

Meeting Summary, RTCA Special Committee 186, Working Group 5 Development of MOPS for UAT

The meeting was held on 18-19 December 2000, at the offices of RTCA in Washington DC. The meeting was called to order at 1 p.m. on December 18, 2000 by Co-Chairman George Ligler. George provided introductory remarks and subsequently introduced Rich Jennings as the other Co-Chairman of Working Group 5 (WG-5) and Gary Furr as the WG-5 secretary. George welcomed all attendees and asked that each one introduce themselves and their organization. The attendees included:

Jerry Anderson – FAA (AIR-130)	Richard Jennings FAA (AIR-130)	Robert Saffell – Rockwell Collins
John Ashley – Mitre Corp	Ed Juleau – NTIA, Dept of Commerce	Robert Seach – NTIA, Dept of Commerce
Larry Bachman – JHU – APL	Randy Kenagy – AOPA	Kip Spurio – USAF HQ AFFSA/XR
Mike Biggs – FAA (ASR-200)	Todd Kilbourne – Trios Associates	Robert Strain – Mitre Corp
Sam Buckwalter – ARINC (AEEC Staff)	Richard Kulpinski – Mitre Corp.	Terry Stubblefield – FAA (AFS-430)
George Chang – Consultant	Chuck LaBerge – Honeywell ASTG	Nick Talotta – FAA TC (ACT-350)
Cynthia Cyrus – Trios (FAA-AND-530)	George Ligler – PMEI	Tom Teetor – Defense Concept Assoc.
John Doughty – Garmin International	Gary Livack – FAA (AFS-400)	William Thedford – Contractor (Hanscom)
Ed Fabeny – Galaxy Scientific	James Maynard – UPS Aviation Technologies	Dave Thomas – Titan (FAA TC ACT-350)
George Flathers – Consultant (AOPA)	Chris Moody – Mitre CAASD	Hartmut Uhr – Infosys for Avitech, Germany
Gary Furr – Titan Corp. (FAATC-ACT-350)	Tom Mosher – UPS Aviation Technologies	Ed Valovage – Sensis Corp.
John Gonda – DoD	Kevin O’Toole – USAF HQ AFFSA/XOP	Richard Weathers – JCS J61
Paul Gross – Arthur D. Little (FAA)	Tom Pagano FAA TC (ACT-350)	George Wilson – Delta Airlines
Val Heinz – Lincoln Laboratory	Kevin Parker – JHU – APL	Warren Wilson – Mitre Corp.
James Higbie – JHU – APL	Robert Prill – BAE Systems CNI	Gene Wong – FAA (AND-530)
Craig Hodgdon – Titan Corp (Hanscom AFB)	William Russell – Russell Systems	

1. Following introductions, regrets were announced as follows:
 - a. Stan Jones of Mitre Corp
 - b. Nikolas Fistas of Eurocontrol
 - c. Greg Kuehl of UPS Airlines
2. George Ligler initiated a discussion of the WG-5 Terms of Reference. George referred to a letter written by Steven Zaidman (**Working Paper 1-02**) dated June 2, 2000, in which it was requested that “RTCA begin immediate work on the development of a UAT Performance Standard,” and further, upon the completion of those performance standards that “RTCA continue working toward the completion of a full UAT MOPS.” On or about June 22, 2000, RTCA distributed a letter to all manufacturers and SC-186 members requesting their response to whether or not they supported the production of a UAT MOPS. At the September 13, 2000 meeting of the RTCA Program Management Committee (PMC), the response to this inquiry was presented to the PMC as being very positive and Rocky Stone confirmed that a UAT MOPS might be produced by January 1, 2002, as indicated in a summary to the minutes of the PMC (**Working Paper 1-01**).
3. Following a brief discussion on the Terms of Reference, Chris Moody of Mitre was introduced for the purpose of presenting an “Overview of UAT.” This presentation is available as **Working Paper 1-03**. Chris indicated that Johns Hopkins University Applied Physics Laboratory (JHU-APL) is running simulations of UAT in support of the Technical Link Assessment Team (TLAT). There were questions concerning the involvement of EUROCAE and as indicated by George Ligler, EUROCAE WG-51 (ADS-B) intends to complete its work after the completion of a VDL Mode 4 MOPS.
4. Mike Biggs, FAA ASR, then gave a presentation on UAT Spectrum Coordination. Mike reviewed the original reasons why the FAA Capstone Project was assigned a frequency of 966 MHz. 966 Mhz was selected because the range between 962 and 977 is set aside by ICAO so as not to interfere with Interrogation/Reply bands. Mike also placed a question to the Working Group, which became

- Action Item 1-1**, asking the question “Can UAT be tunable within a small frequency range?” As an addition to this presentation, Jim Chadwick of Mitre CAASD also discussed frequency ranges and presented the “Long-Term L-Band Spectrum Management Proposal” (**Working Paper 1-04**), also referred to as the “Dead Moose Proposal.” Jim indicated that he hoped that a UAT frequency decision could be coordinated within the United States by May 2001.
5. The Working Group was then given a presentation by Nick Talotta and Tom Pagano of the FAA Technical Center entitled “Test Bed Capability in support of the UAT MOPS Development” (**Working Paper 1-05**). The presentation outlined the hardware and software capabilities available in the ACT-350 organization for the purpose of gathering, recording and analyzing UAT signals and messages.
 6. Chris Moody gave a presentation (**Working Paper 1-06**) to the Working Group entitled “Capstone Program Summary,” which detailed some of the capabilities and timeframes set out in the Capstone program at Bethel Alaska. For further information on Capstone and current status reports, see the web site at: <http://www.alaska.faa.gov/capstone> .
 7. George Ligler then gave a brief discussion on Safe Flight 21 and the TLAT pertinent to UAT performance evaluation. George discussed the agreed traffic scenarios and requirements related to the ADS-B MASPS (DO-242) and the “Eurocontrol ADS Programme Proposed Criteria for ADS-B Datalink Technical Assessment” (**Working Paper 1-07**). George recommended that the WG consider this document during the production of the UAT MOPS (see item #10 below). Other remaining issues that will affect the completion date of the UAT MOPS included:
 - a. The ADS-B DO-242A (MASPS update) completion (approval date unknown, perhaps 3Q01)
 - b. TIS-B – MASPS group – WG-2 will have their 1st draft possibly in June 2001
 - c. FIS-B – approved by SC-195 – WG-5 needs access to this document (**Action Item 1-3**)
 - d. ASSAP MOPS, under development by WG-4
 - e. UAT Frequency Selection – between 960 – 1030
 8. Gary Furr discussed the RTCA Standards documents that relate to the MASPS, MOPS and Style Guides for the production of all RTCA documentation. The current RTCA standard for word processing is MS-WORD-97. RTCA hopes to move to MS-WORD-2000 soon. Until this happens, it was agreed that WG-5 will conduct all business in MS-WORD-97 formats. Gary distributed copies of the RTCA “Basic Document Style Guide” and the RTCA “MOPS Drafting Guide.” Gary discussed the changes in the Style Guide and how they will affect the development of the UAT MOPS document. Electronic copies of these documents should be used as starting points for writers of sections of the UAT MOPS. These electronic copies will be available on the UAT MOPS Working Group 5 web site located at: <http://adsb.tc.faa.gov> .
 9. Gary Furr also gave a brief presentation on the UAT MOPS Email List Server that has been made available to the Working Group by Mitre. In order to access this email list server, members that want to be on the list should send an email from their home email address to the command address: listserv@lists.mitre.org . The text of the message should be “subscribe uatstds-list” and the email list server will reply with an acceptance email. Any email sent to the actual email list server for distribution to the membership should be sent to the list address: uatstds-list@lists.mitre.org . Once you have been notified that your name has been properly added to the email list server membership list, you can see the names of the other list members by sending the command “review uatstds-list” to the command address: listserv@lists.mitre.org .
 10. The Working Group further discussed the scope of the UAT MOPS effort and the open issues that will influence the amount of work and the timing of the completion of that work. The Working

Group agreed to target January or February 2002 for submitting the UAT MOPS document to the RTCA PMC for its review and approval. In order to meet this date for submission to the PMC, it was agreed that the schedule CANNOT include either revisions made to RTCA/DO-242 or the TIS-B MASPS. Additionally, if the initial UAT MOPS is to include requirements emanating from the Eurocontrol Criteria identified in **Working Paper 1-07**, then WG-5 needs those requirements codified by May 2001 as well as discussed by Eurocontrol at the WG's April meeting (tentatively set to be held in Brussels). George Ligler took **Action Item 1-4** to confirm the meeting at Eurocontrol in Brussels on April 2-5, 2001. The WG further agreed to incorporate the FIS-B MASPS into its considerations when that document is approved (tentatively February 2001). Finally, the WG agreed that the UAT spectrum decision needed to be made five (5) months before the submission of the UAT MOPS to the PMC. George Ligler indicated that he would communicate this schedule dependency to RTCA management.

11. The Working Group then began a general discussion based around the Identification and Development of Action Plans for MOPS Technical Issues. Technical Issues discussed included:
 - a. The role of GNSS/GPS in the UAT MOPS. **Action Item 1-6** was taken by a group of members led by Chris Moody to present a position paper at the next WG#5 meeting.
 - b. Are there any derived requirements from the existing ADS-B Operational Safety Assessment document? **Action Item 1-7** was taken by a group of members led by Jerry Anderson to provide a report at the next meeting on this topic. **Working Paper 1-08** is identified as the basis of this review.
12. The Working Group proceeded to review the sections of the proposed UAT MOPS and worked through the identification of individuals and organizations that would be responsible for writing drafts of those sections. The following table is the result of the assignments of those writing actions. The asterisk (*) beside a name indicates the lead person or organization.

UAT MOPS Writing Assignments

Section	Description	Writing Assignment	Next Draft Available
1.	Introduction	Bill Flathers * Jerry Anderson	April Meeting
2.1	General Requirements	UPS-AT *	Feb. Meeting
2.2	Equipment Performance Requirements	Chris Moody * Bob Saffell Rich Weathers Jim Maynard/UPS-AT JHU-APL (to be confirmed)	Feb. Meeting With discussion On Latency
2.3	Environmental	Small group after 2.4 is written	
2.4	Equipment Test Procedures	Tom Pagano * Bob Saffell UPS-AT Chuck Laberge JHU-APL (to be confirmed)	
3.	Installed Equipment Performance	TBD	
4.	Equipment Performance Characteristics	Greg Kuehl	Feb. Meeting

Section	Description	Writing Assignment	Next Draft Available
App.A	Glossary and Acronyms	Rich Jennings Terry Stubblefield	
App.B	MASPS Cross Reference Matrix	Greg Kuehl Jim Maynard * Nikos Fistas JHU-APL (to be confirmed)	
App.C	Example ADS-B Message Encoding	Chris Moody Team of 2.2 writers	
App.D	UAT Ground Infrastructure	Ed Valovage * Paul Gross	
App.E	Aircraft Antenna Characteristics	TBD	
App.F	Link Budgets and Scenario Dependent Ranges	Larry Bachman	
App.G	Standard Interference Environments	Mike Biggs	

13. The following table indicates the agreed upon meeting dates and places for meetings of Working Group #5 through August 2001. It was agreed not to set meetings later than August until the Working Group has had a chance to assess progress over the next several meetings.

Proposed dates and places for future meetings of the UAT MOPS Working Group 5:

Dates/Time	Meeting Place
February 20, 9:00 through noon February 23	Radisson Suite Hotel Oceanfront, 3101 North Highway A1A Indialantic, FL 32903 (321-773-9260) Hosted by Rockwell Collins
April 2, 9:00 through noon April 5	Eurocontrol, Brussels Travel info and lodging details TBD
May 1, 9:00 through 5pm May 3	Salem, OR - Hosted by UPS-AT Travel info and lodging details TBD
June 19, 9:00 through noon June 22	Hanscom AFB, Lexington, MA Travel info and lodging details TBD
July 31, 9:00 through noon August 3	WJH Tech Center, Atlantic City NJ Travel info and lodging details TBD

14. The following **Action Items** were identified during the course of the meeting. The asterisk (*) beside a name or organization indicates that they are the lead.

Action Number	Action Description	Assigned to	Status
1-1	Can UAT be tunable within a small frequency range? Is there a difference in cost? Report results at the February 20 WG-5 meeting.	UPS-AT * Bob Saffell Richard Kulpinski	
1-2	Take a close look at what we can do to UAT to make it cope with pulsed interference, DME, JTIDS. Report results at the February 20 WG-5 meeting.	Bob Prill Warren Wilson * James Higbie Rich Weathers	

Action Number	Action Description	Assigned to	Status
1-3	Discuss with RTCA the availability of (electronic) FIS-B document for WG-5 members.	George Ligler Rich Jennings	
1-4	Confirm meeting location at Eurocontrol, Brussels for April 2, 9am through noon April 5	George Ligler	
1-5	Discuss with US representative to AMCP (Brent Phillips) the possibility of presenting a UAT Position Paper at the next meeting of AMCP (May 2001). Report results at the February 20 WG-5 meeting.	Gary Livack	
1-6	Present position paper on the role of GNSS/GPS in the UAT MOPS. Report results at the February 20 WG-5 meeting.	Chris Moody * Bill Flathers Tom Telton Gary Livack Chuck Laberge	
1-7	Are there any derived requirements from the existing ADS-B Safety Assessment document. Report results at the February 20 WG#5 meeting.	Rich Jennings Jerry Anderson * Chris Moody Ray Yuan Bill Thedford	
1-8	Working paper on equipage classes for the review of WG#5 to be reported at the February 20 meeting.	Chris Moody	

15. The following **Working Papers** were identified during the course of the meeting. These papers will be posted on the UAT MOPS web site located at: <http://adsb.tc.faa.gov>

SC-186 Working Group 5 – MOPS for UAT – Working Papers

Working Paper	Size	Description	Introduced At:
SC186/WG5-WP-1-01	9KB	RTCA PMC Meeting Summary, 9/13/2000	12/18/00, Meeting 1 RTCA
SC186/WG5-WP-1-02	7KB	Letter from Steve Zaidman to RTCA requesting UAT MOPS by mid-2001	12/18/00, Meeting 1 RTCA
SC186/WG5-WP-1-03	186KB	UAT Overview, presentation by Chris Moody	12/18/00, Meeting 1 RTCA
SC186/WG5-WP-1-04	7KB	Long-Term L-Band Spectrum Management Proposal, presentation by Jim Chadwick	12/18/00, Meeting 1 RTCA
SC186/WG5-WP-1-05	1,837KB	FAA Tech Center Capability in support of the UAT MOPS, presentation by Tom Pagano	12/18/00, Meeting 1 RTCA
SC186/WG5-WP-1-06	782KB	Capstone Program Summary, presentation by Chris Moody	12/18/00, Meeting 1 RTCA
SC186/WG5-WP-1-07	34KB	Eurocontrol ADS Programme Proposed Criteria for ADS-B Datalink Technical Assessment	12/18/00, Meeting 1 RTCA
SC186/WG5-WP-1-08	516KB	ADS-B Operational Safety Assessment Report, dated Sept. 20, 2000	12/18/00, Meeting 1 RTCA
SC186/WG5-WP-1-09	132KB	System Description for the Universal Access Transceiver as published in the "Phase One Link Evaluation Report, Status and Initial Findings," Appendix D, dated November 1999	12/18/00, Meeting 1 RTCA

