplink ELM  
*Old 2.2.17.3: Uplink ELM Capability*  
*Old 2.2.13.4.3: Uplink Interface – Interrogator Identity*  
*Old 2.2.17.2.4: Multi-site Uplink ELM Protocol*  
*Old 2.2.13.4.1: Uplink Interface - Data Rate*

2.2.20.2 Level 4 Downlink ELM  
*Old 2.2.17.4: Full ELM Capability*  
*Old 2.2.17.4.1: The Comm-D/ELM Protocol*  
*Old 2.2.13.5: Downlink Message cancellation*  
*Old 2.2.17.2.5: Multi-site Downlink ELM Protocol*  
*Old 2.2.13.4.2: Downlink Interface – Data Rate*

**2.2.21 Level 5 Transponder – Enhanced Protocols**  
*Old 2.2.17.5: Enhanced Data Link transponder*

2.2.22 **TCAS-Compatible Mode S Transponder** – (*Old 2.2.20 - use completely*)

**2.2.23 Extended Squitter (ES)**

2.2.23.1 ADS-B Extended Squitter  
*Old 2.2.16.2.6.2 through 2.2.16.2.6.2.9*  
*Add ICAO material from Doc NNNN*

2.2.23.2 Event-Driven Squitter (*RA Broadcast material ??*)

2.2.23.3 Extended Squitter/Non Transponder Devices (*old 2.2.16.2.6.3*)

2.2.23.4 Military Extended Squitter (*old 2.2.16.2.6.4*)

2.2.23.5 Extended Squitter Maximum Transmission Rate (*old 2.2.16.2.6.5*)

**2.2.24 Elementary Surveillance (ELS) Compliant Transponder**

**2.2.25 Enhanced Surveillance (EHS) Compliant Transponder**

**Appendix A: Acronyms and Definitions of Terms**

**Appendix B: Mode S Specific Services (MSSS)**

Miscellaneous:

Alphabetize field descriptions (2.2.14.4)

Add TCAS RI info to Field Descriptions

1.4.3 *add transponder level descriptions from ICAO*