International Civil Aviation Organization

THE FIFTH MEETING OF AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) IMPLEMENTATION CO-ORDINATION GROUP OF APANPIRG (ATNICG/5)

Kuala Lumpur, Malaysia, 31 May – 4 June 2010

Agenda Item 3: **Review the ICAO Doc 9880 and 9896 and on-going development activities including the report of the ACP WG-M**

DRAFT REPORT OF ACP WGM1-6 MEETING

(Presented by the Secretary of ACP WGM Meeting)

SUMMARY

This paper presented the draft ACP WGM-16 Meeting report held in Paris, France from 17-19 May 2010.

ACP WG-M/15 REPORT

18 November 2009

AERONAUTICAL COMMUNICATIONS PANEL (ACP)

WG M – Maintenance of A/G and G/G Communication Systems
16th Meeting

Paris, France, 17th – 19th May 2010

DRAFT - Report of ACP WGM-16 Meeting

Drafted by the Secretary

Summary

This document is the DRAFT ACP WGM-16 Meeting Report.

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1. OPENING OF MEETING

1.1 The Working Group Rapporteur, Brent Phillips opened the 16th meeting of WG-M. Following which, the meeting participants introduced themselves to the meeting.

1.2 This was followed by a review of the meeting agenda and schedule, following which it was approved by the meeting.

2. AGENDA ITEM 1(b) : STATUS OF ACTION ITEMS

2.1 The actions items and the list regarding their disposition are provided in Attachment 3.

The list of action items and the proposed actions were accepted by the meeting. However a number of comments for further consideration were made. These were as follows:

- It was pointed out that the Eurocontrol AMC has information on bilateral connections and that this could be useful.
- It was also pointed out that the AMC has a lot of other useful information which would be helpful for prospective implementers.
- As different parts of Doc. 9880 would be approved at different times, it was asked if each part could have the revisions numbers attached. The response was that both the printed and ICAO-net versions would at least have revision numbers attached, to make the situation clearer.
- The Rapporteur accepted an action item to add provisions for IPS support of Directory services to Doc 9896.
- The action item regarding the revival of the CCB was to remain open. In the ensuing discussion it was reinforced that although the CCB could expedite actions, final approval would always reside with WG-M.

Two new action items arose from the list of actions from WG-M/15, they are as follows:

Action item 16-1: Develop provisions in Doc 9896 for the support of the X.500-based Directory Services given in Doc 9880 by IPS.

Action Item 16-4: Secretary to take action to allow the ICAO GIS Portal to be used as a means to the timely capture information on bilateral AMHS connections and other CNS developments

3. Agenda Item 2(a) – Status of FAA DataComm Programme

Andy Colon presented IP ## providing an overview of the DataComm programme along with the current status. DataComm is a multi-faceted programme covering the deployment of datalink based on VDL M2 in the US, along with the development of various ground based applications to exploit the new capability. Among the latter are the Tower Datalink System (TDLS) and an FIS capability along with support for various other CPDLC-based services.

The paper detailled the status of the FAA Data Comm Program in the areas of: Segment 1 and 2 implementation, Acquisition Life Cycle Schedule, Milestones and Activities, Program Outreach, DCNSD Acquisition Status and Notional Architecture.

Of special interest to the group was the fact that financial incentives will be available to encourage aircraft equipage.

4. Agenda Item 2(b) – Status of LINK 2000+/ SESAR

Liviu Popescu (EUROCONTROL) presented **IP02** an update of the current status of LINK 2000+ activities on behalf of Mr Soren DISSING (EUROCONTROL – Link2000+). The presentation provided an update on incentive progress since the last WGM, an update on regulatory aspects in particular the outcome of the EC-EASA workshop in EUROCONTROL and an update of the VDL M2 multi-frequency validation lead by EUROCONTROL.

Incentives are supported through the EC Trans-European Transport Network Executive Agency (TENT-EA) European Economic Recovery Plan (EERP) where EUROCONTROL was requested to bid on behalf of the Airspace Users. Final decision was reached on 22nd December 2009. The EUROCONTROL bid specifically identified an initial 913 Aircraft within 20 Airlines to be upgraded to DLS IR (EC Reg 29/2009) compliance; this number is not fixed and is expected to be larger. The fleet shall be equipped in 2011 and 2012. The emphasis is mainly on ensuring that most of the fleet was upgraded to use Protected Mode versions of CPDLC. The aim is to complete this by the end of 2012.The funding to Airspace Users covers 20% of the actual airline cost. EUROCONTROL administers the grant from TENT-EA and is currently negotiating contracts with Airspace Users.

The regulatory context is defined by the EC Single European Sky Implementing Rule 29/2009 on Data Link Services and the EASA provisions for Airworthiness and OPS approval. An EC-EASA workshop was held in EUROCONTROL on 16th March 2010. The aim of the workshop was to target One Single Process for Airworthiness & Compliance to EC 29/2009 by clarifying the EC-EASA processes and interfaces. An EASA Certification Specification is planned for 1st quarter of 2011 based on AMC 2011 supplemented by a technical annex (current special conditions).

The Multi-frequency VDL M2 validation is carried out by EUROCONTROL in a phased approach. Phase 1 – laboratory testing starting Q2 2010, Phase 2 – Flight trails in a limited VDL M2 Multi-Frequency ground implementation starting Q3 2010 and Phase 3 – Airline Flights in a limited VDL M2 Multi-Frequency ground implementation starting Q1 2011. Phase 1 & 2 will use the ARINC 750 "Troublemaker" to emulate failures on the RF link. Phase 2 will use 3 VDL Ground Stations on the 2nd frequency with flight trials performed by a test aircraft (NLR Citation) having the "Troublemaker" installed onboard. Phase 3 will take benefit of the mandate forward fit to test VDL M2 Multi-frequency on operational aircrafts selected through the 24 bit address.

It was pointed out that analysis had shown that at least three VDL M2 frequencies would be needed to accommodate the anticipated loading once SESAR had been implemented.

In the discussion following the presentation it was clarified that the scope of the TENT-EA incentive includes PM-CPDLC and multi-frequency VDL Mode 2 and that the outcome of VDL M2 Multi-frequency Validation will be used as an input in the planned update of ICAO DOC 9776.

In the ensuing discussion it emerged that as the US would be using the "message set" developed by SC-214/WG-78 and that it may not be compatible with the LINK 2000+ message set. It was revealed that there was backward compatibility between the SC-214 message set and that of LINK 2000+. Although this may be the case, the fact that this may cause operational problems could not be completely refuted. Human factors and training issues were seen as a probable areas for incompatibility. After some discussion it was agreed that this needed to be brought up with groups with greater operational knowledge. This resulted in the following Action Item;

Action Item 16-3: Secretary to check with OPLINK panel to determine impact of different DataComm and LINK 2000+ messages sets. Nikos Fistas to check with LINK 2000+ management to determine the same.

Nikos Fistas presented **IP04** dealing with the Future Communication Infrastructure (FCI) and SESAR. Key to this is the multilink concepts dealing with three communications links L-band, Surface Wireless and Satellite. He also described the SESAR Work Packages dealing with these.

On the subject of the L-band communication system, an evaluation of this is expected to be completed in 2011. The first candidate technology to be considered is LDACS-1. It was pointed out that LDACS-2 would only be considered if LDACS-1 failed to meet the necessary criteria.

Work packages dealing with SWIM and Civil/Military communication interoperability were also discussed.

Nikos then went on to describe Action Plan 30. This is a successor to Action Plan 17 which produced the COCR (Communications Operations and Concept Requirements Document). This document projected the future communication system loading based on an analysis of various operational scenarios.

The Secretary welcomed this move, stating the many of the original assumptions supporting the COCR were now invalid and therefore the results were no longer valid. He went on to point out the AOC traffic was severely underestimated and that this needed to be addressed in Action Plan 30, if a realistic result was to be obtained.

ITEM FOR FOLLOW-UP: WG-M to closely monitor the activities taking place under Action Plan 30

5. Agenda Item 2 (c) - Status of Surface Wireless Communications

The FAA and NASA Glenn Research Center (Glenn) presented the status toward U.S. development of the Aeronautical Mobile Airport Communications System (AeroMACS) standard, the first of three harmonized air/ground recommendations of the Future Communications Study (FCS) endorsed by ICAO ACP WGW-2. The paper **(WP-17)** and briefing **(WP-18)** covered the background on plans for the first element of the harmonized Future Communications Infrastructure (FCI) operating in the 5091-5150 MHz AM(R)S band co-allocated for airport surface operations during the World Radiocommunications Conference in 2007. A new RTCA Special Committee (SC-223**????**) was established in July 2009 to propose an AeroMACS standard profile. The AeroMACS profile will be based on a profile of the IEEE 802.16-2009 standard that has been certified by the WiMAX Forum ™ for commercial interoperability. A parallel Working Group (WG-82) has been established by EUROCAE to help ensure common standard in the future.

It was pointed out that the applications being supported in the US would require 30 MHz more bandwidth that being sought for Europe. It was also pointed out that the system could support the terrestrial component of ADS-B.

In collaboration with and under sponsorship of the FAA, NASA Glenn and the ITT Corporation (ITT) have implemented a prototype AeroMACS within the CNS Test Bed located at NASA Glenn and the adjacent Cleveland NASA Hopkins International Airport (CLE) in Cleveland Ohio. The AeroMACS prototype consists of two multi-sector base stations and eight subscriber stations (SSs), all of which are stationary at this time. An initial operational capability has been established. NASA Glenn and ITT plan to experiment with mobile SSs in the second half of CY2010. Findings on the AeroMACS RF and network performance and initial recommendations on key parameters of the AeroMACS profile are being provided to SC-223. Glenn is also investigating practical considerations for design of an AeroMACS including: frequency spectrum interference with co-allocated services and adjacent bands, spectrum efficiency and channelization methodology, initial security implications of an AeroMACS based on commercial WiMAX™ standard profile, and options for provision of AeroMACS services for air traffic control, advisory information, airline operational control and airline administrative communications, and airport and port authority services that directly affect safety and regularity of flight on the airport surface. The SC-223 plans to complete definition of the initial AeroMACS profile by the end of September 2009.

ITEM FOR FOLLOW UP: Once the AeroMACS profile is available. WG-M to take action on the establishment of WG-S.

6. Agenda Item 3(b) – AMHS and Directory Updates.

Jean-Marc Vacher presented **IP02** an update paper about the status of the MESANGE project which is currently underway in France and in Switzerland. The goal of the MESANGE project was the replacement of the current AFTN/CIDIN message switches installed in the Bordeaux and Geneva COM Centres, with new message switches including AMHS functionality so as to enable the transition to AMHS. A major step has been recently achieved with the start of operational service of the new systems in France and in Switzerland, for AFTN and CIDIN functionality. Transition to AMHS is now being prepared, and should result in start of international operational AMHS service between both States, at the beginning of 2011.

WP07 was also presented which aims at updating an Amendment Proposal (AP) related to the Detailed Technical Specifications for AMHS (Doc 9880 Part IIB) submitted in the WGM/14 meeting. The initially reported defects were detected during the preparation of the Site Acceptance Testing (SAT) of the MESANGE AMHS Implementation Project which is currently underway in France and in Switzerland. The main defect is related to the lack of identical processing for probes and messages received from AMHS at an AFTN/AMHS Gateway. The parameter which is not handled identically for probes and messages is named Encoded Information Types (EITs). In WGM/14 it was agreed that the AP should be subject to a review period. An e-mail contribution to the paper was received as part of this review, and the present version of the AP includes one addition and a few clarifications suggested in that contribution.

7. Agenda Item 3(a) – Security Updates (Doc 9705 Baseline).

Michael Olive, Honeywell, presented a working paper (**WP09)** titled "Summary of the ATN/OSI Doc. 9880 Security Validation Report." This paper uses a presentation format to summarize the ATN/OSI Doc. 9880 Validation Report, which is made available in its entirety in **WP08**.

The ATN/OSI security validation activity was performed by the Aerospace Advanced Technology organization of Honeywell International Inc. under contract to the FAA and in support of the FAA DataComm Program Office. The purpose of the activity was to validate ATN/OSI security requirements transferred from Doc. 9705 Edition 3 Sub-Volume VIII to Doc. 9880 Part IV-B, including changes recommended in WGM14/IP05. The activity re-uses the validation objectives and validation means applied previously during validation of Doc. 9705 Sub-volume VIII. The validation approach leveraged:

1) the ACARS Message Security (AMS) standard (ARINC 823), which is based on the ATN/OSI security provisions specified in Sub-Volume VIII of ICAO Doc. 9705, Edition 3, and it includes the security enhancements recommended for incorporation into Doc. 9880 Part IV-B; and,

2) and the Honeywell Secure ACARS implementation, which is compliant with ARINC 823-compliant and which implements a System Security Object based on the ATN/OSI provisions.

These artifacts are used to show, by analysis and inspection that:

1) there is significant alignment between ATN/OSI and AMS security provisions;

2) Secure ACARS is a representative implementation; and
3) system-level testing and flight demonstration of Secure ACARS in a representative operational datalink environment provides confidence in the technical security solution specified in draft Doc. 9880 Part IV-B.

The validation effort identified only minor defects and typographical errors. In addition, the validation report includes four recommendations for potential improvements:

1) Use of industry standards for certificate and CRL profiles, consistent with the approach taken in ICAO Doc. 9896 (ATN/IPS);

2) Removal of compressed certificates, which are a non-standard, ATN-unique format that impose constraints on uncompressed certificates;

3) Reconsider use of compressed elliptic curve points, which may have third-party intellectual property implications; and

4) Use of a single public/private key pair for both digital signature and key agreement in order to minimize security overhead, aircraft computational requirements, and life-cycle costs associated with procurement and management of certificates.

The working group was invited to review the detailed Doc. 9880 security validation results in WP08 and to consider the four recommendations.

This led to the following Action Item.

Action Item 16-4: Secretary/Mike Olive to update security provisions in Doc 9880

Jean-Marc Vacher, DSNA, noted that the former ATN Panel identified several instances where Intellectual Property was a potential issue in ICAO Doc. 9705, Sub-volume VIII. Regarding Recommendation 3, which suggests that uncompressed elliptic curve points be specified in lieu of compressed points, he asked whether this was the last intellectual property issue to be resolved. Mr. Olive responded that no other issues were encountered during the standardization and implementation of ACARS Message Security, which is based on the ATN security provisions. Tom McParland, BCI (supporting FAA) added that other potential intellectual property issues had been addressed previously in Doc. 9705, Sub-volume VIII.

Liviu Popescu, EUROCONTROL, asked whether the security provisions had been validated in an operational datalink environment. Mr. Olive replied that the Honeywell Secure ACARS flight demonstration was performed in a representative operational datalink environment using actual avionics, operational VHF frequencies, an operational datalink service provider ground network, and an operational ground system. Mr. Popescu followed up with a similar question about PKI. Mr. Olive responded that a test Certificate Authority was used to generate keys/certificates. Although an operational PKI was not validated during the Secure ACARS flight demonstration, Mr. Olive noted that PKI is being used successfully to support other aeronautical applications such as software data-loading to aircraft. Lastly, Mr. Popescu asked whether implementation of the four recommended improvements would increase costs. Mr. Olive replied that the ARINC 823 ACARS Message Security standard adopted the same recommendations as means to reduce life cycle costs for the airlines.

Nikos Fistas, EUROCONTROL, asked whether the Doc. 9705/9880 security requirements represented a minimum, indicating that security must be an option and noting that security is not included in the Link2000+ program and any future needs for security will be provided by SESAR. Tom McParland responded that ATN/OSI security is optional, based on local policy; however, if security is implemented for ATN/OSI, then Doc. 9880 Part IV-B specifies the provisions for achieving an interoperable security solution.

Andy Colon, FAA, indicated that the FAA DataComm program goal is to implement ATN/OSI security as a planned product improvement in Segment 1 Phase 2. He also noted that there are no current plans for confidentiality; consequently, messages are sent in-the-clear so they can be read and interpreted by systems that do not implement ATN/OSI security.

The meeting then dealt with WPs 10-16 presented by Vid Patel and Tom McParland. These dealt with further amendment proposals for the security provisions of Doc 9880.

In the ensuing discussion it was pointed out that as the security provision of Doc. 9880 had not been approved, amendment proposals were not needed as these provisions were a, “work in progress” and were therefore a part of their development. It was agreed that in future, these proposals should be captured in Information Papers.

The discussion then moved onto the origins of the security requirement. It was pointed out that this should be forthcoming from SC-214/WG-78. It was stressed that ACP WG-M can only

develop a mechanism for providing security based on there being a stated operational requirement. It later emerged that the US has declared that security would be needed for CPDLC however Europe would consider these under SESAR Work Package 16.

The discussion returned to **WPs 10-16**. These culminated in **WP16** which described security provision for the ATN Dialogue Service. This represents an alternative to the current provisions which are provided in the Upper Layer Comms Services. The salient points from this were:

- These were subject to validation
- These also work with IPS.
- These can be made optional and are backwardly compatible.
- These would be introduced as part of a Planned Product Improvement to Segment 1, Phase 2 of DataComm (ie; using the SC-214/WG-78 message set).

The need for a sub-group to review security APs was raised without conclusion. It was agreed that Tom McParland would take action to get approval for the APs on security.

Action Item 16-5: Tom McParland to obtain approval for Doc 9880 Security APs.

8. Agenda Item 6 : Other Business

The Secretary delivered WP06 which provided details of the planned Air Navigation Conference in November 2012. He went on to explain that this provided an opportunity to (i) obtain approval for a new work programme and to (ii) expedite approval of SARPS and Manuals.

He encouraged the group to consider this and propose items for consideration. The following were offered as examples for such consideration;

- Plans for efficient VHF spectrum usage as voice utilisation drops due to datalink.
- Future systems with automatic frequency changes
- Efficient voice accommodation on L-band system.

9. Agenda Item 3(c): PM-FIS and PM-ADS-C Status.

Greg Saccone presented **WP20** dealing with the current handling of CPDLC, ADS, FIS and CM in document 9880 and more importantly making this consistent with the work of SC-214/WG-78.

Although at WG-M/15, three options for the handling of ATS application in Doc 9880 were presented. This paper proposed a fourth option, ie: removing all of the applications and allowing them to reside in the appropriate industry standards and leaving only the provisions for protocol support in Doc 9880.

10. Agenda Item 4(a) – IPS Implementation Status

Liviu Popescu presented **IP07** discussing the current status of the Pan-European Network Services (PENS). A key point was the fact that a security policy is still outstanding. This will be deliverable under SESAR Work Package 14.

11. Agenda Item 4(c) – Discussion on how to proceed with Air-Ground Security.

Isabelle Herail presented **IP05** and **IP06** dealing with the security issues being considered for LINK 2000+. This paper identified numerous threats, ie; masquerading and denial of service and discussed mechanism to protect against these. It also pointed out the security provisions in place today.

12. Agenda Item 4(d) – Doc 9896 VOIP Development Status.

Andy Colon discussed the current status of Doc 9896. A key concern was the management of references used on Doc 9896. This remains an open issue.

13. Agenda Item 5 – Maintenance of VDL Documents.

Rob Morgenstern presented **WP02** and **IP08**, the former detailing changes to support applications being considered by SC-214/WG-78, the latter to support multi-frequency operations. These were approved by WG-M however EUROCONTROL asked for a period of time to consider these amendments further. The conclusion was that provisional approval was given pending further review by Eurocontrol.

Niklas Friberg presented **WP5** describing various updates to the manual on VDL Mode 4 (Doc 9816). These were improvements to remedy shortcoming found during operational evaluation. The group approved all of these.

Action Item 16-6: Secretary/Niklas Friberg to amend draft of Doc 9816.

14. Agenda Item 6 – Maintenance of UAT Documents.

George Ligler presented WP7 which detailed a number of changes to Doc 9861 – the Manual of UAT. Part of the justification for these changes was (i) that they were necessary improvements resulting from operational evaluation and (ii) the same changes were being applied to 1090 Mode-S extended squitter and were being included in the relevant manual, Doc 9871.

Another change allow the use of a bottom antenna only for ADS-B out. The changes were being included in the new ADS-B rule being included in Federal Aviation Regulations Part 91.225. These will become mandatory from January 1, 2020.

The above changes were approved by WG-M upon the condition that they will be submitted for approval and publication at the revised version of Doc 9871.

Action Item 16-6: Secretary/Ligler to amend Doc 9861 and submit for approval and publication concurrently with similar action to Doc 9871.

15. AGENDA ITEM 8: Next Meeting

17.1 The Meeting agreed to hold the next meeting on ## ##-##, 2010. The meeting would be immediately followed by the next meeting of WG-I. The location is to be decided.

16. APPENDIX 1 – LIST OF ATTENDEES

ICAO ACP-WG M – Maintenance: Meeting 15, Montreal Canada

16th – 18th November, 2009

NAME	ORGANIZATION NAME	PHONE / FAX	E-MAIL
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James Budinger			
Niklas Friberg	LFV		
Jean-Marc Vacher	DSNA		
Stephane Tamalet	AIRBUS		
Isabelle Herail	EUROCONTROL		
Danny Bharj	SITA		

17. APPENDIX 2 – Proposed Agenda and Schedule

WG-M Proposed Agenda:

1. General
   a) Approval of Agenda
   b) Review of Action Items

2. Status of On-Going Data Communications Programs
   a) FAA Data Comm and NextGen
   b) EUROCONTROL Link 2000+ /SESAR
   c) Surface Wireless Communications
   d) Others

3. ATN/OSI Document 9880 Update Status
   a) Security Updates (9705 baseline)
   b) AMHS and Directory Updates
   c) PM-FIS and PM-ADS-C status.

4. ATN/IPS Status
   a) IPS Implementation Activities (Update Only)
   b) Potential Adoption of IPS Security (Ground-Ground Only) (Update Only)
      a. Doc 9896 or Doc 9880
   c) Discussion on how to proceed with Air-Ground Security
   d) Doc 9896 VoIP Standards Development Status

5. Maintenance of VDL Documents
   Technical Manual ICAO Doc. 9776 AEEC 631-5
   Technical Manual ICAO Doc. 9816

6. Maintenance of UAT Documents

7. Other Issues
   a) Spectrum Management
   b) Others as needed

8. Next Meeting

WG-M:16 Proposed Schedule:

Monday morning start at 9:00 am

	Monday (17 May)	**Tues (18 May)**	**Wed (19 May)**	
Morning	Agenda Items 1 2a, 2b	Agenda Items 4, 5,	EEC Tour Draft Report Review	
Lunch				
Afternoon	Agenda Items 3a, 3b, 3c	Agenda Item 6, 7		

18. APPENDIX 3 – List of Action Items

Action Items OPEN following WG-M/16

Action Item	Description	Status
#15-1	Secretary to explore the possibility of improving the collection of data related to implementation issues by allowing the Regional Offices to act convey information related to implementation issues to ICAO HQ, thus allowing the Secretariat to then decide on the necessary action.	OPEN pending further investigation
#15-4	Secretary to provide guidance material on the use of the AMC in Part 2(b) of Document 9880.	OPEN pending ACP web-site support and changes to Doc 9880
#16-1	Develop provisions in Doc 9896 for the support of the X.500-based Directory Services given in Doc 9880 by IPS.	OPEN
#16-2	Secretary to take action to allow the ICAO GIS Portal to be used as a means to the timely capture information on bilateral AMHS connections and other CNS developments.	OPEN
#16-3	Secretary to check with OPLINK panel to determine impact of different DataComm and LINK 2000+ messages sets. Nikos Fistas to check with LINK 2000+ management to determine the same.	OPEN
#16-4	Secretary/Mike Olive to update security provisions in Doc 9880	OPEN
#16-5	Tom McParland to obtain approval for Doc 9880 Security APs.	OPEN
#16-6	Secretary/Niklas Friberg to amend draft of Doc 9816.	OPEN
#16-7	Secretary/Ligler to amend Doc 9861 and submit for approval and publication concurrently with similar action to Doc 9871.	OPEN

Action Items CLOSED at WG-M/16

Action Item	Description	Status
#2	Secretary to coordinate with ICAO Regional Offices to explore the need to keep "attached files" (file transfer body parts) in the AMHS extended service. If there is no need for such files, references to be deleted from Doc 9880.	CLOSED
#3	Secretary to amend Doc 9880 to reflect the near and far term implementation of Directory Services.	CLOSED (replaced by new action item)
#5	Secretary to explore the use of Regional Air Navigation Plans to capture information related to bilateral AMHS connections.	CLOSED (replaced by new action item).
#6	Doc. 9880 to be amended by Secretary to include the proposed amendments.	CLOSED