

**Summary of Meeting #29 of RTCA SC-186 Working Group 3
and Meeting #6 of EUROCAE Working Group 51, Subgroup 1
held at RTCA Headquarters in Washington DC as a Joint Session for the
Maintenance of the ADS-B 1090 MHz Extended Squitter (1090ES) MOPS
from 21 – 24 July 2009 between 9:00am and 5:00pm EDT
<http://adsb.tc.faa.gov/WG3.htm>**

The meeting was called to order by Working Group 3 Co-Chair Thomas Pagano of the FAA ATO-P organization at about 9:00am, 21 July 2009. Mr. Pagano and EUROCAE WG-51, SG-1 Chair Jorg Steinleitner welcomed all attendees and asked that each attendee introduce themselves and their organization. The participants during part, or all, of the meeting included:

Dr. Larry Bachman, JHU-APL	Richard Jennings, FAA AIR-130	Eric Potier, Eurocontrol (WG-51, SG-1)(phone)
Dave Barnard, L-3 / ACSS	Stan Jones, Mitre CAASD	Robert "Bob" Saffell, Rockwell Collins
Chip Bulger, FAA AIR-130	Larry Kenney, Raytheon	Stuart Searight, FAA ATO-P
Bob Burns, Engility Corp, FAA ATO-P AJP-653	Dr. Ian Levitt, FAA ATO-P. AJP-653	Charles Sloane, FAA AIR-130
Gary Furr, Engility Corp, FAA ATO-P, AJP-653	Al Marshall, Sensis Corp	Jorg Steinleitner, Eurocontrol (WG-51, SG-1)(phone)
Michael Garcia, ITT Corp.	Johan Martensson, Eurocontrol (WG-51, SG-1)	Jessie Turner, Boeing ATM
Martin Gray, Trig Avionics (WG-51, SG-1)	Dean Miller, Boeing ATM (phone)	Don Walker, Honeywell International
Dr. William Harman, MIT Lincoln Lab	Tom Pagano, FAA ATO-P, AJP-653	

1. Tom Pagano and Jorg Steinleitner began the meeting with **Agenda Item #1** by welcoming all participants to RTCA Headquarters in Washington DC.
2. After Tom Pagano and Jorg Steinleitner 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 1090-WP29-01. 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. Several 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 1090-WP29-01R1.
3. Next, under **Agenda Item #3**, the Meeting turned to Working Paper 1090-WP29-02 as presented by Gary Furr as the Summary of Meeting #28, which was held at the facilities of EUROCAE in Malakoff near Paris France on 16 – 19 June 2009. Jessie Turner of Boeing asked about the report of paragraph 5.5 with the potential treatment of duplicate addresses by the Ground Stations. Mike Garcia offered an answer. Tom Pagano clarified the question asking what the Ground Station would do if it received a potential duplicate address on two different UAT targets --- would the Ground Station rebroadcast both sets of information on 1090ES? Mike Garcia indicated that he would check on that condition and report back to WG-3/SG-1. The minutes of Meeting #28 were accepted by the Joint Session as published.

4. Under **Agenda Item #4a**, Gary Furr then began a brief review of Working Paper 1090-WP29-03 as a brief look at the current status all of the currently proposed changes that could be included in what was originally referenced as “Change 3 to DO-260A,” but has now been recognized as the complete publication of DO-260B.
 - 4.1 Gary indicated that there would not be a detailed review of this Working Paper, given that it is only a working copy of the progress of the activities of the Working Groups toward the ultimate published MOPS documents. It was pointed out that there had been assignments made for Action Items to many, or most, of the proposed changes during Meeting #28 at EUROCAE and that these actions would be updated during or after this Meeting, and that the Change Matrix would continue to be updated during and after this Meeting for Meeting #30.
 - 4.2 Gary indicated that Working Paper 1090-WP29-___ as posted on the Agenda, was supposed to be a working draft of version 3.0 of the current DO-260B with all changes differing from the published DO-260A being highlighted in yellow.
 - 4.3 During the review of WP29-03, there was discussion on the Ground Speed issue. It was agreed that we would leave the newly modified Ground Speed encoding which represents an encoding for Ground Speed=0 as decimal encoding of one (1).
5. Next, under **Agenda Item #5**, 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 previous Meetings. Working Papers in Agenda Item #5 were taken in no particular order and were interleaved with Working Papers in Agenda Item #6. The presentation of a given Working Paper was dependent on the availability of certain Meeting Members. The summaries below simply represent the summaries at the time of presentation.
 - 5.1 The first Working Paper to be reviewed was 1090-WP29-05 under Agenda Item #5b, presented by Rich Jennings as a result of Action Item 28-01. This Working Paper presents a proposal to modify the sections in DO-260B that relates to an optional Extended Squitter Inhibit. This issue is an outgrowth of the previous discussions on ADS-B ON/OFF switches and was discussed during the Paris Meeting, and it was agreed that Rich would propose actual DO-260B text to make sure that IF some means was provided to inhibit ADS-B, that it would be annunciated to the pilot. The proposed changes in WP29-05 were reviewed and discussed, and the Joint Session approved the changes to be incorporated by Gary Furr into the draft of DO-260B.
 - 5.2 The Meeting then began to review Working Papers 1090-WP29-16 and 1090-WP29-16Add under Agenda Items #5h and #5i, presented by Bob Saffell as a result of Action Item 28-03 dealing with all of the possible changes that also need to be made in DO-260B because of the previously agreed insertion of the new Target State and Status and the revisions of the Operational Status Message. There was considerable discussion regarding a note that Bob proposed to add in §2.2.5.1.6.2. As a result, there were questions concerning the assumptions in the MOPS that the Time Mark is synchronized to the start of the UTC second. Those T=1 discussions were postponed until Rich Jennings and Tom Pagano had a chance to discuss the issue with George Ligler, who

was unable to be at the meeting in person. After that discussion, there was still disagreement among the Joint Session, and it was agreed that a separate Teleconference would be scheduled to discuss the issues and to ensure that the correct people would be available. As for the remainder of the proposed changes in WP29-16 and WP29-16Add, the Joint Session agreed with the proposed changes and Gary Furr agreed to incorporate those changes into the draft of DO-260B. (*The subsequent teleconference was scheduled for 1:00pm on Thursday, 30 July 2009.*)

- 5.3 The Meeting then began to review Working Paper 1090-WP29-15R1 under Agenda Item #5g, presented by Larry Bachman as a result of Action Item 28-06 regarding the paragraphs of the STP MOPS that have been identified by the SC-186 STP MOPS Ad Hoc Subgroup to be copied from the STP MOPS and retained in the new versions of the ADS-B Link MOPS. There was considerable discussion regarding the issue of whether or not to include into the Link MOPS the information regarding “Source Selection.” Larry pointed out that §2.2.4.7.1 of the STP MOPS was discussed in the WG-5 meeting on 14 – 16 July and the UAT WG determined that text should be developed to go into the UAT MOPS for source selection. FAA AIR-130 indicated that they feel that there should be a requirement in the Link MOPS for Source Selection, so it was agreed by the Joint Session that Don Walker would accept Action Item 29-01 to produce proposed test procedure text for both MOPS. However, later during the Session, there was further agreement that Don Walker would draft a sentence or two for review on Wednesday with regard to a requirement for horizontal position source selection. Don offered text for source selection that was reviewed and discussed, and was numbered as Working Paper 1090-WP29-21. Don will take WP29-21 and propose a specific location and specific test procedures for the Source Selection.
- 5.4 The Meeting then began to review Working Paper 1090-WP29-08 under Agenda Item #5c, presented by Tom Pagano as a result of Action Item 27-07 regarding the potential handling of Duplicate Addresses on 1090ES. Tom proposed several modifications to the Report generation section of the MOPS in §2.2.10 and in the new ADS-R sections. There were several questions from Kurt Schueler of Garmin that were discussed and answered. Dean Miller asked also about why the proposed changes did not cover potential duplicate addresses for TIS-B targets. Tom offered an explanation for why he did not include duplicate addresses for TIS-B targets. Tom indicates that the correct place to perform this function is in the Ground Stations. It was discussed and agreed that a note would be added to the proposed changes in this Working Paper to the affect that “*Duplicate address processing is not required for TIS-B targets. The assumption is that the ADS-B Ground Stations will protect against any duplicate address situation.*” After discussion and Meeting agreement, the editorial changes produced 1090-WP29-08R1, and Gary Furr agreed to implement the suggested changes into the draft of DO-260B.
- 5.5 The Meeting then began to review Working Paper 1090-WP29-13 under Agenda Item #5f, presented by Larry Bachman as a result of Action Item 25-03 regarding proposed changes to Appendix P for the purpose of removing the specific scenario dates (i.e., LA2020, Core Europe 2015, etc). After discussion and Meeting agreement, there were minor editorial changes to produce 1090-WP29-13R1, and Gary Furr agreed to implement the suggested changes into the draft of DO-260B.

- 5.6 The Meeting then began to review Working Paper 1090-WP29-17 under Agenda Item #5j, presented by Bill Harman as a result of Action Item 26-02 regarding the proposed update to Appendix E for air-to-air ranges for the various avionics classes. After discussion and Meeting agreement with the proposed changes, Gary Furr agreed to implement the suggested changes into the draft of DO-260B as a new Appendix E.
- 5.7 The Meeting then began to review Working Paper 1090-WP29-10 under Agenda Item #5d, presented by Ian Levitt as a result of Action Item 28-02 regarding the agreed-to changing of the airborne latitude language in the MOPS to account for the agreed-to changes in total and uncompensated latency. The Meeting was asked to review the proposed language over night and have another discussion. Bill Harman offered an alternative set of text for several places in the Working Paper. After discussions on the addition proposed text, Tom Pagano agreed to accept **Action Item 29-03** to take all inputs and draft the proposed changes into a new Working Paper for Meeting #30 to show proposed changes for Airborne and Surface, Latitude and Longitude, including some proposed changes to test procedures.
- 5.8 The Meeting then began to review Working Paper 1090-WP29-20 under Agenda Item #5k, presented by Eric Potier as a result of Action Item 28-05 regarding the creation of a proposed new MOPS Appendix for demonstrating the transmission of less than or equal to 6.2 extended squitters averaged over 60 seconds. After discussion and Meeting agreement on the proposed text for the Appendix, Gary Furr agreed to implement the suggested changes of the Working Paper into the draft of DO-260B as a new Appendix.
- 5.9 The Meeting then began to review Working Paper 1090-WP29-12 under Agenda Item #5e, presented by Larry Bachman as a result of Action Item 25-03 regarding proposed changes to the information previously suggested as changes for Appendix P with regard to adding the AIS equipment classes. After discussion and Meeting agreement, Larry agreed under Action Item 25-03 to make revisions to this again to break the first column into a 3NM and 10NM bin and present it again at the next meeting.
- 5.10 The Meeting discussed in real-time a proposal from Bob Saffell and Don Walker with respect to the resolution of the issue that has been discussed around the Position Offset Applied bit. Bob and Don proposed a solution whereby a new Subtype=2 of the Operational Status Message (OSM) would be broadcast at the rate of once every 10 seconds and the new OSM would include a calculation for the offset if the POA=0. Working Paper 1090-WP29-06 was not formally presented. However, at the suggestion of Gary Furr, the Meeting considered and agreed that the 8 reserved bits in the Operational Mode Codes of the Operational Status Message could be used for the "GPS Antenna Offset" parameter instead of creating a new Subtype message. Bob Saffell accepted **Action Item 29-02** to write up a new Working Paper that describes the proposed solution so that it can also be shared with WG-5 for UAT prior to their meeting in August.
- 5.11 The Meeting then began to review Working Paper 1090-WP29-04R1 under Agenda Item #5a, presented by Don Walker as a result of Action Item 27-01 dealing with

setting some sort of accuracy if the POA bit is set. After discussion, the Meeting disagreed with the need to set a new requirement or new test procedures in line with the suggestions of this Working Paper.

6. Under **Agenda Item #6**, the Meeting discussed the additional Working Papers that make proposals on issues related to proposed changes to DO-260A. Working Papers in Agenda Item #6 were taken in no particular order and were interleaved with Working Papers in Agenda Item #5. The summaries below simply represent the summaries at the time of presentation.
 - 6.1 The Meeting reviewed Working Paper 1090-WP29-11 under Agenda Item #6d prepared by Tom Pagano. The Working Paper deals with changes that Tom believes need to be made because of reviews of the sections on TIS-B and ADS-R because of the already proposed changes that have been agreed upon. During review there were discussions that resulted in edits that are reflected in 1090-WP29-11R1. The Meeting agreed with the proposed edited changes, and Gary Furr agreed to implement those changes into the draft of DO-260B.
 - 6.3 The Meeting continued with the review of Working Paper 1090-WP29-09 under Agenda Item #6c prepared by Bob Burns. The Working Paper deals with proposed changes to the test procedures as a result of the proposed changes to the TIS-B and ADS-R sections that were discussed in Working Paper 1090-WP29-11. During review there were discussions which resulted in edits that are reflected in 1090-WP29-09R1. The Meeting agreed with the proposed edited changes, and Gary Furr agreed to implement those changes into the draft of DO-260B.
 - 6.4 The Meeting continued with the review of Working Paper 1090-WP29-14 under Agenda Item #6e prepared by Eric Potier. The Working Paper deals with several proposals for enabling the insertion of several radius of containment (R_C) values for Surface Position Message TYPE Codes. This Working Paper was reviewed during the ICAO ASP TSG Meeting in Paris in June and each of the four (4) alternatives were considered and discussed. It was the decision of the ICAO ASP TSG to recommend alternative four (4) to the RTCA SC-186 and EUROCAE WG-51, SG-1 Joint Session. There was considerable discussion from manufacturers related to advising the problems related to not retaining backward compatibility. The proposals of Working Paper 1090-WP29-14 were rejected by the Joint Session. Eric Potier then agreed to make a proposal to be able to use an additional bit to describe the use of additional NIC values. Eric came back on Thursday morning and presented what was designated as Working Paper 1090-WP29-19, described below.
 - 6.5 The Meeting continued with the review of Working Paper 1090-WP29-07 under Agenda Item #6b prepared by Al Marshall of Sensis Corporation. The Working Paper deals with an introduction and detailed explanation of the Compact Position Reporting (CPR) algorithm, which is used to encode and decode the latitude and longitude values that are reported in the Airborne and Surface Position Messages. After a review of the proposed new Appendix, the Joint Session accepted the proposed text with some minor

edits to be made in the very near future by Al Marshall, and Gary Furr agreed to format the Working Paper as edited into a new Appendix for DO-260B.

- 6.6 The Meeting continued with the review of Working Paper 1090-WP29-19 under Agenda Item #6g prepared by Eric Potier. The Working Paper deals with an alternative method for setting additional NIC Supplement values for Surface Messages with TYPE Code=8 to represent the additional radius of containment of 0.3 NM and to retain the old values of 0.2 NM and 0.6 NM. During discussion, the Joint Session agreed to add NIC Supplement-C and to use Bit 20 in the Operational Status Message. Gary Furr updated Working Paper 1090-WP28-28 to reflect the newly added parameter and agreed to update the draft of DO-260B to reflect the new NIC Supplement-C.
 - 6.7 The Meeting continued with the review of Working Paper 1090-WP29-18 under Agenda Item #6f prepared by Stuart Searight and Dean Miller. The Working Paper deals with how to deal with the MASPS Compliance Matrix. Dean brings up the issue of how to deal with F.3 for the TIS-B compliance. WG-3/SG-1 agrees with the recommendation that section F.2 be updated and further agreed that F.3 be updated as well.
7. Under **Agenda Item #7**, the Meeting discussed Other Business issues.
- 7.1 The Meeting briefly discussed the topic of updating the §2.2.8 and §2.4.8 for the State Vector, Mode Status and Target State Reports. Tom and Gary accepted **Action Item 29-05** to review these sections and DO-260B proposed changes.
 - 7.2 It was agreed that there would be a separate teleconference related to discussing the issue that was brought up regarding the Time Mark for the case where T=1. That teleconference was scheduled for 1:00pm EDT on Thursday, 30 July 2009. To be reported on separately.
 - 7.3 It was briefly discussed again that Appendix N would need to be updated to reflect changes related to Version TWO Receivers seeing and understanding Version ZERO and Version ONE Messages.
8. Under **Agenda Item #8**, the Meeting discussed the dates, times and length of the future meetings of the joint sessions of RTCA SC-186 WG-3 and EUROCAE WG-51, SG-1. Jorg Steinleitner had previously indicated that it was the position of WG-51, SG-1 that it would probably be better for all concerned to hold the August meeting in Washington DC instead of at Eurocontrol, in view of the number of vacations taken by the European members during August. 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
WG-3 #30 SG-1 #7	18 – 21 August 2009 9:00am 8/18 to noon 8/21	Confirmed at RTCA in Washington DC
	31 August 2009	Distribution of SC-186 FRAC and EUROCAE WC
WG-3 #31 SG-1 #8	Week of 5 – 9 October '09 Specific days TBD	Proposed for FRAC Comment Resolution at RTCA SC-186/WG-51 Joint Plenary on 9 October <i>Will have to consider Comment Resolution for UAT will be taking place during the same week.</i>

9. The following is a summary of all of the Open Action Items from previous Meetings, and those accepted during Meeting #28.

Action Number	Action Description	Assigned to	Status
25-03	Update Appendix P to include AIS equipment class. This will include the results of the USA East Coast model for 2020 and 2035. Indicate specific placement in Appendix P for proposed changes.	Larry Bachman	See WP28-04 See WP29-12 See WP29-13
25-23	Open Action for Gary Furr to implement agreed upon changes into the current draft of DO-260B for review during the next meeting.	Gary Furr	On-Going
28-02	Propose specific language for the §2.2 (including §2.2.5.2) requirement and the §2.4 test procedures, Appendix A changes, and the new Timing Appendix, to achieve the requirements for specifying the total and uncompensated latency. Implement the expected actions in WP28-20 for requirements, test procedures and Appendix A changes and review prior to the July meeting.	Ian Levitt Tom Pagano Bob Saffell Dave Barnard Don Walker	See WP28-20 See WP29-10
29-01	Draft test procedure text for Source Selection which will be reviewed for both Link MOPS, based on text discussed in Working Paper 1090-WP29-21.	Don Walker	Due < 13 August
29-02	Write up the requirements and test procedures for the understanding of the addition of the 8 bits in the Operational Mode Code bits for the GPS Antenna Offset.	Bob Saffell	Due < 13 August
29-03	Take Working Paper 1090-WP29-10 and consider addition suggestions from Meeting #29 and create the necessary MOPS sections for Airborne and Surface, Latitude and Longitude and propose any changes in test procedure sections.	Ian Levitt Tom Pagano	Due < 13 August
29-04	Review Appendix F.3 for what to do with regard to the MASPS Compliance Matrix for TIS-B.	Gary Furr Stuart Searight Tom Pagano Dean Miller	Due < 13 August
29-05	Review §2.2.8 and §2.4.8 for updates to all of the Reports based on changes for DO-260B.	Tom Pagano Gary Furr	Due < 13 August

10. The **Working Papers** for all WG-3 Meetings, as well as the Meeting Agendas, Meeting Minutes, and Meeting Schedules are posted on the ADS-B 1090 MHz web site maintained at the FAA William J Hughes Technical Center, located at: <http://adsb.tc.faa.gov/WG3.htm>