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**AERONAUTICAL COMMUNICATIONS PANEL (ACP)**

**WG-I – Internet Protocol Suite – 17th Meeting**

**Montreal, Canada, 15th - 16th July 2014**

**Report of ACP WG-I/17 Meeting**

**Presented by the Rapporteur and the Secretary**

**Summary**

This document is the ACP WG-I/17 Meeting Report.

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**Note:** This report follows the chronological order in which agenda items were discussed.

# 1. AGENDA ITEM 1: MEETING ORGANIZATIONAL ISSUES

1.1The meeting was opened by the Rapporteur, Mr. Liviu Popescu who welcomed all participants to the meeting.

1.2 The meeting was attended by 13 experts, the Panel Secretary, Mr. Vaughn Maiolla. The list of participants is in Appendix B of this report.

# 2. AGENDA ITEM 2: APPROVAL OF THE AGENDA AND REVIEW OF WG-I/15 MEETING REPORT

2.1 A draft agenda coordinated by the Rapporteur with key members of the ACP WG-I was presented and accepted by the meeting. The agenda is in Appendix A of this report.

2.2 In the discussion on the agenda, the issue was raised as to whether change requests to already published versions of Doc 9896 should be handled by WG-M, as this could be considered maintenance. The Secretary commented that much of the work was still under development and hence should stay with WG-I. The question was then raised about new subject was as RPAs and SWIM. Regarding the items related to these subjects the Secretary informed that panels restructuring activities are ongoing and the response depends on their outcome.

**ITEM FOR FOLLOW UP #17-1**: Determine which items are to be allocated to WG-I and WG-M.

2.3 The Secretary explained the new ACP web-site highlighting the point that it was one of the few panel web-sites that was public. The point was made by a number of WG members that in the future there would be many documents containing sensitive security information (as IP addresses and configuration parameters) and that a protected area should be provided for these in the web-site. This led to the following action item.

**ACTION ITEM #17-1:** Secretary to have the ACP web-site modified to provide a protected area for sensitive documents.

# 3. AGENDA ITEM 3: REVIEW OF ACTION ITEMS

3.1 The Panel Secretary presented WP2. Action Items were reviewed with the following outcome:

| **Action**  **Item** | **Description** | **Status** |
| --- | --- | --- |
| **13-8:** | ICAO Secretariat will work to obtain IPV6 address blocks for the Regions. – Still in progress.  ***Efforts made at AN-Conf/12 to obtain necessary resources.*** | OPEN – In progress. |
| **14-4:** | Secretariat draft State Letter asking for (i) support from personnel with IPS skills and (ii) an extension to the schedule for the work programme based on the various reasons given above. In order to be effective State Letter must ask for experts to be nominated by name with details of expertise.  ***Letter not distributed as funding to make use of personnel not yet available. Secondee with the skills being sought now.*** | OPEN – In progress |
| **14-5:** | ICAO to develop a justification for a /16 address block and make an application to ARIN or IANA based on expediency.  ***As above.*** | OPEN |
| **14-6:** | Hoang Tran to draft guidance material for Doc 9896 on IPV4-IPV6 transition. | **CLOSED** |
| **14- 8:** | ICAO to apply for new TLD and draft appropriate guidance material on the allocation of lower level domain names.  ***As per 13-8, 14-4, 14-5*** | OPEN |
| **14-9:** | Secretary to capture some justifications on paper and circulate to WG-I members. Once done, the Secretary to prepare a paper seeking the ACP WGW to request the ANC to approve the formation of a Task Force.  ***AN-Conf 12 has identified SWIM as a priority a Panel has been.*** | **CLOSED** |
| **15-01:** | Secretary to make efforts to have changes given in WPs 4 and 5 into Edition 2 of Doc. 9896. If not successful then these changes shall be used to produce Edition 3 of Doc. 9896. Secretary to report to WG-I on this within two weeks.  ***Doc 9896 ed 2 was rejected by editorial and has been re-vamped awaiting recent additions.*** | **CLOSED** |
| **15-02:** | Secretary to make details of Annex 10 amendment available to WG-I.  ***TMP2 was provided on the ACP WG-I/16 web. (Applicability date is November 2013)*** | CLOSED |
| **16-2:** | Hoang Tran to update the contents of WP04 and provide more details in the next WG-I/17 meeting | OPEN |
| **16-3:** | Secretary to include amendment proposals (related to 2.4.1.1 and 2.4.2.1 provided by WP05 and several modifications captured by WP07) into unedited version of 2nd edition of Doc 9896.  ***Done and distributed in updated version prior to WG-I/17.*** | **CLOSED** |
| **16-4:** | Focal points to list existing implementation guidance documents available at regional level and to report them to the next WG-I meeting. | OPEN  (standing item) |
| **16-6:** | Vic Patel to provide approved security documents developed for ICAO Asia/Pacific regional under ATNICG. | **CLOSED**  Due to IP07 |

# 4. AGENDA ITEM 4: ICAO DOC 9896 EDITION 2 PUBLICATION

Michael Olive, Honeywell, presented a joint Boeing-Honeywell working paper (WP06) titled “Technical Issues and Proposed areas of improvements to ATN/IPS, ICAO Document 9896, Part II.”

This paper presents two technical issues and two areas for improvement that were identified during implementation and validation of the IPS DS. The working group supported the recommendations to address the identified technical issues, which includes explicit mapping of the D-END result values and modifying the TCP/UDP state tables to support proper handling of CPDLC end requests containing an uplink message.

With regard to the D-END result issue, Mr. Liviu Popescu, EUROCONTROL, stated the he would check with EUROCONTROL colleagues to ascertain how they handled mapping of the D-END result values in IPS DS 2009 validation activities.

The working group also supported the suggestions to clarify the ATNPKT format description and to clarify the Destination and Source Port descriptions, both of which improve readability and enhance interoperability. With regard to the suggestion to consider specification of ATNPKT using ASN.1, Mr. Greg Saccone, Boeing, noted that there are pros and cons to the ASN.1 approach; the working group agreed that further analysis would be necessary.

Mr. Vaughn Maiola, ICAO, asked about the urgency to implement changes in the current planned edition of ICAO Doc. 9896. Mr. Popescu observed that IPS implementations are still in early stages and he expects that additional issues/improvements will be identified in the future. Consequently, the working group agreed to accumulate proposed improvements, which would serve as basis for a future edition of Doc. 9896.

# 5. AGENDA ITEM 8.2: IMPLEMENTATION GUIDANCE DEVELOPMENT – IPv4-IPv6 TRANSITION.

5.1 Andy Isaksen presented WP03 which proposed three possible configuration for the ATN based on IPv6:

1. A common Global IP Network
2. Regional IP Networks that interface to one another
3. Upgrade existing International Private Lines (IPLs)

5.2 It was pointed out that Option 1, would facilitate a global addressing plan as proposed in Doc 9896. Nonetheless, since ICDs, an IPv6 Addressing Plan, a BGP Routing Policy or Autonomous System Numbering Plan had not been developed, other options should be considered as they each had specific advantages. These are summarized as follows;

5.3 For a Global IP Network the following steps are required :

1. Form a common global contract to a single service provider
2. All users are required to use this common service provider
3. An IPv6 address will be assigned and maintained by a common service provider

This approach is the only option that can support a global IPv6 address and a global seamless IP network .

5.4 For a Regional IP network the following steps are required:

1. Users in the same region issue a contract to a common service provider
2. IPv6 address is to be issued to each user by this common service provider
3. Interface to other regions will be through AMHS

This approach cannot support global IPv6 and seamless integration between regional networks. However, the regional common network can provide cost savings to ANSPs that have more than three interfaces (e.g. three IPLs) as these ANSPs need only a single connection and, possibly, an additional connection for diversity.

5.5 The use of international private lines (IPLs) will require the following steps:

1. Upgrade the IPL to at least 64 Kbps
2. Implement the IP router
3. Adopt and maintain IPv6 address

The industry has issued advice that the IPL with bandwidth of 64kbps will not be accepted. T-1 or E-1 circuit (1.5-2.0 Mb) IPL can be issued until 2017. Coordination between ANSPs for upgrade has been a time consuming process. The IPL approach also is not an optimized solution for network diversity or alternative routing.

5.6 In the discussion that ensued it was pointed out that some regions had already begun allocated IPv6 addresses which would make the adoption of a global addressing scheme difficult. It was agreed by the meeting that the various approaches should be considered when developing the outstanding guidance material (as mentioned above) for the ATN/IPS.

Liviu Popescu (EUROCONTROL) explained that in Europe the IPv6 address management and the Network Service provision are dissociated and he recommended this approach that supports and facilitates global IPv6 implementation.

He informed that for the EUR Region IPv6 address management, an ICAO EUR/NAT Document is curently under development based on EUROCONTROL best practice in this domain since 2005.

Such document will be made available early 2015 to be used for the development of IPv6 addressing implementation guidance in DOC 9896.

# 6. AGENDA ITEM 6: REGIONAL IMPLEMENTATIONS

6.1 Liviu Popescu presented on behalf of Yuksel Eyuboglu (EUROCONTROL)WPs 5, 5.1 and 5.2 which dealt specifically with the development of the European Directory Service (EDS).

6.2 Development began in 1998, implementation and validation commenced in 2013 with initial operations being planned for Q4 2014. Supporting the EDS was a suite of documents including a Concept of Operations, User Interface Documents and Test Documents. The EDS Operational Concept (ICAO EUR\_AMHS\_Manual-Appx\_G-v9\_0) and the EUROCONTROL EDS User\_Interface\_Manual\_V1 0 were made available to the meeting as attachments to WP5 (WPs 5.1 and 5.2) as input for the Directory Service implementation guidance development in DOC 9896.

6.3 As a result of the above, at ICAO EUR/NAT AFSG/18 the following policy statement was released – “That States are encouraged to undertake all appropriate actions to implement, validate and put in operation local Directory Service Agents (DSAs) and make use of Directory data in AMHS operations”

6.4 One implication of the European move towards automated directory services was that in long term the AMC would no longer be available and that AMC was relied upon by other Regions ( e.g. ASIA PAC) . This point was noted however the meeting could take no action on this.

# 7. AGENDA ITEM 4: ICAO DOC 9896 EDITION 2 PUBLICATION - Review of latest draft

7.1 The meeting returned to Agenda Item 4. The Secretary presented the latest draft version of Doc 9896 which was reviewed by the group. This document had been circulated earlier among group members and comments sought. The results of this final review were as follows:

1. Some minor editorial changes were made.
2. All content related to directory services was removed to avoid having it duplicated in two documents (Doc 9880 and 9896).

7.2 The Secretary then explained that all efforts would be made to have this published by the end of this year. He explained that he hoped to gain approval for publication from the ACP members via correspondence. If this approach was rejected, then the document would need to be submitted to the WGW (scheduled for December) prior to submission to the ICAO editorial section and final approval for publication. The result of this would be a five month delay.

# 8. AGENDA ITEM 8.3 – MOBILITY

8.1 Bernhard Haindl presented IP03 on Locator/Identifier Separation Protocol (LISP) a multi-homing mobility solution for the ATN/IPS. This technique offers numerous advantages

compared to the methods currently defined in ICAO Doc. 9896.

The presentation addressed the following:

8.2 First, the characteristics of mobile IPv6 (MIPv6) and its proposed enhancements (Proxy MIPv6, Fast Handover MIPv6, NEMO) were presented and the following drawbacks were pointed out:

* No multihoming support
* No virtualization support
* Stateful approach
* Scalability problem of security management
* For every airplane a HA (Home Agent) is involved
* Route optimization only for IPv6
* Depends on network service provider routing

8.3 LISP (Locator/Identifier Separation Protocol) was introduced as novel approach in order to enhance the ATN/IPS-based network layer. It focuses on usage of LISP technology in a multi-homing environment in order to achieve mobility and high availability for safety critical communication over aeronautical networks between aircraft and ground infrastructures. It was shown how the LISP mechanisms can be used to apply fast convergence, provide session continuity, enable secure dynamic location updates and enable a make-before break handover in multilink environment.

8.4 Four fundamental capabilities of LISP were presented:

1. It provides a clear demarcation point between user sites and WAN provider network for routing and security. That makes distribution of responsibilities and reduces the control complexity between the user and WAN provider.
2. It allows enhancement of the network concerning new sites connected to the WAN provider or multi-homing of existing sites or even changing or adding of WAN providers without any disturbance of existing ongoing communication. Such changes are automatically detected and integrated in a seamless way.
3. Network security especially integrity and authentication of messages as well as optional encryption can easily be added if necessary (e.g. in case the WAN network is located in a shared or non-trusted security domain) in a scalable and seamless manner by usage of GETVPN technology available in commercial off the shelf IP routers.
4. Multi-homing and mobility are an inherent functionality of LISP hence support of multilink concept for communication to mobile aircrafts is available from Day-One by using just COTS LISP routers. With appropriate configuration of these COTS LISP routers “Move before Break”, “Seamless communication” and “Constraint-based Routing depending on available QoS” implementations are possible.

8.5 It was agreed to consider this technology for the development of the mobility implementation guidance material of DOC 9896.

# 9. AGENDA ITEM 8.5 – DNS NAMING

8.1 The secretary presented IP5 which promoted the use of Domain Name Servers (DNSs). These had been rejected in the past, as it was considered beyond the capability of ICAO to operate these.

8.2 Although the arguments presented had merit, the group did not accept the proposal at this time for a number of reasons which are outlined in the following paragraphs.

8.3 The use of would require a global addressing scheme, which ICAO had not been able to secure at this time. This problem was compounded by the fact that a number of Regions had already begun allocating their own addresses.

8.4 Liviu Popescu mentioned that the use of DNSs provided no benefit for the fixed network capabilities implemented at this time, as the same capability was provided through the available Directory Services. He further pointed out that DNSs were vulnerable to security breaches and hence would require DNS Security (DNSSec), adding to their complexity.

8.5 Greg Saccone pointed out that the Air-Ground links would benefit from the use of DNSs however they would not be implemented for a number of years. Hence action to secure a global address space now, in support of DNSs, would incur costs with no immediate benefit.

8.6 The Secretary then made the point that if DNS implementation (with DNSSec) was limited to air-ground links then interconnection between the air-ground links and the fixed network would lead to inconsistent security. Andy Isaksen reminded the meeting that SWIM would eventually extend to the cockpit compounding this problem.

8.7 It was pointed out that SWIM would not carry critical ATC data and hence the two systems (Air-Ground Datalink and SWIM) would be segregated thus reducing this problem.

8.8 Given the above discussion, the meeting agreed to re-consider the use of DNSs when a clear need was identified in the future.

# 10. AGENDA ITEM 8.5 – SECURITY

10.1 Vidyut Patel presented IP07 which provided information on the security policy adopted by the ICAO Asia-Pacific Internetwork Coordinating Group (ATNICG). The salient points of this were as follows:

1. Two documents on network security had been developed:
   1. “Asia/Pac Aeronautical Telecommunications Network System Integrity Policy”.
   2. “Asia/Pacific ATN System Integrity Checklist”
2. The first covered many areas including “functional policy statements” and provisions for verification and authorisation.
3. The second covered management, operational and technical controls.

10.2 In the ensuing discussion, the question was raised as to why the ACP had not developed a similar policy. The secretary pointed out that this had been requested but had not been forthcoming. He went on to explain that the Aviation Security Panel (AVSECs) had also been approached on this but could not react quickly as they had focussed on personnel security until now. He then described the work of the AVSEC Threat and Risk Working Group who had produced a “threat matrix” for CNS system. He then undertook to post this on the AG-I web-site and requested that members provide comments on this. This resulted in the following action item:

**ACTION ITEM #17-2:** All members to provide comments on the AVSEC documentation (TMP 01 and 02).

10.3 Greg Saccone presented IP07, which was a joint effort between Airbus and Boeing to assess the impact of the FAA Threat Assessment for Air-Ground Datalink. The study provided a number of initial conclusions:

1. Waiting for an incident would involve a long period of exposure.
2. Schedule and cost impacts are major, especially to retrofit existing data link equipped fleet
3. Each aircraft fleet would require its own development programme.

10.4

10.5 Boeing and Airbus are continuing to perform security studies both internally and externally (e.g. within SESAR). As such, statements and conclusions defined in this presentation are subject to change based on the outcome of these continuing studies. Additionally, Boeing and Airbus stated that the usage of the FAA provided information for this task did not constitute Boeing and Airbus endorsement of the provided information; it was merely used as input for the task.

10.6 Boeing and Airbus both agree that security needs to be addressed at some point for the air-ground segment, and that the risk environment continues to evolve. However, they both also agree that the impacts of implementing data security mechanisms are major, particularly with the retrofit fleet, and that doing so would result in the need to redefine the current FAA Data Comm program roadmap which would have an effect on the program’s success.

Therefore, a number of near-term recommendations for further study were made. These do not impact the avionics and include:

* Strengthening security of ground networks as much as possible
* Ensuring controllers are aware of unsolicited closure messages, may indicate attack
* Ensuring flight crew procedures are adequately defined to deal with unsolicited/unexpected messages
* Comparison of messages in ground segments to catch spurious inputs
* Leveraging VDL stations to detect spurious signals nearby
* Enhanced conformance monitoring for aircraft

10.7 Longer-term recommendations include furthering investigation into solutions on the aircraft and ground sides, including what was developed for ICAO Docs 9705/9880 as well as other potential solutions. This would also include technology tradeoffs (e.g. the need for communication link independence, application vs transport/network level solutions, etc).

In order to develop an overall security concept, there first needs to be a full understanding of the entire system, including:

* Clear security requirements
* Technology choices based on the requirements,
* Requirements allocation
* Determining how the system as a whole will be managed, funded and maintained, from all users’ aspects (airlines, communication service providers, air navigation service providers, etc).

10.8 The impacts of potential security solutions were then listed on the various segments. For the aircraft, these includes multiple key issues (generation, storage, usage, etc, as well as key attributes such as sizes and numbers, associations and lifecycles), key/certificate exchange mechanisms, application updates in order to make use of keys/certificates, HMI changes to allow management functions, and potential performance impacts on the hardware and at the communications level.

10.9 Another major factor to consider is that current airplane programs are operating at very close to capacity from an implementation perspective. Adding new requirements such as security will introduce competition for resources for other planned additions and changes, potentially including software updates, fixes, and customer feature requests. This can delay much-needed improvements. Having additional funding may not be enough to overcome this limitation due to finite resources.

10.9 Airlines will also be impacted depending on what is implemented. Airlines would likely need to deal with multiple security instantiations for their airline operational control (AOC) communication functions, which have one security solution, and the Air Traffic Services (ATS) communication functions, which would have another. Depending on the airline’s capabilities, a PKI solution would also need to either be implemented in-house or procured externally, along with the added maintenance and operational changes. These are major impacts, both from cost and operations change perspectives.

ANSPs would also be similarly impacted, with the same issues facing the aircraft systems. These would also need to be coordinated at the international level, since disconnects in security implementation would have impacts on operational data link usage.

10.10 In addition to these many impacts, the major questions remain:

* Who pays for all the upgrades, and how is that cost distributed ?
* Who is responsible for running and maintaining the system?
* Who pays for operation and maintenance?

10.11 Boeing and Airbus took different but similar considerations into account while arriving at a potential technical solution, which is based on the modified Doc 9880 approach (“security shim”). This solution was chosen since at present, it provides a communication-level agnostic approach. The potential solution still needs a lot of definition, and of course it would need to be sure to satisfy the security requirements. But based on this, complexity assessments were made versus other implementations (e.g. Boeing FANS-2 and Airbus FANS-A+C) and those assumptions were applied to Boeing and Airbus product lines. From these assumptions per-model development costs were arrived it, which were submitted to the FAA under non-disclosure agreements. These costs were only for implementation, and NOT for the actual operation and maintenance of the system. It was also noted by both Boeing and Airbus that their models would need individual development programs.

10.12 A notional security roadmap timeline was then discussed. Based on Boeing and Airbus internal and joint discussions, and assuming a best-case scenario and, more importantly, agreed-upon security requirements, it would like take approximately 9 years to work the solution through international standards groups, define new operational procedures, development and implement both air and ground segment solutions, and have those coordinated and ready for operation. It was still noted that the operation and maintenance (and who would perform those) were still not covered.

10.13 In conclusion, both Boeing and Airbus agreed that:

* Based on current potential limitations, the modified Doc 9880 solution could likely mitigate potential security requirements, but would need further development.
* Implementation of data security would have a large impact on the current FAA Data Comm program, and would result in the need to redefine the FAA Data Comm roadmap, which would likely jeopardize the program
* From the time that specific security requirements are defined, it would likely take approximately 9 years for that solution to be agreed upon internationally and implemented across all segments so that it would be ready for operation
* Both Boeing and Airbus believe that Data Security deployment can only be achieved with a world-wide harmonized position and agree-upon solution
  + Between all regions operating and planning to deploy data link
  + Based on a consolidated need resulting from a globally convergent threat assessment
  + Any differences in implementation will lead to the loss of datalink capability, along with the associated operational and safety benefits

10.14 The meeting was invited to note the contents of the paper.

# 14. AGENDA ITEM 9.2 – ANY OTHER BUSINESS – SWIM, INFORMATION MANAGEMENT SERVICE

Andy Isaksen presented IP01. This Information Paper presented the first attempt to gain more understanding of operation and implementation of service based on the SWIM Concept – DRAFT Version 0.9 developed by ICAO Air Traffic Management Requirements and Performance Panel (ATMRPP), dated 30 November 2013. This paper is also limited in its scope to Aeronautical Fixed Service (AFS). This paper focuses on the SWIM concept and presents the implementation issues/requirements for the meeting for information only since the SWIM Concept document is still in draft version and there is no request from ATMRPP for support.

While the document is still in draft, it is expected that SWIM will be implemented in 2018. As this expectation is rapidly approaching, this paper identified the need for either a Standards and Recommended Practices or a Technical Manual document be developed to supply the necessary guidance to implement SWIM.

The Information Paper identified specific issues that would need to be addressed by this technical documentation in the following categories: Requirements, Architecture, Governance & Management, Security, and Transition.

The Working Group agreed with the issues listed in the Information Paper.

# ACTION ITEM #17-3: All members to provide comments on the questions raised by IP01 and also provide any concerns that they may have. These will be forwarded to the Secretary of the ATMRPP and the newly-formed Information Panel by the Secretary (ACP).

# 15. AGENDA ITEM 9.1: ICAO PANEL RESTRUCTURING AND WORK PLAN PRIORITIES

The Secretary provided a verbal explanation supported by diagrammes of both the ICAO Panel restructuring and the re-organisation of the Air Navigation Bureau. This was advance information to help ACP WG-I prepare for the forthcoming changes. The Group was advised that this was for advice only as the final approvals had not been granted.

The points of interest to the group were as follows:

* The ACP and OPLINKP will be merged.
* OPLINKP will become the Operational Datalink Working Group
* The work of WG-I, WG-M and WG-S will most likely be consolidated into the Datalink Infrastructure Working Group.
* A new Voice Communications Working Group (VCWG) will be formed however it is not clear what the scope of work for this WG will be or where its membership will be drawn.
* The existing WG-F will become a stand-alone panel, the Frequency Spectrum Management Panel.

A number of questions were raised regarding the changes to the ACP. The first was whether the work on satellite and AeroMACS voice would be migrated the Voice Comms WG. To this the Secretary responded that this was not likely as, he anctipated that the VCWG would pursue new or innovative tasks, rather than assume the work currently being done by existing WGs. The point was made that there did not appear to be any dedicated group to deal with Cyber-Security. The Secretary responded to this by explaining that Aviation Security was handled by the Aviation Security (AVSEC) Panel and that they were a part of another bureau not affected by the re-structure. He also added that they had traditionally dealt with issues related to personnel security and were only just beginning to grasp Cyber-Security issues. He went on to say that the Communication, Navigation, Surveillance and Information Management Panels would no doubt support the work of the AVSEC Panel on this.

On the subject of the ANB re-organisation, it was explained that the eight sections currently involved in standards development would be merged into three sections:

* Airport Operations & Interoperability
* Airspace Management & OptimizationIntegrated Planning.

The integrated planning group’s role will be to coordinate the work of the various panels to ensure that all required deliverables for a given initiative are delivered in a timely manner.

16. AGENDA ITEM 8. Work Programme Items – Implementation guidance development:

16.1 Liviu Popescu presented IP02 on behalf of the SESAR P15.02.10 project partners . This paper presented a list of documents to be considered for the ATN/IPS Implementation guidance development for Security, Multicast and Voice over IP (VoIP) under Part III of ICAO DOC 9896.

16.2 These documents were created by AENA, DFS, DSNA, ENAV, EUROCONTROL, FREQUENTIS, INDRA and SELEX ES for the SESAR Joint Undertaking within the frame of the SESAR Programme co-financed by the EU and EUROCONTROL.

16.3 The listed documents are deliverables of SESAR P 15.2.10 that were approved for dissemination to ICAO WGI members. The SESAR 15.2.10 project aims at defining and verifying a terrestrial communications infrastructure appropriate for ATM ground/ground communication applications, being capable of supporting the existing services (i.e. voice, signalling) and addressing the new concepts to be developed in SESAR such as SWIM (System Wide Information Management) services. The project addressed 4 key areas:

1. PENS investigations led by EUROCONTROL,
2. Security aspects lead by EUROCONTROL,
3. support for multicast led by FREQUENTIS and
4. validation of VoIP led by FREQUENTIS.

16.4 The following documents had been approved for dissemination to ICAO WGI to be considered for the ATN/IPS Implementation guidance development for Security, Multicast and Voice over IP (VoIP).

* Security Documents:
  + D04 - SWIM Backbone Security Risk Assessment
  + D05 - SWIM Backbone Security System Model
  + D06 - SWIM Backbone Security Management
* Multicast Documents:
  + D07 - Requirements analysis and test scenario definition on IP multicast
  + D08 - Test Definition and Implementation in test-bed on IP multicast
  + D09 - Guidelines for IP multicast applications via PENS
* Voice over IP (VoIP) document
  + D12 - Report on Verification of VoIP Technology for G/G & A/G Communications

16.5 The Group was invited to consider the listed documents for ATN/IPS Implementation guidance development for Security, Multicast and Voice over IP (VoIP). The Group was also requested to limit dissemination only to those involved in the work of WG-I.

**17. AGENDA ITEM 8.7: WORK PROGRAMME ITEMS – IMPLEMENTATION GUIDANCE DEVELOPMENT - AMHS**

17.1 Michel Solery presented WP04 which was a result of Action Item 16-4, tasking “Focal points to list existing implementation guidance documents available at regional level and to report them to the next WG I meeting”.

17.2 This paper lists three documents developed by the ICAO EUR Aeronautical Fixed Service Group (AFSG) containing guidance material about AMHS over IP, with a focus on network considerations.

17.3 The documents were as follows:

* ICAO EUR AMHS Manual, EUR DOC 020, Version 9.0 - The main focus of the EUR AMHS Manual is the AMHS application, with few considerations regarding TCP or IP matters. Section 3.5 of the Manual, however, specifically deals with the AMHS “Underlying Network”, namely the IP network used to interconnect AMHS COM Centres.
  + - IP Infrastructure Test Guidelines for European AMHS, EUR DOC 027, Version 0.1 - The purpose of the document is to define a set of IP Infrastructure Tests from the viewpoint of the application in order to ensure the IP connectivity between application systems, e.g. AMHS, prepared for going into operation. The document defines the objectives and prerequisites as well as the set of IP tests themselves.
    - EUROCONTROL - “Coordination Guidelines for PENS-Interconnected COM Centres” - The purpose of this document is to establish a coordinated process of common COM Centre coordination procedures to be applied in case of disruption of communications between COM Centres interconnected through IP networks and PENS (“Pan European Network Services”)

17.4 The Group was invited to note the information provided, and to use the provided references as appropriate, where Guidance Material about AMHS over IP is needed.

18. AGENDA ITEM 8.8: WORK PROGRAMME ITEMS – IMPLEMENTATION GUIDANCE DEVELOPMENT - VOIP

18.1 Bernhard Haindl presented WP08 which was a result of Action Item 16-4. This paper provided information on planned and existing Guidance Material regarding VoIP. This paper lists the existing and planned documents developed by the EUROCONTROL VOIP Implementation Support Group (VOTE) containing supporting and guidance material about VOIP

* Identified Guidance documents:
  + VoIP Interoperability and Interworking test specifications document suite ed 2.0-12/2013. The objective of these documents is developing to defining the Conformance and Interoperability test cases to be performed on SIP Telephone, Radio and Gateway User Agents. The document suite consists of one ATM cross reference matrix and 5 Volumes named equivalent to the EUROCAE ED-137B documents, listed below:
    - VOIP in ATM Cross-Reference Matrix specification ed 2.0-December 2013
    - Volume 1-Radio Interoperability and Performance Test case specification for VoIP in ATM ed 2.0-December 2013
    - Volume 2-Telephone Interoperability and Performance Test case specification for VoIP in ATM ed 2.0-December 2013
    - Volume 3A-SIP v ATS-R2 Interworking Gateway Test case specification for VoIP in ATM ed 2.0-December 2013
    - Volume 3C-SIP v ATS-QSIG Interworking Gateway Test case specification for VoIP in ATM ed 2.0-December 2013
    - Volume 4-Recording and Event Logging Test case specification for VoIP in ATM ed 2.0-December 2013
* VOTER 2 1 3 baseline specification ed 2 7 - February 2014. The objective of this document is to provide a high level description of the test cases included in the test tool VOTER 2.1.3. This version of the VOTER baseline covers ED137B VOL 1 Radio, ED137B VOL 2 Telephony and ED137B VOL4 – Recording.
* EUROCONTROL plans to develop the following guidance and support material within VOTE:
  + - IPv6 addressing plans.
    - VOIP Network implementation guidance.
    - Equipment Procurement Guidelines (VCS, GRS, REC).
    - VOIP Security implementation guidelines.
    - Performance apportionment implementation guidelines.

18.2 All the identified guidance material is available on the EUROCONTOL VOTE Sharepoint (https://ost.eurocontrol.int/sites/VOTE) with restricted access for VOTE members only. He then explained that these could be distributed to ICAO WG-I members upon request through the ACP Secretary. As with other restricted document these would need to be placed on the members-only repository to be provided on the ACP Web-Site as discussed in paragraph 2.3.

# APPENDIX A - ACP WG-I AGENDA

**AERONAUTICAL COMMUNICATIONS PANEL (ACP)**

**SIXTEENTH MEETING OF WORKING GROUP - I**

**Montreal, Canada 28 – 30 January 2013**

**Proposed Agenda**

**(Presented by Liviu Popescu)**

**WG-I Proposed Agenda:**

1. Meeting Organisational Issues

2. Approval of the Agenda & Review of WG-I/15 Meeting Report ***WP1***

3. Review of Action Items and Items for Follow-Up. ***WP2, IP3, IP4, TMP1, TMP2***

4. IPv6 implementation papers (Mobile and Fix) ***WP4, WP7***

5. Regional IP implementations (need input from ICAO regional secretariats)

6. A/G security standards update

7. Work Programme Items – Implementation guidance development: ***WP5, TMP4***

7.1. IPv6 Addressing

7.2. IPV4- IPV6 transition

7.3. Security ***WP3***

7.4. DNS Naming

8. Any Other Business

8.1. AN-Conf/12 Outcome Discussion ***(IP3, IP4)***

8.2. SWIM, Information Management Service ***WP6, IP2***

8.3. UAS A/G mobility and security standards ***IP1, TMP5,TMP6***

9. Next meeting

# 

# APPENDIX B LIST OF ATTENDEES

**ACP WG-I/16 – Montreal, Canada: 28th – 30th July 2013**

LIST OF ATTENDEES

|  |  |  |  |
| --- | --- | --- | --- |
| Nominated By | Name | Business Phone | E-mail Address |
| ***State*** | | | |
| Austria | Bernhard Haindl |  | Bernhard.haindl@frequentis.com |
| Canada | Zbigniew Jasiukajc |  | Zbigniew.jasiukajc@sita.aero |
| Canada | John Taylor | 16139934061 | john.taylor@tc.gc.ca |
| Canada | Benoit Gosselin |  | gossebe@navcanada.ca |
| France | Stephane Tamalet |  | stephane.tamalet@airbus.com |
| France | Michel Solery | 33562145473 | michel.solery@aviation-civile.gouv.fr |
| France | Jean-Marc Vacher | 33562145474 | jean-marc.vacher@regis-dgac.net |
| Japan | Shoichi Hanatani | 81-80-1252-7866 | shoichi.hanatani.he@hitachi.com |
| Japan | Ichiro Murata | 81-80-5181-7177 | ichiro.murata.sb@hitachi.com |
| Japan | Yasuto Sumiya | 81-422-41-3175 | sumiya@enri.go.jp |
| Saudi Arabia | Hazim A. Abudaowd | (02) 671-7717, ext. 1255 | habudaowd@gaca.gov.sa |
| Saudi Arabia | Turki M.A. Yosef | (02) 671-7717 ext.1565 | tayosef@gaca.gov.sa |
| Sweden | Robert Witzen | 1-514-426-7654 | r.witzen@videotron.ca |
| United States | Brent W. Phillips | +1 202-385-7188 | brent.phillips@faa.gov |
| United States | Hoang Tran |  | Hoang.tran@faa.gov |
| United States | Andy Isaksen | 1-609-485-4296 | Andy.isaksen@faa.gov |
| United States | Vidyut Patel | 1-609-485-5046 | Vidyut.patel@faa.gov |
| United States | Greg Saccone | 1-253-657-6370 | Gregory.t.saccone@boeing.com |
| United States | Tom McParland | 1-609-425-4410 | tmcparland@bcisse.com |
| United States | James Moulton | 1-703-879-8813 | moulton@ons.com |
|  |  |  |  |
| ***International Organization*** | | | |
| EUROCONTROL | Liviu Popescu | 3227293757 | Liviu.popescu@eurocontrol.int |
| ICAO | Vaughn Maiolla | 6153 | VMaiolla@icao.int |
| ICAO | Mie Utsunomiya | 6082 | MUtsunomiya@icao.int |

***23 participants***

# APPENDIX C – TABLE OF ACTION ITEMS AND OUTCOMES

Items for Follow-Up at WG-I/16

| **Action Item** | **Description** | **Status** |
| --- | --- | --- |
| **13-8** | ICAO Secretariat will work to obtain IPV6 address blocks for the Regions. – Still in progress.  ***Efforts made at AN-Conf/12 to obtain necessary resources.*** | OPEN – In progress. |
| **14-4:** | Secretariat draft State Letter asking for (i) support from personnel with IPS skills and (ii) an extension to the schedule for the work programme based on the various reasons given above. In order to be effective State Letter must ask for experts to be nominated by name with details of expertise.  ***Letter not distributed as funding to make use of personnel not yet available. Secondee with the skills being sought now.*** | OPEN – In progress |
| **14-5:** | ICAO to develop a justification for a /16 address block and make an application to ARIN or IANA based on expediency.  ***As above.*** | OPEN |
| **14-6:** | Hoang Tran to draft guidance material for Doc 9896 on IPV4-IPV6 transition. | OPEN |
| **14- 8:** | ICAO to apply for new TLD and draft appropriate guidance material on the allocation of lower level domain names.  ***As per 13-8, 14-4, 14-5*** | OPEN |
| **14-9:** | Secretary to capture some justifications on paper and circulate to WG-I members. Once done, the Secretary to prepare a paper seeking the ACP WGW to request the ANC to approve the formation of a Task Force.  ***AN-Conf 12 has identified SWIM as a priority and a hence a Panel/Task Force/Study Group will be established.*** | **CLOSED** |
| **15-01:** | Secretary to make efforts to have changes given in WPs 4 and 5 into Edition 2 of Doc. 9896. If not successful then these changes shall be used to produce Edition 3 of Doc. 9896. Secretary to report to WG-I on this within two weeks.  ***Doc 9896 ed 2 had been finalised and supported by WG-I/16 (agenda item 4)*** | OPEN |
| **15-02:** | Secretary to make details of Annex 10 amendment available to WG-I.  ***TMP2 was provided on the ACP WG-I/16 web. (Applicability date is November 2013)*** | OPEN |
| **15-03:** | Brent Phillips to look into FAA intentions to deal with SWIM at the AN-Conf/2.  ***AN-Conf/12 now done. SWIM is a high priority.*** | **CLOSED** |
| **15-04:** | Secretary to draft State letter seeking support for SWIM activities.  ***Overtaken by events.*** | **CLOSED** |
| **15-05:** | Secretary to develop short explanation of the approach to be used with the JCG to obtain additional resources to assist the ACP with the development of IPS guidance material. This shall be pursued in parallel with the actions agreed at WG-I/14. This shall be distributed to members of WG-I within two weeks.  ***This item was closed at the meeting when the JCG working paper and the resulting recommendation from AN-Conf/12*** | **CLOSED** |

New action items at WG-I/16

| **Item** | **Description** | **Status**   ***Deadline*** |
| --- | --- | --- |
| **16-1:** | Secretary to upload AN-Conf/12 recommendations related to SWIM and Cyber-Security. | **CLOSED** during WG- I/16 meeting |
| **16-2:** | Hoang Tran to update the contents of WP04 and provide more details in the next WG-I/17 meeting. | OPEN *November 2013* |
| **16-3:** | Secretary to include amendment proposals (related to 2.4.1.1 and 2.4.2.1 provided by WP05 and several modifications captured by WP07) into unedited version of 2nd edition of Doc 9896. | OPEN *August 2013* |
| **16-4:** | Focal points to list existing implementation guidance documents available at regional level and to report them to the next WG-I meeting. | OPEN *November 2013* |
| **16-5:** | Secretary to provide a list of the relevant ICAO Documents detailing their current status and their current location (ACP Repository or ICAO .net). | **CLOSED** *End February 2013* |
| **16-6** | Vic Patel to provide approved security documents developed for ICAO Asia/Pacific regional under ATNICG. | OPEN  WGI#17 |

# APPENDIX D – LIST OF CURRENT DOCUMENTS (ACP)

As of **14 June, 2013**

**OUTCOME OF ACTION ITEM 16-5**

Secretary to provide a list of the relevant ICAO Documents detailing their current status and their current location (ACP Repository or ICAO net)

| **DOCUMENT TYPE AND TITLE** | **Any amendments under development? If Yes/explain** | **Current location of amendment proposal**  **(ACP repository or ICAO Net)** | **ICAO NET** | **ICDB**  **(Word file)** |
| --- | --- | --- | --- | --- |
| **ANNEXES:** **Annex 10 — Aeronautical Telecommunications** |  |  |  |  |
| Volume III — Communication Systems  Part I — Digital Data Communication Systems,  Part II — Voice Communication Systems | ***Yes***  Amendment 88 | On ACP Web-Site in original WPs.  Applicability date :  ***Nov 2013*** | Yes | Yes |
| **MANUALS:** |  |  |  |  |
| Manual on the Planning and Engineering of the Aeronautical Fixed Telecommunication Network (Doc 8259) | ***No*** |  | **No** | **No**  *ICAO doesn’t have electronic copy.* |
| Manual on HF Data Link (Doc 9741) | ***No*** |  | **No** | **No**  There are some parts of the 1st edition 2003 but *ICAO doesn’t have consolidated electronic copy.* |
| Manual on VHF Digital Link (VDL) Mode 2 (Doc 9776) | ***Yes***  ***New edition in preparation*** | ***On ACP web-site in original WPs*** | **Yes** | **Yes**  (1st edition 2003) |
| Guidelines on the Use of the Public Internet for Aeronautical Applications (Doc 9855) | ***No*** |  | **Yes**  (1st edition 2005) | **Yes**  (1st edition 2005) |
| Manual on Universal Access Transceiver (UAT) (Doc 9861) – Second edition - 2012 | ***Yes***  ***New edition in preparation*** | ***With ICAO’s***  ***Editorial section (EDL/EN).*** | **Yes**  (1st edition 2009) | **Yes**  (1st edition 2009) |
| Manual on Required Communication Performance (RCP) (Doc 9869) | *Yes*  *Amendment proposal in preparation by* ***OPLINKP*** | ***OPLINKP*** | **Yes**  (1st edition 2008) | **No** |
| Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols (Doc 9880) | **Yes**  ***New edition in preparation*** | ***On ACP web-site in original WPs*** | **Yes**  (1st edition including Amendment 1 of the Part III of Doc 9880 in April 2011) | **Yes**  (1st edition including Amendment 1 of the Part III of Doc 9880 in April 2011) |
| Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols (Doc 9896) – Edition 2.0 | ***Yes***  ***New edition in preparation*** | ***With us (IIM) to consolidate several amendment proposals*** | **Yes**  (Unedited version of 2nd edition on the ICAO NET) | **Yes**  (1st edition 2010) |
| Manual for Aeronautical Mobile Satellite (Route) Service (Doc 9925) | ***Yes***  ***New edition in preparation*** | ***On ACP web-site in original WPs*** | **Yes**  (1st edition 2010) | **Yes**  (1st edition 2010) |

*Note: Yellow highlighted line- Amendment proposal or new edition in preparation*

— END —