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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 7: Review Proposed Modification to APANPIRG ATN Implementation

REVIEW STRATEGY FOR THE IMPLEMENTATION OF AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) IN THE ASIA/PACIFIC REGION

(Presented by Singapore on behalf of the ATNICG sub-group)

SUMMARY

This paper presents the updated proposed revision to the Strategy for Implementation of Aeronautical Telecommunication Network (ATN) in the Asia/Pacific Region for review by the meeting.

1 Introduction

1.1 This paper serves to present the proposed amendments to the revised Strategy for implementation of ATN in the Asia/Pacific Region that was presented through WP/10 (see Attachment A) in the Seventh ATNICG Working Group (ATNICG WG/7) Meeting held in Bangkok on 29 January 2010.

2 Discussion

2.1 The revised Strategy, formulated by ATNICG WG/6 was discussed in the last ATNICG WG/7 meeting. In general, the meeting felt that the Strategy should allow for connectivity between the hubs to be left for bilateral arrangements and the network should be based on either X.25 or IP sub-network. In addition, the Strategy should ensure that there is no single point of failure for the network. The meeting was also of the view that the Strategy should be studied further so that a more comprehensive amendment proposal could be developed for adoption by APANPIRG.

2.2 As such, amendments to the revised Strategy were subsequently made by the sub-group that was tasked to review the Strategy and is provided in a tabular form in Attachment B of this paper for review by the meeting.

3 Action by the Meeting

3.1 The meeting is thus invited to review the proposed amendments and make comments/changes as required. Subject to the consensus/agreement of the meeting, the amended strategy would be recommended for the consideration of APANPIRG through CNS/MET SG.

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ATNICG WG/7-WP/10

International Civil Aviation Organization

THE SEVENTH WORKING GROUP MEETING OF ATN IMPLEMENTATION COORDINATION GROUP OF APANPIRG (ATNICG WG/7)

Bangkok, Thailand, 29 January 2010

Agenda Item: Review Regional ATN Implementation Strategy

Strategy for Implementation of ATN in the Asia/Pacific Region

(Presented by Australia, China, India, Fiji, Hong Kong, Japan, Singapore and United States)

SUMMARY

This paper presents the proposed revision to the Strategy for Implementation of Aeronautical Telecommunication Network (ATN) in the Asia/Pacific Region that was further updated in the ATNICG WG/6 for consideration by the meeting. The proposed revision was to accommodate the developments that have taken place in the environment subsequent to adoption of the Strategy by APANPIRG/17.

1 INTRODUCTION

1.1 The 1st edition of the Strategy for implementation of ATN in the Asia/Pacific Region was developed by the Seventh Meeting of the ATN Transition Task Force (ATNTTF/7) to assist the Asia/Pacific States on ground-to-ground ATN implementation. It was adopted by APANPIRG/16 under Conclusion 16/29. It was also recognized that the strategy needs to be reviewed from time to time in light of developments and as required; amendments developed should be processed for review and adoption by APANPIRG.

1.2 The first amendment to the Strategy was proposed at ATNICG/1 meeting, in consideration of the progress in ACP's development work of the SARPs for IPS and the need to ensure harmonization of procedures and protocols. The amended Strategy permits the deployment of a network approach for the provision of dual stack (OSI and IPS) protocols and was adopted by APANPIRG/17 under Conclusion 17/21 (see Appendix 1). Subsequently, it was identified this Strategy should be reviewed for introduction of new developments such as ATN over IPS implementation in the Asia/Pacific Region. The Strategy was thus revised to include this new requirement by the Third Meeting of ATNICG. The recommended revised strategy was presented to APANPIRG/19 through CNSMET SG/12 (see Appendix 2).

2 DISCUSSION

2.1 In order to develop a common Strategy for the implementation of ATN in the region, the group sees the need to review the Strategy once again so as to merge the ATN over IPS implementation strategy with the ATN implementation strategy. A new version of the strategy (see Appendix 3), based on change proposals that were developed at the ATNICG/4 meeting and comments received subsequently, was developed at the ATNICG WG/6 meeting held in Hua Hin, Thailand in Sep 2009. The Strategy was modified in a way to more clearly differentiate the general Strategy from the specific requirements of States to implement the Strategy.

2.2 As a result, the updated Strategy for Implementation of the ATN in the Asia/Pacific Region has three sections: Considerations for the Strategy; a Description of the General Strategy; and State Requirements to Implement the Strategy:

a. The considerations for the Strategy includes the need for digital data communications, the availability of ICAO specification for ATN/OSI and ATN/IPS, the availability of supporting documentation, AFTN and AMHS terminal support, trials and demonstrations that have already been conducted, and the availability of equipment for ATN/OSI and ATN/IPS.

b. The general strategy for implementation of ATN in ASIA/PAC is to initially deploy a backbone network of ATN/OSI routers and MTAs as the basic infrastructure. The ATN/OSI routers will start with X.25 connections to one another but gradually migrate to IP. This however will not be over the Public Internet. Non-backbone MTAs may connect to backbone MTAs using either ATN/OSI or ATN/IPS. Backbone MTAs may likewise connect to MTAs in other regions using either ATN/OSI or ATN/IPS. The strategy does not require all states to implement MTA but rather permits the States to simply have Terminals which connect to MTAs in other states. These connections may be via the Public Internet provided appropriate security provisions are in place. The longer term strategy of the region is to convert all AFTN systems to AMHS, and eventually transition completely to ATN/IPS for AMHS.

c. The Strategy for Implementation of the ATN in the Asia/Pacific Region contains specific implementation requirements for the States. All implementations must be in compliance with ICAO standards and APANPIRG documents. Specific requirements for backbone systems, non-backbone systems to interconnect are identified as are requirements for connections to other regions. States are also required to work co-operatively to implement the ATN expeditiously and ensure system inter-operability, and provide appropriate training to the personnel for ATN implementation.

3 ACTION BY THE MEETING

3.1 The meeting is invited to consider the updated ATN implementation strategy proposed by ATNICG WG/6 and make comments/changes as required. Subject to the consensus/agreement of the meeting, the updated Strategy will be recommended for adoption by APANPIRG at ATNICG/5.

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APPENDIX 1 TO ATNICG WG/7-WP/10

STRATEGY FOR IMPLEMENTATION OF THE AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) IN THE ASIA/PAC REGION[1]

Considering that:

a) the requirement for a robust ground-to-ground Aeronautical Telecommunication Network (ATN) to meet growing need for a digital data communications to support the Air Traffic Management Operational Concept;

b) the availability of ICAO SARPs and Technical Manuals for implementation of ATN;

c) the awareness generated in States for replacement of the present AFTN with digital data network by conducting various seminars and meetings;

d) the availability of several guidance materials, interface control documents (ICDs) required to assist States to ensure harmonization of procedures and protocol to assure inter-operability within the region;

e) the agreement in EUR region and North American region to provide gateways to support ATN protocol suites implemented in adjacent region;

f) the feasibility of introducing SARPs compliment air-ground application in a secured network without prolonged delay;

g) work in progress in ACP of IPS SARPs development for ground-to-ground communications and study undertaken on the feasibility of air-ground IPS;

h) the need to migrate to Binary Universal form of representation of meteorological data (BUFR) coded OPMET messages; the emerging need to use lower case letters in NOTAM messages;

i) the trial and demonstrations conducted by several States in the ASIA/PAC region for implementation of ATN/AMHS and actions taken by States for introduction of ATN/AMHS; and

j) availability of equipment and readiness of vendors to support provisions of equipment for both OSI/IPS ground-to-ground and OSI air-ground communications.

[1] Version adopted by APANPIRG/17 under its Conclusion 17/21

THE GENERAL STRATEGY FOR THE IMPLEMENTATION OF THE ATN INFRASTRUCTURE AND ASSOCIATED ATN APPLICATIONS IN THE ASIA/PAC REGION SHOULD BE AS FOLLOWS:

a) implementation be in full compliance with Annex 10 SARPs, PANS, ICDs and guidance materials adopted by APANPIRG;

b) in the ASIA/PAC region ground-to-ground ATN will initially support the implementation of ATS Message Handling System (AMHS) to replace AFTN;

c) strategically deploy backbone ATN routers to provide fault tolerant infrastructure to initially support ground-to-ground applications and eventually support air-ground applications;

d) during the transition phase, some AFTN system may remain in operation. A reasonable time frame should be established for their replacement with AMHS;

e) MTA sites should provide AFTN/AMHS gateways during the transition phase;

f) States should work co-operatively to assist each other on a multinational basis to implement the ATN expeditiously and to ensure system inter-operability;

g) States should organize training of personnel to provide necessary capability to maintain and operate the ground-to-ground ATN infrastructure and applications;

h) upon successful deployment of ground-to-ground ATN infrastructures and applications within the region, States gradually introduce ATN air-ground infrastructures and applications; and

i) Strategically deploy network approach that permits dual stacks protocols (OSI/IPS) operations.

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APPENDIX 2 TO ATNICG WG/7-WP/10

REVISED STRATEGY FOR IMPLEMENTATION OF THE AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) IN THE ASIA/PAC REGION [2]

1. All States having Backbone Boundary Intermediate System (BBIS) in the Asia/Pacific Region should continue to implement ATN/OSI as per the current regional plan (FASID Tables CNS-1B and CNS-1C);

2. For States with Boundary Intermediate System (BIS), deployment of IPS based AMHS and/or inter-State ATN circuits may be considered depending on the impact on the regional ATN network connectivity and redundancy, and the agreement with the adjacent States;

3. For AFS interface to adjacent regions, communication with States with only one connection to the APAC region can use IPS on a bilateral basis. States in adjacent regions that have multiple connections to the APAC region are recommended to continue to support ATN/OSI links;

4. The region should construct an effective regional ATN ground network that supports both OSI and IPS based services. This could be achieved by upgrading inter-State circuits to support IPS as well as OSI communication, and introducing IPS routers alongside BIS routers;

5. Any subsequent new services or AMHS Message Transfer Agent (MTA) should be able to support dual stack to assist future transition to “ICAO compliant” IPS network technology; and

6. The ATNICG task list shall be revised to include development of IPS implementation documentation.

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[2] Version presented to APANPIRG/19

APPENDIX 3 TO ATNICG WG/7-WP/10

STRATEGY FOR IMPLEMENTATION OF THE AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) IN THE ASIA/PACIFIC REGION

Considering:

1) the requirement for a robust ground-to-ground Aeronautical Telecommunication Network (ATN) to meet the growing need for digital data communication to support the Air Traffic Management Concept;

2) the availability of ICAO SARPs and technical manuals based on the OSI Protocol Suite (ATN/OSI) and the Internet Protocol Suite (ATN/IPS);

3) the availability of AMHS Transition and Implementation guidance materials required to assist States to ensure harmonization of procedures and protocols and thereby assure inter-operability within the region;

4) the need to support States currently using AFTN terminals for communication with other States, and the need to replace these aging terminals with ATS Message User Agents;

5) that several States in the ASIA/PAC region have conducted trials and demonstrations for implementation of AMHS and have taken actions for introduction of AMHS; and

6) the availability of equipment and readiness of vendors to provide equipment for both ATN/OSI and ATN/IPS ground-to-ground and ATN/OSI air-ground communications.

THE GENERAL STRATEGY FOR THE IMPLEMENTATION OF THE ATN INFRASTRUCTURE AND ASSOCIATED ATN APPLICATIONS IN THE ASIA/PAC REGION IS AS FOLLOWS:

a) strategically deploy a backbone network of ATN/OSI routers and MTAs to provide a reliable infrastructure to initially support ground-to-ground applications and the planned ATN/OSI air-ground applications;

b) gradually migrate ATN/OSI backbone routers from X.25 sub-network connectivity to IP sub-network connectivity using the IP SNDCF feature of ATN/OSI routers;

c) implement IP sub-network connections among backbone and non-backbone routers as a private network, i.e., without connection to the Public Internet;

d) permit non-backbone States to connect to backbone States using either ATN/OSI routers and MTAs, or IP routers and MTAs;

e) permit backbone States with connections to States in other regions to connect using either ATN/OSI routers and MTAs, or IP routers and MTAs on a bilateral basis;

f) permit States with limited AFTN or AMHS connections to other States to connect to MTAs in other States rather than operate their own MTAs;

g) permit States with limited AFTN or AMHS connections to other States to connect terminals to MTAs in other States using the Public Internet but with appropriate security provisions for access control;

h) within a reasonable time frame convert all AFTN systems to AMHS; and,

i) eventually operate AMHS applications only with IP routers and MTAs.

IN ORDER TO ACHIEVE THE ABOVE STRATEGY THE FOLLOWING IS REQUIRED OF STATES IN THE ASIA/PAC REGION:

j) States shall provide implementations in compliance with Annex 10 SARPS and ICAO Manuals, and with the Plans, Policies, and AMHS Transition and Implementation guidance materials adopted by APANPIRG;

k) States having Backbone Boundary Intermediate Systems (BBIS) shall implement MTAs that support both ATN/OSI and ATN/IPS;

l) States having BBIS shall implement ATN/OSI routing with X.25 sub-network capability and optionally with IP sub-network capability for interconnection with other BBIS;

m) States having BBIS that connect to States in other regions shall provide high availability connections (e.g., with redundant physical connections);

n) States having Boundary Intermediate Systems (BIS) shall implement ATN/OSI MTAs, or ATN/IPS MTAs, or dual-stack MTAs;

o) States shall work co-operatively to assist each other on a multinational basis to implement the ATN expeditiously and to ensure system inter-operability; and

p) States shall organize training of personnel to provide necessary capability to maintain and operate the ground-to-ground ATN infrastructure and applications.

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REVISED STRATEGY FOR IMPLEMENTATION OF THE AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) IN THE ASIA/PACIFIC REGION (WITH PROPOSED AMENDMENTS)

Considering:		**Proposed amendments**
1)	the requirement for a robust ground-to-ground Aeronautical Telecommunication Network (ATN) to meet the growing need for digital data communication to support the Air Traffic Management Concept;	No change.
2)	the availability of ICAO SARPs and technical manuals for the ATN based on the OSI p~~P~~rotocols ~~Suite~~ (ATN/OSI) and the Internet Protocol Suite (ATN/IPS), and the availability of equipment and readiness of vendors to support both ATN/OSI and ATN/IPS ground-to-ground communications;	Proposed for similar items to be grouped together and read "top-down" (i.e. from network to applications) to create a logical progression to increase coherence. Proposed to merge items (2) & (6) and move item (4) to the end of this section.
3)	the availability of AMHS Transition and Implementation guidance materials required to assist States to ensure harmonization of procedures and protocols and thereby assure inter-operability within the region;	No change
4)	the need to support States currently using AFTN terminals for communication with other States, and the need to replace these aging terminals with ATS Message User Agents (UA); and	Minor change to add abbreviation for User Agent
5)	the backbone States ~~that several~~ States in the Asia/Pacific region have already implemented, or are in the process of procuring and implementing, AMHS based ATN/OSI. ~~conducted trials and demonstrations for implementation of AMHS and have taken actions for introduction of AMHS; and~~	Proposed to replace item (5) as it is old and seems like little progress has been made.
6)	~~the availability of equipment and readiness of vendors to provide equipment for both ATN/OSI and ATN/IPS ground to ground and ATN/OSI air ground communications.~~	Proposed to merge items (2) & (6)
THE GENERAL STRATEGY FOR THE IMPLEMENTATION OF THE ATN INFRASTRUCTURE AND ASSOCIATED ATN APPLICATIONS IN THE ASIA/PACIFIC REGION IS AS FOLLOWS:		**Proposed amendments**
a)	strategically deploy a backbone network of ATN/OSI	Minor change to add abbreviation for

	routers and AMHS Message Transfer Agents (MTA) to provide a reliable infrastructure to initially support ground-to-ground applications and the planned ATN/OSI air-ground applications;	Message Transfer Agents
b)	~~gradually migrate ATN/OSI backbone routers from X.25 sub-network connectivity to IP sub-network connectivity using the IP SNDCF feature of ATN/OSI routers~~ strategically deploy an ATN/IPS backbone network as a private network which comprises dedicated point-to-point circuits without connection to the Public Internet to support data communication, and migrate ATN/OSI router interconnections from X.25 sub-network to IP sub-network connectivity;	Proposed to merge item (b) and (c)
c)	~~implement IP sub-network connections among backbone and non-backbone routers as a private network, i.e. without connection to the Public Internet;~~	Proposed to merge item (b) and (c)
d)	permit non-backbone States, and States in other regions with a single connection to the Asia/Pacific region, to connect their MTAs to backbone States using either ~~ATN/OSI routers and MTAs, or IP routers and MTAs~~ the OSI-based ATN Internet Communication Service (ICS) or the ATN IPS;	Proposed to merge (d) and (e) as the conditions for non-backbone States and States in other regions with a single connection to the Asia/Pac region are the same. India proposed the following changes: Permit non-backbone States, and States in other regions with ~~a single~~ connection(s) to the Asia/Pacific region, to connect their MTAs to backbone States using either the OSI-based ATN Internet Communications Services (ICS) or the ATN IPS on a bilateral basis;
e)	~~permit backbone States with connections to States in other regions to connect using either ATN/OSI routers and MTAs, or IP routers and MTAs on a bilateral basis;~~	Proposed to merge (d) and (e)
f)	permit States with limited ~~AFTN or AMHS connections to other States to connect to MTAs in other States rather than operate their own MTAs~~ AFS connections or traffic with other States to operate only UA terminals and to use the MTA of another State, subject to bilateral agreement. Such UA to MTA connections may use the Public Internet subject to appropriate security provisions and access control;	Proposed to merge items (f) and (g) and revised text slightly.
g)	~~permit States with limited AFTN or AMHS connections~~	Proposed to merge items (f) and (g)

	~~to other States to connect terminals to MTAs in other States using the Public Internet but with appropriate security provisions for access control;~~	and revised text slightly.
h)	~~within a reasonable time frame convert all AFTN systems to AMHS~~ complete migration from AFTN to AMHS within the time frame specified in the FASID ; and	Replace with revised text without alteration to the meaning
i)	~~eventually operate AMHS applications only with IP routers and MTAs~~ once a robust ATN/IPS backbone network has been established, eventually phase out use of the ATN ICS by AMHS and operate the AMHS MTA network using the ATN/IPS as specified in ICAO Doc 9880 section 3.2.2.2.3.	Requires clarification. HK proposed the following changes: once a robust ATN/IPS backbone network has been established, eventually phase out use of the ATN ICS ~~by AMHS~~ and operate the AMHS MTA network using the ATN/IPS as specified in ICAO Doc 9880 section 3.2.2.2.3.
IN ORDER TO ACHIEVE THE ABOVE STRATEGY THE FOLLOWING IS REQUIRED OF STATES IN THE ASIA/PACIFIC REGION:		**Proposed amendments**
j)	States shall provide implementation in compliance with Annex 10 SARPS and ICAO Manuals, and with the Plans, Policies and AMHS Transition and Implementation guidance materials adopted by APANPIRG;	No change.
k)	States having Backbone Boundary Intermediate Systems (BBIS) shall implement ~~MTAs that support both ATN/OSI and ATN/IPS~~ AMHS MTAs that support both the ATN ICS and ATN/IPS network services as specified in ICAO Doc 9880 section 3.2.2.2. States having Boundary Intermediate Systems (BIS) may implement MTAs that support either or both network services;	Proposed to merge item (k) and (n)
l)	States having BBIS shall implement ATN/OSI router~~sing~~ with X.25 sub-network capability and later introduce ~~optionally~~ with IP sub-network capability for interconnection with other BBIS;	If IP SNDCF is only “optional”, then and OSI network that operates on top of an IPS network could not be realized. Suggest replacing “optionally with” with “later introduce”. HK proposed the following changes: States having BBIS shall implement ATN/OSI routers with X.25 sub-network capability and later introduce with IP sub-network capability for

		interconnection with other BBIS and non-backbone States; India proposed the following changes in addition to HK's proposal: States having BBIS shall implement ATN/OSI routers with X.25 sub-network capability and later migrate to ~~introduce with~~ IP sub-network capability for interconnection with other BBIS and non-backbone States and non-backbone States;
m)	~~States having BBIS that connect to States in other regions shall provide high availability connections (e.g. with redundant physical connections);~~	Proposed to delete (m) since redundant physical connections may not economically be justifiable considering that alternative network paths to adjacent regions will be available.
n)	~~States having Boundary Intermediate Systems (BIS) shall implement ATN/OSI MTAs, or ATN/IPS MTAs, or dual-stack MTAs;~~	Proposed to merge item (k) and (n)
o)	States shall work co-operatively to assist each other on a multinational basis to implement the ATN expeditiously and to ensure system inter-operability; and	No change. HK proposed the following changes: States shall work co-operatively to assist each other on a multinational basis to implement the ATN and AMHS in an expeditious and coordinated manner ~~expeditiously~~ and to ensure system inter-operability; and
p)	States shall organize training of personnel to provide necessary capability to maintain and operate the ground-to-ground ATN infrastructure and applications.	No change

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