

RTCA Paper No. 128-10/SC209-026
Summary of the Plenary Meeting #11 of RTCA SC-209
held at RTCA Headquarters in Washington DC as a Joint Session
with EUROCAE WG-49 for the Maintenance of the ATCRBS and Mode S MOPS
<http://adsb.tc.faa.gov/SC209.htm>

The meeting was called to order by RTCA SC-209 Co-Chair Thomas Pagano of the FAA ATO-P organization at about 9:00am, 8 September 2010. Mr. Pagano and EUROCAE WG-49 representative Eric Potier welcomed all attendees and asked that each attendee introduce themselves and their organization. The participants during part, or all, of the meeting included:

Dominic Anello, DoD AIMS Program Office	Tom Pagano, FAA ATO-P, AJP-653	Charles Sloane, FAA AIR-130
Raymond Bayh, BAE Systems	Eric Potier, Eurocontrol (WG-49)	Don Walker, FAA AIR-130
Gary Furr, Engility Corp, FAA ATO-P, AJP-653	Alex Rodriguez, Rockwell Collins	Kevin Wilson, Honeywell International
Martin Gray, Trig Avionics (WG-49)	Robert "Bob" Saffell, Rockwell Collins	

1. Tom Pagano and Eric Potier began the meeting with **Agenda Item #1** by welcoming all participants to RTCA Headquarters in Washington DC.
2. After Tom Pagano and Eric Potier concluded their initial remarks, Tom indicated that the next order of business would be **Agenda Item #2** to review the proposed Agenda, which was distributed for this Meeting under Working Paper SC209-WP11-01. Gary Furr pointed out that several Working Papers had been added to the proposed Agenda that was initially distributed via email and posted on the web site. Further, Gary noted that all revisions of Working Papers would be posted to that web page as soon as possible after their revision or after the end of the meeting. The Agenda was reviewed in detail because of the specific requirements related to presentation timing and the availability of certain Joint Session members. Working Papers were added during the Meeting and others were scheduled to be presented at specific times, as was indicated on the revised Agenda, which was posted to the web page as [Working Paper SC209-WP11-01R1](#).
3. Next, under **Agenda Item #3**, the Meeting turned to [Working Paper SC209-WP11-02](#) as presented by Gary Furr as the Summary of Joint Meeting #10, which was held at the facilities of EUROCAE in Malakoff near Paris France on 28 – 30 June 2010. Eric Potier brought up the topic of bullet #5.9 of the Minutes of Meeting #10. Eric points to an email from Kevin Hallworth on 7 September to Don Walker indicating that he had discussed the changes in Working Paper SC209-WP10-12 and was now in agreement with the changes. Eric points out that the Minutes of Meeting #10 indicate that we left the meeting with the agreement instead of with Kevin Hallworth having an action for further discussion. After a brief discussion on the topic, the minutes of Meeting #10 were accepted by the Joint Session as published.

4. Next, under **Agenda Item #4** the Joint Session began the review of Working Papers that have been submitted as the result of Open Action Items, which were initially accepted during Meeting #10. Working Papers in Agenda Item #4 were taken in no particular order and were interleaved with Working Papers in Agenda Item #5. The presentation of a given Working Paper was dependent on the availability of certain Joint Meeting Members. The summaries below simply represent the summaries at the time of the presentation.
 - 4.1 The Meeting began the review of [Working Paper SC209-WP11-03](#) under Agenda Item #4a, presented by Bob Saffell as a result of Action Item 10-11. This Working Paper addresses the differences regarding specification of the pulse spacing from the P5 Pulse to the Sync Phase Reversal as specified in RTCA DO-181D and other relevant industry documents. Bob found that all of the versions of DO-181() have indicated the synch phase reversal as 0.4 +/-0.1 microseconds, as opposed to ICAO, ARINC and EUROCAE documents, which have displayed the value as 0.4 +/-0.05 microseconds. The recommendation of the Working Paper was to make the change in P5 to synch phase reversal in DO-181D to 0.4 +/-0.05 microseconds. After discussion, the Joint Session agreed to the change and Gary Furr agreed to update the DO-181D Change document to reflect the change.
 - 4.2 The Meeting then began to review [Working Paper SC209-WP11-04](#) under Agenda Item #4b, presented by Bob Saffell as a result of Action Item 10-03 dealing with timeouts in Registers 08₁₆ and 20₁₆. The original Working Paper was presented during the Paris Joint Session as WP10-04 as a response to questions raised by Kevin Wilson of Honeywell. It was agreed during Meeting #10 that Bob would take the Action Item 10-03 to further review his proposals for changes. In WP11-04, Bob makes modifications to the recommendations originally proposed in WP10-04. Bob stepped through WP11-04 in detail and there were various discussions on specific changes. The major issues were that in the recommended changes in WP11-04, Bob has proposed changes to Notes and no specific “shall-based” requirements in any of the documents. This is primarily to avoid making changes in requirements in DO-260B and affecting the currently published FAA ADS-B OUT Rule. Review of WP11-04 was suspended on Wednesday morning to await input from Don Walker. Review of WP11-04 was resumed on Thursday morning to discuss the issue of no proper requirement being in DO-260B to perform what is trying to be accomplished with Notes in this Working Paper. There is a requirement in DO-260B at §2.2.5.1.11.c that indicates that the ID contain ALL ZEROS if it becomes not available. However the termination requirement in §2.2.3.3.2.12.c indicates that the ID Message never times out, so the test procedure at §2.4.3.2.5.3, Step 4 needs to be fixed in DO-260B to indicate that the transponder needs to be reinitialized at the beginning of the test procedure, and to delete the *Note* at the end. After discussion, the Joint Session agreed that all recommended changes in the WP11-04 were accepted in total. Additionally, the priority handling of registers firm requirements and test procedures will be incorporated into DO-181D in §2.2.23.1.4.

- 4.3 The Meeting then began to review [Working Paper SC209-WP11-05](#) under Agenda Item #4c, presented by Bob Saffell as a result of Action Item 10-02 regarding making changes to the maximum update interval for Register 60₁₆. In DO-181D/ED-73C, it was found that references to the maximum update interval was specified as 1.0 seconds, instead of 1.3 seconds as it was thought to have been agreed for Register 50₁₆. In WP11-05, Bob made several suggestions for bringing DO-181D/ED-73C into compliance with the other Register. After discussions, the Joint Session agreed to the changes and Gary Furr agreed to update the DO-181D/ED-73C Change documents to reflect the changes.
- 4.4 The Meeting then began to review [Working Paper SC209-WP11-06](#) under Agenda Item #4d, presented by Bob Saffell as a result of Action Item 10-01 regarding changes that need to be made in ICAO Doc 9871 and ARINC 718A-3 regarding adding inertial vertical velocity input data via Label 165 to Register 60₁₆. The issue was raised in WP11-05 for changing the maximum update interval for Register 60₁₆ and as a result, Working Paper WP11-06 was for making the required changes in ICAO Doc 9871 and ARINC 718A-3. The Joint Session agreed that the change for adding Label 165 to Register 60₁₆ was proper and the change would be carried forward to the ICAO ASP Working Group meeting as a proposed change to Doc 9871 and that Bob Saffell would submit a change for ARINC 718A-3.
- 4.5 The Meeting then began to review [Working Paper SC209-WP11-07](#) under Agenda Item #4e, presented by Gary Furr as a result of Action Item 10-09 regarding the usage of the term “All-Call” as they are used in both DO-181D and ED-73C. During the gathering of data for the creation of this Working Paper, Gary found that there are hundreds of occurrences of the term “all-call” and so a matrix was created to identify the various unique uses of the term in DO-181D, ED-73C and the ICAO SARPs, with the recommendation to review the matrix of “all-calls” and to only make a change in the “Change” documents if there could be an actual error identified in the usage of the term “all-call.” After discussion, there were several cases where the Joint Session reviewed DO-181D for individual uses. Specific changes were agreed to in §1.4.3.1, §2.4.2.6, §2.5.4.13 and numerous cases in Appendix D, which were identified and edited into a version of Appendix D during discussions. Each of these changes also has an equal change in ED-73C. Gary Furr agreed to update the DO-181D/ED-73C Change documents to reflect each of these changes.
- 4.6 The Meeting then began to review Working Paper SC209-WP11-09 under Agenda Item #4f, presented by Eric Potier as a result of Action Item 10-07 regarding making proposals for adding cases for DI=3 because not all of these were added during the development of DO-181D/ED-73C. During discussions of each specific change, there were edits to WP11-09 to create [Working Paper SC209-WP11-09R1](#). At the completion of discussions on individual changes, the Joint Session agreed with the proposed changes as represented in WP11-09R1, and Gary Furr agreed to update the DO-181D/ED-73C Change documents to reflect the changes.

- 4.7 The Meeting then began to review [Working Paper SC209-WP11-11](#) under Agenda Item #4g, presented by Alex Rodriguez as a result of Action Item 10-05 regarding a proposed new Register to be used for maintenance data. Alex stepped down through each of the fields that have been proposed explaining the reasoning behind each field. It was agreed that the proposed Register would be revised to remove bit #51 (Standby mode) and replaced by an indication of what source is being used. **Action Item 11-04** was accepted by Alex and Bob Saffell to revise the proposed maintenance register for presentation during the ICAO ASP Working Group meeting in Brussels in October and also for presentation at the November SC-209/WG-49 Joint Session.
 - 4.8 The Meeting then began to review [Working Paper SC209-WP11-16](#) under Agenda Item #4h, presented by Charles Sloane as a result of Action Item 10-08 regarding the regular use of non-selective lockout with PC=1 and DI=3. After discussion, the Joint Session agreed that the changes proposed in WP11-16 would be accepted for DO-181D/ED-73C and further, Eric Potier accepted the action to create a working paper for the ICAO ASP Working Group meeting to inform the ASP of the proposed changes to Annex 10, Vol. IV SARPs, also identified in WP11-16. Gary Furr agreed to update the DO-181D/ED-73C Change documents to reflect the changes.
 - 4.9 The Meeting then began to review [Working Paper SC209-WP11-19](#) under Agenda Item #4i, presented by Bob Saffell as a result of Action Item 10-10 regarding the timeout and termination of Registers 62₁₆ and 65₁₆. Bob presented sections of DO-260B that deal with the broadcast rates and termination of ADS-B messages before making recommendations for changes in DO-181D/ED-73C. Review of WP11-19 was suspended on Wednesday afternoon to await input from Don Walker in conjunction with other proposed changes in WP11-06. The Joint Session did not completely review and approve WP11-19 because of the unavailability of Don Walker during the remainder of the meeting. However, after the meeting, Tom Pagano and Gary Furr reviewed this Working Paper with Don Walker and came to the conclusion that all of the proposed changes were acceptable. Gary Furr agreed to update the DO-181D/ED-73C Change documents to reflect the changes.
5. Under **Agenda Item #5**, the Meeting discussed the additional Working Papers that made proposals on issues related to proposed changes to DO-181D and ED-73C. Working Papers in Agenda Item #5 were taken in no particular order and were interleaved with Working Papers in Agenda Item #4. The summaries below simply represent the summaries at the time of presentation.
 - 5.1 The Meeting reviewed [Working Paper SC209-WP11-08](#) under Agenda Item #5a prepared by Tom Pagano. As presented to the ICAO ASP TSG in Working Paper TSGWP09-18 and previously to Meeting #10 of the Joint Session of RTCA SC-209 and EUROCAE WG-49 as Working Paper SC209-WP10-10R1, there was an indication that the existing requirements for Interrogation Acceptance Protocol are not specific about how a transponder should respond when the DI field contains an undefined value. Those Working Papers indicated that this has the potential to cause problems if the SD field is misinterpreted when these values are contained in an interrogation. Those Working Papers proposed requirements to make transponder behavior deterministic

when the DI field is undefined. Those Working Papers argued that if left unchanged, vendors could potentially alter transponder states when the DI codes are potentially defined in the future. Working Paper SC209-WP11-08 argues that the changes which were discussed and agreed upon in Meeting #10 were not appropriate and should be reversed. After discussion, it was agreed that the previous change to Figure 2-15 and the added bullet in §2.2.19.1.1 would be reversed and Tom Pagano accepted **Action Item 11-05** to create a new working paper to propose a different change.

- 5.3 The Meeting continued with the review of Working Paper SC209-WP11-10 under Agenda Item #5b prepared by Eric Potier. The Working Paper deals with comments that have come to us from EADS regarding the contents of ED-73C. Eric indicated that a subgroup of WG-49 has already reviewed these comments and the Working Paper indicates what proposed changes should be made to either or both MOPS documents. As the Working Paper was reviewed, Gary added the agreements of the Joint Session in the right-most column of the Working Paper for each specific item discussed, and these agreements were recorded as [Working Paper SC209-WP11-10R1](#). There are various changes that are identified that will need to be implemented in either ED-73C and/or DO-181D Change documents, as well as actions to review specific sections of DO-260B for potential changes. Gary Furr agreed to update the DO-181D/ED-73C Change documents to reflect the agreed upon changes.
- 5.4 The Meeting continued with the review of Working Paper SC209-WP11-12 under Agenda Item #5c prepared by Gary Furr and Tom Pagano. The Working Paper deals with potential changes to the TCS and RCS commands. The Joint Session began review of WP11-12 in conjunction with the changes proposed in WP11-19 by Bob Saffell since the proposed changes in WP11-12 deal with broadcasting all ADS-B Messages when the TCS command indicates an On-The-Ground (OTG) status. Tom Pagano introduced WP11-12 by indicating that in the beginning of the Transponder MOPS development, the TCS command language followed the ICAO SARPs language, which tends to lead one to believe that only the surface position message would be broadcast for TCS=1 or 2. But further investigation leads to the understanding that for TCS=1 or 2, what was intended is that all surface format messages be broadcast, including the ID, Aircraft Operational Status and Aircraft Status. Review of WP11-12 was suspended on Wednesday afternoon to await input from Don Walker. Review of WP11-12 was resumed on Thursday morning. After discussions, changes were made to produce Working Paper SC209-WP11-12R1 expanding the definition of the TCS subfield in order to clarify what is broadcast. It was agreed by the Joint Session that all other changes in WP11-12R1 were accepted. It was agreed by the Joint Session that the results of [Working Paper SC209-WP11-12R1](#) must be reported to the ICAO ASP Working Group at their October meeting. Gary Furr agreed to update the DO-181D/ED-73C Change documents to reflect the agreed upon changes.
- 5.5 [Working Paper SC209-WP11-13](#) under Agenda Item #5d prepared by Gary Furr and Tom Pagano was not reviewed by the Joint Session because of lack of time available. This Working Paper will be presented again during the next Joint Meeting at EUROCAE in Paris, 15 – 19 November 2010.

- 5.6 The Meeting continued with the review of [Working Paper SC209-WP11-14](#) under Agenda Item #5e prepared by Kevin Hallworth and presented to the Joint Session by Eric Potier. Working Paper WP11-14 deals with the major findings of the study commissioned by the European Aviation Safety Agency (EASA, Tender EASA.2009.OP.20) and reported on during the Paris Joint Session by Dr.-Ing Jochan Bredemeyer of Flight Calibration Services GmbH (FCS) in Working Paper SC209-WP10-17. Eric Potier reviewed the major findings of the study and after discussion by the Joint Session, for **Working Paper bullet 2.1** for Phase Reversal Detection, it was agreed that there would be Notes to be proposed in the MOPS to clarify the issue of phase reversal detection. **Action Item 11-03** was accepted by Eric Potier to develop these Notes and other specific changes to DO-181D/ED-73C based on the recommendations in WP11-14. During further review and discussion, it was noted that for **Working Paper bullet 2.2**, the referenced criteria in ED-73C §3.8.3 [DO-181D, §2.2.5.2] is consistent with the SARPs requirements at Annex 10, Vol. IV, §3.1.2.10.3.1. For **Working Paper bullet 2.3** it was agreed that there would be no change to the MOPS documents, but perhaps an additional Note to recommend that in practice IQ demodulation may not be sufficient to meet the MOPS requirements.
- 5.7 The Meeting continued with the review of [Working Paper SC209-WP11-15](#) under Agenda Item #5f prepared by Kevin Hallworth and presented to the Joint Session by Eric Potier. The Working Paper deals with an incident report from the Swedish Accident Investigation Board of two separate incidents aboard a passenger aircraft, and their recommendations. The recommendation that affects SC-209/WG-49 was for the transponder to provide a “quick selection feature” for setting the emergency code of 7700. After discussions, the Joint Session agreed that adding a poorly implemented “quick selection feature” could actually increase the possibility of false alarms, and might lead to inadvertent selections of an emergency condition. DO-181D in §2.1.7 already specifies the conditions and requirements for entering the 4096 codes. The discussion led to a decision that no changes would be suggested to the MOPS documents. The Joint Session concluded that it is not clear that the method of entry of 7700 was a factor in the incident. The Joint Session agreed that any proposed change to provide a “quick selection feature” would not significantly reduce the number of pilot actions to select an emergency code.
- 5.8 The Meeting continued with the review of Working Paper SC209-WP11-20 under Agenda Item #5g prepared and presented by Eric Potier. The Working Paper deals with broadcasting the Mode A Code after a transponder has been switched OFF and then back ON, or has changed from Transponder A to B. The basis of this request comes from a discussion that was originally held at the ICAO ASP TSG meeting in Ft Lauderdale in February 2008. Flimsy 3 from that meeting was generated during the TSG meeting to action Eric Potier to propose to SC-209/WG-49 a change to the drafts of DO-181D/ED-73C to set a temporary alert when transitioning from Off or STANDBY to any operational mode. It appeared that this issue was not discussed during the February 2008 SC-209/WG-49 meeting in Melbourne Florida, and Eric Potier was bringing up the issue again for resolution. After discussion, the Joint Session agreed to make changes to the proposed changes and these revisions were captured in [Working Paper SC209-WP11-20R1](#). Gary Furr agreed to update the DO-181D/ED-73C Change documents to reflect the agreed upon changes.

6. Under **Agenda Item #6**, the Meeting was presented with the actual drafts of the proposed Change 1 to DO-181D and Change 1 to ED-73C that had been prepared prior to the meeting and posted as Working Papers [SC209-WP11-17](#) and [SC209-WP11-18](#).

6.1 The Meeting was unable to directly review the contents of either of these Working Papers because of the lack of time available. All of the Working Papers and proposed changes will be incorporated into revised drafts of these documents and presented again in updated form during the next Joint Session at EUROCAE in Paris on 15 – 19 November 2010.

7. Under **Agenda Item #7**, the Meeting discussed the dates, times and length of the future meetings of the joint sessions of RTCA SC-209 and EUROCAE WG-49. It was agreed by the Joint Session that the previously proposed Final Review and Comment resolution session that was proposed for EASA in Cologne Germany should be for longer than three (3) days. Kevin Hallworth was contacted and he confirmed that he was unable to host the meeting for a full five days. Eric Potier also confirmed that he would not be able to host the November meeting because of the lack of available conference rooms. Upon being contacted, Roland Mallwitz confirmed that EUROCAE would have space available in the Malakoff office for a full five days. Therefore, the Meeting agreed that the currently planned future meetings in order to meet our schedule would be the following:

Meeting #	Dates/Time	Meeting Location
12	15 – 19 November 2010	EUROCAE @ Malakoff, Paris France
13	24 – 28 January 2010	Melbourne Florida hosted by Rockwell Collins

8. The following is a summary of all of the Open Action Items from previous Meetings, and those accepted during Meeting #11.

Action Number	Action Description	Assigned to	Status
11-01	Based on WP11-04, prepare requirements and test procedures for register priority in DO-181D §2.2.23.1.4 for Register 08 ₁₆ .	Alex Rodriguez Bob Saffell	
11-02	Based on WP11-12R1, propose test procedures for DO-181D and indicate whether any other changes might be necessary for DO-260B.	Bob Saffell Tom Pagano	
11-03	Based on the recommendations in WP11-14, propose specific changes to DO-181D/ED-73C.	Eric Potier	
11-04	Based on comments received during Meeting #11, revise the proposed maintenance register presented in WP11-11 for review initially at the ICAO ASP Working Group meeting in Brussels in October and also for the November SC209/WG49 meeting.	Alex Rodriguez Bob Saffell	
11-05	Based on the agreement to reverse the changes for DI=4, 5, 6, remove the changes in both Change documents and create a new working paper to propose a new change.	Tom Pagano	

9. The **Working Papers** for all SC-209 Meetings, as well as the Meeting Agendas, Meeting Minutes, and Meeting Schedules are posted on the ADS-B web site maintained at the FAA William J Hughes Technical Center, located at: <http://adsb.tc.faa.gov/SC209.htm>