

**Minutes of Meeting #05 of RTCA SC-209 Working Group #1
For The Development & Maintenance of the Mode-S MOPS**

<http://adsb.tc.faa.gov/SC209.htm>

Meeting #5 of Working Group #1 of RTCA/SC-209 was called to order by Co-Chair Tom Pagano at 9:00am EST, 11 February 2008, at the Crowne Plaza Hotel in Melbourne Florida. Mr. Pagano then welcomed all attendees and asked that each attendee introduce themselves and their organization. The attendees for part or all of the meeting included the following:

Yves Audineau, Rockwell Collins, France	Showkat Osman, Honeywell
Raymond Bayh, BAE Systems	Tom Pagano, FAA Tech Center – AJP-653
David Bowen, Eurocae Technical Secretary	Eric Potier, Eurocontrol
Robert Duffer, FAA	Lt. Christopher Rose, US Air Force
Gary Furr, Engility Corp., FAATC–AJP-653	Robert Saffell, Rockwell Collins
Antoine Herve, French DGAC	Trevor Smith, UK NATS
Garrett Harris, MIT Lincoln Lab	Bill Thedford, Consultant, USAF
Richard Jennings, FAA AIR-130	Nolan Van Foeken, Garmin International (by phone)
Roland Mallwitz, German DFS	Paul Washlesky, DoD AIMS
Andrew Leone, FAA Tech Center	Randy Wiken, MIT Lincoln Lab

1. Agenda Item #1

- 1.1 Robert Duffer, the Designated Federal Official, was with us during this meeting. Mr. Duffer also welcomed all attendees to the meeting and thanked them for their participation.
- 1.2 Robert Saffell of Rockwell Collins welcomed all attendees to Melbourne Florida and indicated that Rockwell Collins was honored to host this meeting.
- 1.3 Gary Furr presented a list of all of the restaurants in the area that he recommends. The group agreed that all parties would attend a group dinner on Wednesday night.

2. Agenda Item #2

- 2.1 With the proposed meeting Agenda displayed as Working Paper ModeS-WP05-01, Mr. Pagano asked if there were any suggested additions or changes to the Agenda for this meeting. Gary Furr pointed out that the Agenda as posted on the web page actually has a numbering problem, and there are two (2) lines that contain the number 4. Gary Furr corrected the Agenda and also revised it during the meeting with additional Working Papers that became available. The new Agenda Items numbers referred to below will be posted as Working Paper Mode S-WP05-01R1 Mr. Pagano declared that the Agenda was accepted with these changes, and began to progress on the Agenda as revised and offered to the Working Group.

3. Agenda Item #3

- 3.1 Mr. Pagano referred to Agenda Item #3 to discuss the Minutes of SC-209 Working Group #1, Meeting #3, which was held at RTCA Headquarters in Washington DC on 4 – 6 December 2007, and presented to this meeting as Working Paper ModeS-WP05-02. The Minutes of SC-209 Working Group #1, Meeting #4 were accepted by the Working Group as presented in Working Paper ModeS-WP05-02.

4. Agenda Item #4

- 4.1 Mr. Pagano referred to the corrected Agenda Item #4 to discuss the Minutes of Eurocae WG-49, Meeting #14, which was held in Paris in January 2008, and presented to this Meeting as Working Paper WG49N15-M1. Antoine Herve briefly discussed the issues that were covered during WG49N14. The Minutes of Eurocae WG-49 Meeting #14 were accepted by the Meeting as presented in Working Paper WG49N15-M1.

5. Agenda Item #6

- 5.1 The Working Group continued with the corrected Agenda by going on to Agenda Item #6a with a presentation of Working Paper ModeS-WP05-03 by Tom Pagano for the update of a test procedure of the event-driven tests in the draft of DO-181D, §2.5.4.6.2.2. After discussion, the Meeting accepted the change to the test procedure, and asked that it be inserted into the next draft of DO-181D.
- 5.2 The Working Group continued on with the review of the corrected Agenda Item #6b with a presentation of Working Paper ModeS-WP05-04 by Bob Saffell. This Working Paper represents the changes that were agreed to during the WG-49 Meeting #14 in Paris, as regards the requirements and test procedures that have been added to both MOPS documents for the Elementary and Enhanced Surveillance (ELS/EHS), and the Generic Test Procedures. The changes and commentary were highlighted in Working Paper ModeS-WP05-04 for ease of review. Another Working Paper, ModeS-WP05-05 is presented with the same materials, but with the commentary and highlighting removed so that all text can be more easily ported into the next draft of DO-181D. Mr. Saffell stepped through ModeS-WP05-04 page-by-page reviewing and explaining each of the changes that were agreed to in the Paris meeting. After a brief discussion, it was agreed by the Meeting that all of the changes represented in Working Papers WP05-04 and WP05-05 were accepted and can be ported into the next draft of DO-181D.
- 5.3 The Working Group began review of Agenda Item #6d with a presentation of Working Paper ModeS-WP05-06 by Bob Saffell. This Working Paper represents the changes that were agreed to during the WG-49 Meeting #14 in Paris, as regards the test procedures in the Environmental Test Procedure section of both MOPS documents. Bob Saffell indicated that this Working Paper represented only the modified sections. After a brief discussion, it was agreed by the Meeting that all of the changes represented in Working Paper ModeS-WP05-06 were accepted and can be ported into the next draft of DO-181D.

- 5.4 The Working Group began review of Agenda Item #6e with a presentation of Working Paper ModeS-WP05-07 by Rich Jennings. This Working Paper represents the changes that were discussed and agreed to during the WG-49 Meeting #14 in Paris, as regards the labeling of transponder classes and capabilities, as well as the modifications to the “Operations of Controls” and implementation of requirements text satisfying the suggestions of the NTSB recommendations. There were minor editorial changes to the proposed text, which were agreed to by the Meeting and edited into the drafts of both MOPS documents during the discussion.
- 5.5 The Working Group began review of Agenda Item #6f with a presentation of Working Paper WG49N15-M3 by Antoine Herve. This Working Paper represents a collection of issues that remain open in either or both MOPS document in the effort to harmonize both documents. Antoine stepped down through the Working Paper, beginning with those items that should have been addressed by the ICAO Aeronautical Surveillance Panel (ASP) Technical Subgroup (TSG). Each of these items were dealt with individually, with agreeents being edited into both MOPS documents as the discussion progressed. During the review of each of the harmonization issues, we also reviewed Working Paper WG49N15-M5, which contained the updated Figures and Tables as reviewed by WG-49 during their January 2008 Meeting #14. Figures and Tables were edited and updated during the discussion to ensure harmonization between both MOPS documents.

During the review of harmonization issues, there was discussion on the test procedures for Invalid Aircraft Addresses. After discussion on Monday, the issue was delayed to allow Roland Mallwitz to produce a proposal for a compromise. Roland produced what was documented as Agenda Item #6p, Working Paper WG49N15-M7. Upon review of this Working Paper, the Meeting agreed on the proposals of the Working Paper as modified during the discussion. The proposed changes were edited into both MOPS documents.

- 5.6 The Working Group began review of Agenda Item #6k with the presentation of Working Paper ModeS-WP05-10. This Working Paper represents the latest draft version of Appendix B of DO-181D. Andy Leone created draft version 3.1 of Appendix B for the purpose of making several changes that had been identified by WG-49 during their December 2007 and January 2008 Meetings. During the review of Appendix B, it was pointed out that during the ICAO ASP TSG meeting Working Paper ASP TSG WP 4-18 was presented by Eric Potier to ask the TSG for guidance on the setting of Bit 6 in Register 17₁₆. Even though Register 17₁₆ represents dynamic setting of capabilities, the Extended Squitter Event-Driven Message represents a number of different messages, some of which are being broadcast on a continuous basis. Therefore, it was agreed by the Meeting that a new note should be added to the format of Register 17₁₆ to indicate that “*Bit 6 is set to ONE (1) upon the first loading of Register 0A₁₆ and shall remain set until the transponder is powered OFF or until ADS-B transmissions are terminated.*” A Change Proposal will be submitted for the ICAO ASP Working Group to accept during their Meeting in May 2008 in Bangkok for a corresponding change to ICAO Doc 9871.

6. Agenda Item #7

- 6.1 The Working Group began review of Agenda Item #7 with the presentation of Working Paper ModeS-WP05-13. This Working Paper represents a few selected slides from a presentation given by Tom Pagano to the ICAO ASP TSG in summary of analysis of data gathered during an FAA flight test in July 2007. From data gathered and analyzed, the FAA Technical Center has concluded that unsuppressed ATCRBS Mode A interrogation measured counts are higher than what are present in the environment. In the Working Paper, Tom Pagano presented a proposed new requirement for DO-181D. After discussion, it was agreed by the Meeting that the new requirement would be entered into both MOPS documents. In the draft of DO-181D, the new requirement was placed as §2.2.2.4.g and a new test procedure was entered as Step 9 of §2.4.2.1.

7. Agenda Item #11

- 7.1 The Working Group continued with Agenda Item #11a, starting with the review of Working Paper ASP TSG WP 4-25 by Eric Potier. This Working Paper was reviewed during the ICAO ASP TSG Meeting 4 – 8 February 2008 in Fort Lauderdale. The Working Paper discusses the SARPs and MOPS requirements to validate the on-the-ground condition. In Part 1 of the recommendations, WG-49 during their Meeting #14 in January had made the recommendation to eliminate Table 3-7 in SARPs §3.1.2.6.10.3.1, which defines those Emitter Categories where the status of being on-the-ground should be overridden, with a single line. After some discussion, Roland Mallwitz made the suggestion that instead of changing the Table in the 1090ES MOPS, (to which DO-181D refers) that there be a note added below the table regarding those three Emitter Categories (0, 1 and 7) to explain that if there is a means of on-the-ground validation, that it be allowed to be used for those Emitter Categories.

Note: Aircraft reporting ADS-B Emitter Category Set “A” codes 0, 1 or 7 with an automatic means to determine the on-the-ground status, and means to validate that status, may change the status to “Airborne” if the on-the-ground status cannot be validated.

In Part 2 of the recommendations, WG-49 wishes to make the requirement for validation applicable to all transponders and not just those equipped with Extended Squitters. Bob Saffell makes a recommendation that we simply copy the text of ED-73C. This recommendation was agreed by the Meeting and implemented into DO-181D, §2.2.18.2.7.c.

The Working Group continued with discussions of several issues that were discussed by the ICAO ASP TSG during their meeting held in Fort Lauderdale on 4 – 8 February. The Meeting reviewed Working Paper ASP TSG WP 4-17, which discusses the transmission of the Mode A Code. Eric Potier originally presented this Working Paper to the ASP TSG with several Options for increasing the rate of broadcast of the Mode A Code during a change in the Mode A Code. This Working Paper is being presented to this Meeting only for information. The basic issue of this Working Paper will be discussed in more depth in RTCA SC-186 Working Group 3 at a soon to be scheduled meeting.

The Working Group continued with discussions of several issues that were discussed by the ICAO ASP TSG during their meeting held in Fort Lauderdale on 4 – 8 February. The Meeting reviewed Working Paper WG49N16-M6, which had been assigned as Agenda Item #60, in which Roland Mallwitz summarizes some of the information being reported to ICAO ASP on the usage of the 1030/1090 MHz data link. One of the recommendations in the Working Paper was to suppress the broadcast of the Acquisition Squitter.

The Working Group continued with discussions of several issues that were discussed by the ICAO ASP TSG during their meeting held in Fort Lauderdale on 4 – 8 February. The Meeting reviewed Working Paper ASP TSG WP 4-10R1, which addresses the issue of reply rate limiting in the ICAO SARPs and both MOPS documents. The Working Paper proposes a change to the ICAO SARPs to be consistent with the text in DO-181C, and also a change in ED-73C to be consistent to the draft of DO-181D. The Meeting agreed that this proposal should be accepted and ED-73C will be updated to be consistent with DO-181D. A Change Proposal will be submitted for the ICAO ASP to accept during their Panel Meeting in December 2008.

8. Agenda Item #8

8.1 The list of open Action Items was reviewed by the Working Group during the meeting and the summary of Action Items that remained open, or were newly recorded as being assigned and accepted during this Meeting follows:

Action Number	Open Action Item Descriptions	Assigned to	Status
7-1	Contact European manufacturers to ask about the side lobe suppression issue of one percent in DO-181C versus ten percent in ED-73C. Can they meet the 1%.	Kevin Hallworth	Pending further input from European Mfg, WG-49 agrees to go to 1%
7-2	Contact European manufacturers to ask whether they provide mutual suppression according to the newly added request in DO-181D, 2.2.11.b.	Kevin Hallworth	Pending further input from European Mfg.
7-3	Rewrite 2.5.4.19 to be consistent with changes made to the Data Link Capability Reporting in 2.2.19.1.13. Also check 2.6.2.3. Also check ED-73C for correct references.	Bob Saffell	In Process Need by 28 March

Action Number	Open Action Item Descriptions	Assigned to	Status
7-5	Review the environmental sections for Fixed and Variable Direct Data (2.3.2.11.1 & 2.3.2.11.2) to see if referencing 2.6 is appropriate.	Bob Saffell	In process Need by 28 March
7-11	Incorporate the requirements and test procedures for TCAS DO-185B. Include hybrid surveillance.	Bob Saffell Roland Mallwitz	Need by 28 March
WG1-5-1	Manufacturers to review the addition of the requirement in §2.2.2.4.g and the corresponding test procedure in §2.4.2.1 step 9. Required responses/suggestions back to Gary Furr by COB, 14 March 2008.	Manufacturers	
WG1-5-2	Write additional test procedures for ED-73C for extended squitters.	Bob Saffell	
WG1-5-3	Provide feedback to SC-209 and WG-49, and report to the ICAO ASP Working Group meeting in May in Bangkok, on the provision for turning OFF Extended Squitters that is currently identified in the draft NPRM.	Rich Jennings	
WG1-5-4	Provide an analysis of the differences in the latest drafts of ED-73C and DO-181D by 28 March for the April meetings.	Bill Thedford	

9. The Dates and locations of future SC-209 and WG-49 meetings were discussed under Agenda Item #9. The next SC-209 Working Group #1 meeting will be at Engility Corporation at 400 Virginia Avenue, SW in Washington DC on 14 – 16 April 2008. It was agreed that Working Group #1 would try to complete its review of the draft of DO-181D by noon on 16 April and that a meeting of Working Group #2 would be planned for the afternoon of 16 April and all day 17 April 2008 at the same facility. Both WG-49 and SC-209 agreed that they would schedule a meeting for 18 – 19 June 2008 for the purpose of coming to final agreements on the drafts of the Mode S MOPS for publication.

Organization	Dates	Place
WG-49	14 – 16 April 2008	Eurocae, Paris
SC-209 WG-1	14 – 16 April 2008	Engility Corp., 400 Virginia Avenue, SW Washington DC
SC-209 WG-2	16 – 17 April 2008	Engility Corp., 400 Virginia Avenue, SW Washington DC
WG-49	18 – 19 June 2008	Eurocontrol Headquarters, Brussels
SC-209 Plenary #8	18 – 19 June 2008	RTCA Headquarters, Washington DC

10. The **Working Papers** for all SC-209 Meetings, as well as the Meeting Agendas, Meeting Minutes, Meeting Schedules and proposed modifications to the ATCRBS and Mode-S MOPS will be posted on the web site maintained by Gary Furr at the FAA William J Hughes Technical Center, located at: <http://adsb.tc.faa.gov/SC209.htm>

As reported in the Meeting Summary of Eurocae WG-49, Meeting #6, members of SC-209 may access the WG-49 workspace through the Eurocae web site located at: <http://www.eurocae.org/> Login: WG49 and password: MODE-S

Also, the workspace of Eurocae WG-51 can be accessed by SC-209 members through the same Eurocae web site with: Login: WG51 and password: ADSB

Working Papers referenced in these minutes as products of the ICAO ASP TSG can be found at the web site for their meeting on 4 – 8 February 2008, located at:

<http://adsb.tc.faa.gov/TSG.htm>