

**Summary of Meeting #23 of RTCA SC-186 Working Group 5  
held at RTCA in Washington DC and as a Teleconference and WebEx Session for the  
Maintenance of the UAT MOPS  
on 14 – 15 April 2009  
<http://adsb.tc.faa.gov/WG5.htm>**

The meeting was called to order by Working Group 5 Co-Chair Richard Jennings of the FAA's AIR-130 organization at about 9:00am EDT on 14 April 2009 at the facilities of RTCA in Washington DC. Rich welcomed all attendees. The participants during all, or part of Meeting #23 at RTCA and the WebEx session included:

Dr. Larry Bachman, JHU-APL	Dr. George Ligler, PMEI – FAA SBS P.O.	Stuart Searight, FAA, ATO-P
Chip Bulger, FAA AIR-130	Bob Manning, DCS Corp	Bernald Smith, SSA / FAI
Gary Furr, Engility Corp, FAA ATO-P	Chris Moody, Mitre / CAASD	Edward Valovage, Sensis Corp
Richard Jennings, FAA AIR-130	Tom Mosher, Garmin AT	Warren Wilson, Mitre
Stan Jones, Mitre / CAASD	Tom Pagano, FAA ATO-P	

1. Rich Jennings of the FAA AIR-130 organization began Meeting #23 with **Agenda Item #1** by welcoming all participants to the face-to-face meeting at RTCA, with the Telephone bridge line provided by Mitre CAASD and the WebEx Session provided by RTCA. Rich briefly discussed the absence of George Ligler this morning, who was attending the RTCA PMC meeting. George joined us later after the PMC meeting ended.
2. After Rich concluded his comments, the Meeting turned its attention to **Agenda Item #2** for a review of the proposed Agenda for this Meeting. Gary Furr pointed out that the primary function of this Meeting would be to go over the proposed set of changes that is presented in Working Paper UAT-WP23-03 and to obtain agreements and assignments for work on the proposed changes, if any, to the UAT MOPS, for the next Meeting, which will occur on 3 – 4 June 2009 at RTCA, with an RTCA SC-186 Plenary scheduled for 5 June 2009. Gary pointed out that Tom Mosher of Garmin had provided a set of comments on UAT-WP23-03 for the Meeting review prior to the time he will be able to join us on the teleconference line. Rich Jennings indicated that Chip Bulger was working on further definition of the SIL parameter based on recommendations that came out of the WG-3 meeting several weeks ago at RTCA, and that he would be available to join us for that discussion.
3. Next, under **Agenda Item #3**, the Meeting reviewed Working Paper UAT-WP23-02 for the review and approval of the Minutes of Meeting #22, which was held on 23 March 2009 as a Teleconference. No discussion was held regarding the Minutes of Meeting #22 and therefore, the Minutes of Meeting #22 were approved as published.
4. Next, under **Agenda Item #4a**, the Meeting was referred to Working Paper UAT-WP23-05 as presented by Gary Furr. Gary points out that this Working Paper represents an initial draft of DO-282B as it combines the original DO-282A with all changes that were approved and published as “Change 1 to DO-282A.” Gary points out that in this draft those approved changes to the SIL and NIC parameters are highlighted in yellow because they are now part

of the discussion on whether or not to make further changes. This initial draft of DO-282B will now serve as the going-forward point for any future proposed changes that will result in a published DO-282B. All future proposed changes must use UAT-WP23-05 as the point of reference.

5. Under **Agenda Item #4b**, the Meeting then began a detailed review of Working Paper UAT-WP23-03 as Gary Furr began the review of all of the currently proposed changes that should be discussed and agreed upon for the proposed DO-282B. Gary pointed out that WP23-03 represents the latest update to the proposed set of changes that were originally reviewed and agreed upon by RTCA SC-186 WG-3 and EUROCAE WG-51, SG-1 during their effort to update and harmonize the 1090ES MOPS. The list of proposed changes that appears in UAT-WP23-03 is a subset of the original total 1090ES list and represents those proposed changes that potentially affect both the ADS-B MASPS and the UAT MOPS.
  - 4.1 For Change Item #1, Duplicate Addresses, the Meeting agreed to assign **Action Item 23-01** to Chris Moody and Stan Jones to craft a Note to be placed in the receiver section of DO-282B to indicate that an application should look at the position to determine if there could be a duplicate address situation.
  - 4.2 For Change Item #2, Latency and STP MOPS sections, the Meeting discussed the issue of total Latency rather than the uncompensated latency, which is more of a problem in 1090ES. There was Meeting discussion as to whether potentially altering the Data Lifetime in Table 2-64 might resolve the issue of a 1.5 total Latency. **Action Item 23-12** was accepted by Tom Mosher, Chris Moody and Larry Bachman to review the total Latency requirements and present a proposal for resolution at the June meeting. **Action Item 23-13** was accepted by Rich Jennings and Chip Bulger to review the draft Final ADS-B-OUT Rule and advise what specific parameters should be covered by the 1.5 second total Latency requirement.
  - 4.3 For Change Item #3, Mode 3/A Code broadcast, the Meeting agreed that if UAT is to meet the requirements of ADS-B RAD, then there will have to be requirements to transmit the Mode 3/A Code at a higher rate for some defined period of time. After discussions, Larry Bachman agreed to accept **Action Item 23-02** to review the draft of the ADS-B RAD document for any update interval requirements that may affect potential changes in the MOPS.
  - 4.4 For Change Item #4, Mode 3/A Code suppression, the Meeting discussed the fact that there already exists a configuration item specifically on the GDL-90 for Capstone that when set does not transmit the Mode 3/A Code. It was agreed that we would assign **Action Item 23-03** for Chris to create a new requirement to describe the currently existing configuration item in the GDL-90 for Capstone that inhibits the transmission of the Mode 3/A Code if set.
  - 4.5 For Change Item #5, NAC<sub>V</sub> versus HFOM, Rich Jennings described the derivation of the tests set out by Barbara Clark and RTCA SC-159 to remove the connection of HFOM and the setting of NAC<sub>V</sub>. The Meeting reviewed Working Paper UAT-WP23-04 in which Rich and George Ligler have proposed the addition of some language for

the UAT MOPS to discuss how to set the  $NAC_V$  parameter. **Action Item 23-04** was accepted by Stan Jones to create an addition to go with the proposed Appendix on  $NAC_V$ , which would also be used for Appendix J of DO-260B. Bernald Smith inquired about the definition of “normal maneuvers” in the proposed Note, which would go with the  $NAC_V$  Table, and the Meeting agreed to further investigation or a change in the proposed Note to clarify. During the Meeting, Barbara Clarke replied to an inquiry regarding “normal maneuvers” and during the June Meeting, a proposal will be reviewed for any clarifications that might be required to the text.

- 4.6 For Change Item #6a, removing the vertical components of  $NAC_P$ , NIC and SIL, the Meeting agreed that the vertical and horizontal components can be separated. However, the Meeting also agreed that the decision is an ADS-B MASPS decision and the decision to go forward and execute actual changes to the UAT MOPS will have to come after the agreement of the RTCA SC-186 Plenary, which is currently scheduled for 5 June, after the next WG-5 Meeting.
- 4.7 For Change Item #7, a redefinition of SIL, Chip Bulger of the FAA AIR-130 organization described the FAA AIR-130 proposal identified in Working Paper 1090-WP26-26 for redefining SIL from including only the design assurance of the position source, to including the overall ADS-B avionics/system. After discussion, the Meeting agreed with the basic proposal that Chip explained as the AIR-130 position in 1090-WP26-26. This component of SIL should be called the System Design Assurance level. Chip also discussed Working Paper 1090-WP26-30 in which there was a proposal by Jorg Steinleitner for using the current 2-bits of SIL to meet the proposal of AIR-130 and a separate proposal for a 3-bit SIL that would propose future expansion. Chip presented what became Working Paper UAT-WP23-07 in which he altered the 3-bit proposal from Jorg to allow for backward compatibility with the existing 2-bit SIL definition. The Meeting agreed that Chip would continue to work with Jorg and Dean Miller of Boeing, and Stan Jones offered to join the group to further discuss the resolution of the SIL definition in preparation for the WG-3 meeting in Chicago in May.
- 4.8 For Change Item #8, the proposal to add a new equipment class for non-diversity, referenced as AIS, the Meeting agreed that a new equipment class, designated as AIS with the antenna specified to be on the bottom would be specified. Warren Wilson accepted **Action Item 23-05** to propose all of the places in the UAT MOPS document that would need to be changed as a result of proposing the new equipment class. Larry Bachman accepted **Action Item 23-06** to perform the analysis that will go into the Performance Appendix K.
- 4.9 For Change Item #9, the proposal to change the definition of the CDTI Installed and Operational bit to an ADS-B-IN bit was reviewed and the Meeting agreed with the proposal to redefine this bit and to define a new bit for a receiver on the opposite ADS-B link. Tom Pagano accepted **Action Item 23-07** to complete his proposal to specify the actual changes in both DO-260A and DO-282A to implement these changes.

- 4.10 For Change Item #10, the proposal is to delete or “reserve” the Receiving ATC Services flag and the IFR Capability flag. The Meeting discussed the fact that in UAT the GDL-90 currently suppresses the transmission of the 1200 code if the Receiving ATC Services flag is set to one. This is a Capstone specific implementation and it was agreed by the Meeting during the discussion that this would be required to change if the “Receiving ATC Services” Flag were deleted as proposed. By deleting the flag, it implies that a UAT box will always transmit the Mode A Code (1200 or otherwise) and Rich Jennings agrees that this was the intent of the draft NPRM. It was agreed by the Meeting that Chris Moody would accept **Action Item 23-08** to propose changes. Since there is no IFR Capability flag in UAT, this will be dropped from the Change Item.
- 4.11 For Change Item #12, Wake Vortex, George Ligler accepted **Action Item 23-09** to work with a Wake Vortex team to create an Appendix for DO-260B and DO-282B.
- 4.12 For Change Item #13, for Selected Altitude Broadcast, it was discussed that this request has come via the needs of Air Services Australia and UK NATS to broadcast selected altitude. WG-5 agreed to wait on the final definition of the Target State and Status Message from WG-3 to specify any potential changes to DO-282B.
- 4.13 For Change Item #14, for potential broadcast of the TCAS RA Message contents, the Meeting agreed that this is not needed on the UAT system and the Class was set to 4.
- 4.14 For Change Item #15, for the GPS Alarm, the meeting agreed to craft a Note the same as in the 1090ES MOPS. WG-5 will await the draft of the Note for DO-260B and review it for applicability for inclusion in DO-282B.
- 4.15 For Change Item #16, for potential changes that may be required when the ADS-B Version Number is set to two (2), WG-5 agreed that there will be changes required, but no assignments can be made at this time.
- 4.16 For Change Item #17, for determination and validation of the air/ground status, the Meeting discussed the fact that this action in the 1090ES MOPS was for ensuring that the language in DO-260B agreed with that in the ICAO SARPs and in DO-181D. This action for 1090ES indicates that a Note be added which was added into DO-181D. There was Meeting discussion regarding the treatment of Rotorcraft. In Change 1 to DO-282A, there was an addition to §2.2.4.5.2.5.2 indicating that the validation of vertical status would not be performed for Rotorcraft. WG-5 agreed that at a minimum, the Note that will be added to DO-260B will also be added to DO-282B.
- 4.17 For Change Item #18, for Fail/Warn of ADS-B, it was indicated that this is primarily a requirement of AIR-130 for any ADS-B box that is required for the airspace to be able to indicate when it is not working properly. This issue has been discussed during each of the three WG-3 meetings with inputs from Boeing, Airbus and EASA. The primary issue is the wiring in legacy aircraft and their ability to handle this potential Fail/Warn annunciation without rewiring the aircraft. The problem is different in UAT installations. It was pointed out that in §2.2.13.5.1 of DO-282A, there is a requirement for Failure Annunciation. It was agreed by the Meeting that this problem could be resolved for UAT by adding the position source to the text in §2.2.13.5.1. Tom Pagano

and Rich Jennings accepted **Action Item 23-11** to propose to WG-5 a resolution to this Fail/Warn issue based on discussions coming out of the WG-3 Chicago meeting.

- 4.18 For Change Item #19, for the possible addition of a NIC value of 0.3 NM to match the addition in 1090ES for a NIC Supplement for NIC=7, the Meeting discussed the reason for the basic requirement, which is that Boeing wants to use SA ON receivers to provide 3 NM separation. It was agreed that WG-5 would inform WG-3 that it is possible to add a new NIC value for 0.3 NM as an additional NIC encoding, and that WG-5 awaits the final decision by WG-3 as to whether they agree to implement the NIC Supplement for NIC=7.
- 4.19 For Change Item #20, for making changes to Table 2-64, Tom Mosher and Gary Furr will discuss adding columns and/or adding notes to address the concerns of Tom Mosher about separating the control inputs that do not need to be transmitted from those items that are transmitted.
- 4.20 For Change Item #21, for making changes to Table 2-7, Chris Moody describes the situation where ITT has implemented this Table differently than it is specified in DO-282A, and the proposal is to change the MOPS to match that ITT implementation. WG-5 agrees to change the MOPS and Chris Moody accepted **Action Item 23-14** to provide the proposed changes to Table 2-7.
- 4.21 For Change Item #22, for potential changes to the increments for Ground Speed described in Table 2-23, Chris Moody indicates that the request is coming out of RTCA SC-186 WG-1A and that the increment of 1090ES is 0.25 knots. Chris Moody accepted **Action Item 23-15** to make proposed changes to Table 2-23.
- 4.22 For Change Item #23, for using the Address Qualifier to identify the differences between the TIS-B and ADS-R Messages. Chris Moody discussed Table 2-12 and describes the implementation of ITT ground stations, where they are currently using the decimal “3” for the Address Qualifier to indicate an ADS-R Message. WG-5 suggests that AQ=3 changes to TIS-B/ADS-R and a new definition for AQ=6 for ADS-R with a 1090ES anonymous address. **Action Item 23-16** was accepted by Chris Moody to propose specific changes for DO-282B.
- 4.23 For Change Item #24, after discussion, the Meeting determined that this was a dead issue. The Class was set to 4.
- 4.24 For Change Item #25, for Geometric Altitude, WG-5 will copy text from a section of chapter 3 and place it under Table 2-16 as a Note. Tom Mosher sent an email to Gary Furr with the text from Chapter 3 and Gary updated the draft of DO-282B with that text.
- 4.25 For Change Item #26, for guidance on vertical rate source logic, Working Paper UAT-WP23-06 was presented by Warren Wilson.

- 4.26 For Change Item #27, for potentially adding a flag for antenna diversity, **Action Item 23-17** was accepted by Tom Mosher, George Ligler and Chris Moody to determine where to place the flag and to propose changes for DO-282B.
- 4.27 For Change Item #28, for potential guidance for receiver to prioritize uplinks, WG-5 discussed that it has already been requested of the FAA SBS Program Office to provide an air interface document, and the request for guidance for receiver to prioritize uplinks can be accommodated in that request when it is completed. WG-5 indicates that we need the FAA to tell us how they are going to implement the FIS-B service so that we can give the customers what they want.
- 4.28 For Change Item #29, for an airborne receiver to reply with a total number of uplinks or TIS-B receptions that they are seeing, after discussion, the Meeting agreed to have **Action Item 23-18** accepted by George Ligler to discuss this with the FAA SBS Program Office to see if this is an important item for them.
6. Next, under **Agenda Item #5**, the Meeting began the review of Working Papers that represent other issues related to the potential change of DO-282A.
- 5.1 The first Working Paper to be reviewed was UAT-WP23-04 under Agenda Item 5a as presented by Rich Jennings and George Ligler. This Working Paper is the result of an issue coming originally out of the 1090ES MOPS related to the fact that  $NAC_V$  was calculated using HFOM. This Working Paper was reviewed in conjunction with Change Item #5. See 4.5 above.
- 5.2 Chris Moody and Warren Wilson presented Working Paper UAT-WP23-06 as an issue related to vertical rate estimation for UAT transmissions.
7. Under **Agenda Item #6**, the Meeting discussed the dates, times and length of the future meetings of RTCA SC-186 WG-5. The Meeting agreed that the currently planned future meetings in order to meet our schedule would be the following:

Meeting	Dates/Time	Meeting Location
#24	3 – 4 June 2009 9:00am – 5:00pm EDT	RTCA Headquarters, Washington DC with RTCA SC-186 Plenary on 5 June 2009
#25	14 – 16 July 2009 9:00am – 5:00pm EDT	RTCA Headquarters, Washington DC
#26	11 – 12 August 2009 9:00am – 5:00pm EDT	RTCA Headquarters, Washington DC
#27 (if needed)	Week of 5 October 2009 Dates & Times <b>TBD</b>	RTCA Headquarters, Washington DC with RTCA SC-186 Plenary on 9 October 2009

8. The following is a summary of all of the Action Items from Meeting #22 and Action Items accepted during Meeting #23.

Action Number	Action Item Description	Assigned to	Status
22-01	Create a UAT MOPS specific set of proposed changes that start with the list of proposed changes that were identified in Working Paper UAT-WP22-04 for discussion during the April meeting.	Gary Furr	See <b>WP23-03</b> <b>Closed</b>
22-02	Consult with the SBS Program Office and ITT to determine if members of the ITT Team should be involved in the meetings of WG-5.	George Ligler	Due < 13 April
22-03	Consult with FAA AFS to determine if members of Flight Standards should be involved with meetings of WG-5. <i>Rich had a discussion with Pat Z and informed him that if there are items that need to be discussed with AFS, he would inform AFS.</i>	Rich Jennings	Due < 13 April <b>Closed</b>
22-04	Contact ICAO Aeronautical Communications Panel and Secretariat to begin discussions on the possibilities of holding meetings for the purpose of making updates to ICAO Document 9861 for UAT Technical Details and Implementation. <i>George spoke to Brent Phillips who is the Chair of ICAO ACP Working Group M. WG-5 was invited to present at a ICAO ACP meeting in June. We will need to coordinate with Brent to provide charts or to make a presentation in June.</i>	George Ligler	<b>Closed</b>
23-01	Propose a note for UAT as a caution to applications to look at the position for the possibility of a duplicate address. Target the receiver part of the MOPS for location.	Stan Jones Chris Moody	Due < 1 June
23-02	Review the draft of the ADS-B RAD document to see which update interval requirements need to be considered by WG-3/WG-5 and might necessitate changes in the MOPS.	Larry Bachman	Due < 1 June
23-03	Propose a new paragraph or section to describe the configuration item that currently exists for the GDL-90 for Capstone that indicates that the Mode 3/A Code is not transmitted.	Chris Moody	Due < 1 June
23-04	Produce an addition to the proposed Appendix on NAC <sub>v</sub> which will also be used in the Appendix J of DO-260B.	Stan Jones	Due < 1 June
23-05	Identify all of the places in the MOPS that will need to be changed to initiate an equipment class of A1S with the same power (medium) as A1H. Antenna will be on the bottom.	Warren Wilson	Due < 1 June
23-06	Run the performance analysis for addition to Appendix K for the new equipment class of A1S for the antenna on the bottom.	Larry Bachman	Due < 1 June
23-07	Proposal for making modifications to the UAT MOPS for redefining the CDTI Installed and Operational bit to mean that there is a receiver on the broadcasting data link, and to add a bit to define the fact that there is also a receiver installed on the opposing ADS-B link.	Tom Pagano	Due < 1 June
23-08	Review the MOPS and propose changes to set the “Receiving ATC Services” to “Reserved for Receiving ATC Services.”	Chris Moody	Due < 1 June

<b>Action Number</b>	<b>Action Item Description</b>	<b>Assigned to</b>	<b>Status</b>
23-09	Work with the Wake Vortex team to create an Appendix for DO-282B.	George Ligler	Due < 1 June
23-10	Verify that the air/ground determination and validation text is the same in UAT MOPS as in the 1090ES MOPS and DO-181D	Gary Furr	Due < 1 June
23-11	Provide prior to the 3-4 June WG-5 meeting a proposed resolution for the Fail/Warn issue	Tom Pagano Rich Jennings	Due < 1 June
23-12	Put together a proposal for the 1.5 second total latency requirement and propose during June meeting.	Tom Mosher Chris Moody Larry Bachman	Due < 1 June
23-13	Advise the Working Group as to which ADS-B transmitted parameters are covered by the 1.5 second total latency requirement.	Rich Jennings Chip Bulger	Due < 1 June
23-14	Specify the changes for Table 2-7 for DO-282B	Chris Moody	Due < 1 June
23-15	Specify the changes for Table 2-23 for DO-282B	Chris Moody	Due < 1 June
23-16	Specify the changes for Table 2-12 for ADS-R in DO-282B	Chris Moody	Due < 1 June
23-17	Figure out where to stick the “single antenna” bit and define what the bit does.	Tom Mosher Chris Moody George Ligler	Due < 1 June
23-18	Discuss with the SBS Program Office the possibility for an airborne receiver to broadcast a message that might contain some statistics on the reception of uplinks and TIS-B messages.	George Ligler	Due < 1 June

9. The **Working Papers** for all WG-5 Meetings, as well as the Meeting Agendas, Meeting Minutes, and Meeting Schedules are posted on the ADS-B UAT MOPS web site maintained at the FAA William J Hughes Technical Center, located at:

<http://adsb.tc.faa.gov/WG5.htm>