INTERNATIONAL CIVIL AVIATION ORGANIZATION

FINAL REPORT

REPORT OF THE TWENTY FIRST MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/21)

Bangkok, Thailand, 6 to 10 September 2010

The views expressed in this Report should be taken as those of the APANPIRG and not of the Organization. This Report will be presented to the Air Navigation Commission/Council and any formal action taken will be published in due course as a supplement to the Report.

Approved by the Meeting
and published by the ICAO Asia and Pacific Office

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PART I — HISTORY OF THE MEETING

PART I - HISTORY OF THE MEETING

1.1 Introduction

1.1.1 The Twenty First Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/21) was held in Bangkok, Thailand from 6 to 10 September 2010 at the ICAO Asia/Pacific Regional Office.

1.2 Attendance

1.2.1 The meeting was attended by 114 participants from 23 Member States and 3 International Organizations (IATA, IACA and CANSO).

1.2.2 A list of participants is given at **Attachment 1** to the Report.

1.3 Opening of the meeting

Welcome address by Mr. Mokhtar A. Awan, Regional Director, ICAO Asia/Pacific Office

1.3.1 Mr. Awan welcomed the participants from the Member States, International Organizations and ICAO HQ.

1.3.2 Mr. Awan recalled the challenges faced by the Regional Office in the conduct of meetings following the social unrest in Bangkok and expressed gratitude to Indonesia, Malaysia, Singapore and Sri Lanka for their timely offer to host the meetings and seminars.

1.3.3 In highlighting some of the regional issues from ICAO's perspective, he mentioned the achievements in RVSM implementation, RNP routes and Air Traffic Flow Management. Recognising the importance of seamless sky for ATM operations, he informed the group that ICAO workshop scheduled early next year will decide on the mechanism to proceed further. In addition, he recalled the considerable work done in the implementation of new ADS-B surveillance technology, improvements in the provision of meteorology for international aviation and development of Regional Guidance Material on ICAO flight Plan and ATS. He said these initiatives and activities demonstrate the spirit of cooperation and coordination between APAC's States and established a foundation for a seamless ATM system in the APAC Region.

1.3.4 He also recalled the Council's decision to move ahead with Continuous Monitoring Approach (CMA) and establishment of Regional Aviation Safety Group besides the programmes identified for implementation during the next triennium with a focus on the three strategic Objectives –Safety, security and sustainability.

Opening remarks by Mr. W. L. Wong, Senior Director, Changi Airport Advisory Group, Civil Aviation Authority of Singapore and Chairman of APANPIRG

1.3.5 In his opening remarks Mr. W. L. Wong, Chairman of APANPIRG welcomed the members. He reminded that with the once-again rising air traffic, aviation regulators, air navigation services providers and airport operators alike have to employ ways and means to meet the greater demands on our systems, whilst ensuring safety and efficiency were not compromised, yet minimizing impact to our environment.

1.3.6 The Chairman noted further that under the able leadership of the ICAO Asia/Pacific Regional Office and with the commitment of States, APANPIRG and its Sub-Groups and Task Forces had made notable progress in many areas over the last year. These are highlighted below:

– Establishment of Flight Procedure Design Office in China;

– Implementation of reduced horizontal separation; He recalled that the reduction in longitudinal separation will allow more aircraft to operate at optimum flight levels, thus reducing fuel burn and carbon emissions;

– Air Traffic Flow management in the Region- He noted that currently about 90% of the flights transiting the Kabul FIR can get the allocated or higher preferred flight levels.

– Formation of Regional ATFM steering group.

1.3.7 Mr. Wong acknowledged that, although much had been achieved since APANPIRG/20, there was still a lot to do. There were also areas of concern. For example, there remained an urgent need to establish regional contingency plans to deal with contingencies and the momentum on the progress of the regional PBN implementation plan needs to be maintained. He reiterated that with the adoption of the interim Regional PBN implementation Plan, all States should commence PBN planning in accordance with the PBN Regional Plan and the volcanic eruption in Iceland has demonstrated the need for a regional contingency plan to minimize flight disruptions whilst ensuring safety of the travelling public.

1.4 Officers and Secretariat

1.4.1 Mr. W. L. Wong, Senior Director, Changi Airport Advisory Group, CAA Singapore, and Chairman of the APANPIRG, presided over the meeting.

1.4.2 Mr. Mokhtar A. Awan, ICAO Regional Director, Asia/Pacific Office, was the Secretary of the meeting, assisted by Mr. N. C. Sekhar, Regional Officer/AGA.

1.4.3 The meeting was also assisted by Mr. H. V. Sudarshan, Regional Programme Officer, ICAO Headquarters, Mr, Kyotaro Harano, Regional Officer/ATM, Mr. Li Peng and Mr. S. Saraswati, Regional Officers/CNS, Capt. Fareed Shah, Regional Officer/FS and Mr. Christopher F. Keohan, Regional Officer/MET.

1.5 Agenda of the Meeting

1.5.1 The meeting adopted the following agenda:

Agenda Item 1 Follow-up on the outcome of APANPIRG/20 Meeting

1.1 Review of the action taken by the ANC and the Council on the Report of APANPIRG/20

1.2 Review Status of Implementation of APANPIRG/20 Conclusions and Decisions

1.3 Review Status of Implementation of APANPIRG Outstanding Conclusions and Decisions

Agenda Item 2 Global and Inter Regional Activities

Agenda Item 3 Regional Air Navigation Planning and Implementation Issues

3.0 Regional and National Performance Framework

3.1 AOP

3.2 ATM/AIS/SAR

3.3 RASMAG

3.4 CNS/MET

3.5 Other Air Navigation Matters

Agenda Item 4 Regional Air Navigation Deficiencies

Agenda Item 5 Future Work Programme

Agenda Item 6 Any other business

1.6 Working Arrangements, Language and Documentation

1.6.1 The working language of the meeting was English inclusive of all documentation and this Report. Information Papers (IP) and Working Papers (WP) considered by the meeting are listed in the **Attachment 2** to this Report.

1.7 Conclusions and Decisions - Definition

1.7.1 The APANPIRG records its actions in the form of Conclusions and Decisions with the following significance:

1) Conclusions deal with matters which, in accordance with the Group's Terms of Reference, require the attention of States or actions by ICAO in accordance with established procedures; and

2) Decisions deal with matters of concern only to the APANPIRG and its contributory bodies.

1.7.2 Lists of Conclusions and Decisions are given on pages i-6 to i-9.

1.8 Terms of Reference of APANPIRG

1.8.1 The Terms of Reference of APANPIRG was approved by the Council of ICAO (6th Meeting of its 171st Session on 27 February 2004) and revised consequent to the decision of the Council [C- DEC 183/9, March/April 2008]. The revised terms of reference are:

1. Membership

All ICAO Contracting States, who are service providers in an air navigation region and part of that region's ANP, should be included in the membership of that region's PIRG. Furthermore user States are entitled to participate in any other PIRG meetings as a non member. International Organisations recognised by the Council may be invited as necessary to attend PIRG meetings as observers.

2. The Terms of Reference of the Group are:

a) to ensure continuous and coherent development of the Asia/Pacific Regional Air Navigation Plan and other relevant regional documentation in a manner that is harmonized with adjacent regions, consistent with ICAO SARPs and Global Air Navigation Plan for CNS/ATM Systems (DOC 9750) and reflecting global requirements;

b) to facilitate the implementation of air navigation systems and services as identified in the Asia/Pacific Regional Air Navigation Plan with due observance to the primacy of air safety, regularity and efficiency; and

c) to identify and address specific deficiencies in the air navigation field.

3. In order to meet the Terms of Reference, the Group shall:

a) review, and propose when necessary, the target dates for implementation of facilities, services and procedures to facilitate the coordinated development of the Air Navigation Systems in the Asia/Pacific Region;

b) assist the ICAO Asia/Pacific Regional Office in fostering the implementation of the Asia/Pacific Regional Air Navigation Plan;

c) in line with the Global Aviation Safety Plan (GASP), facilitate the conduct of any necessary systems performance monitoring, identify specific deficiencies in the air navigation field, especially in the context of safety, and propose corrective action;

d) facilitate the development and implementation of action plans by States to resolve identified deficiencies, where necessary;

e) develop amendment proposals to update the Asia/Pacific Regional Air Navigation Plan to reflect changes in the operational requirements;

f) monitor implementation of air navigation facilities and services and where necessary, ensure interregional harmonization, taking due account of organizational aspects, economic issues (including financial aspects, cost/benefit analyses and business case studies) and environmental matters;

g) examine human resource planning and training issues and propose where necessary human resource development capabilities in the region that are compatible with the Asia/Pacific Regional Air Navigation Plan;

h) review the Statement of Basic Operational Requirements and Planning Criteria and recommend to the Air Navigation Commission such changes as may be required in the light of new developments in the air navigation field;

i) request financial institutions, on a consultative basis as appropriate to provide advice in the planning process;

j) maintain close cooperation with relevant organizations and State grouping to optimize the use of available expertise and resources; and

k) conduct the above activities in the most efficient manner possible with a minimum of formality and documentation and call meetings of the APANPIRG when deemed necessary to do so.

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List of Conclusions

Conclusion 21/28	**–**	**Regional HF management guidance Material**
Conclusion 21/30	**–**	**Limitation of older Generation FMS**
Conclusion 21/31	**–**	**Revised APAC Regional PBN Implementation Plan**
Conclusion 21/32	**–**	**Develop State PBN implementation Plan**
Conclusion 21/33	**–**	**Aircraft Equipage requirements**
Conclusion 21/35	**–**	**Slow progress of PBN Implementation**
Conclusion 21/36	**–**	**Progress of GNSS Implementation & Awareness of GNSS Manual**
Conclusion 21/38	**–**	**Guidance Material on processing and Display of ADS-B tracks on Air Traffic Controller positions**
Conclusion 21/39	**–**	**Template for promulgation of ADS-B Avionics Equipage Requirements**
Conclusion 21/40	**–**	**Guidelines for Airworthiness and operational approval for ADS-B Avionics Equipage**
Conclusion 21/41	**–**	**Revised Regional Surveillance Strategy for Asia and Pacific Regions**
Conclusion 21/42	**–**	**Rule on Misleading ADS-B Transmissions**
Conclusion 21/43	**–**	**Preparations for WRC-2012**
Conclusion 21/44	**–**	**Visibility of ICAO Position on WRC-2012 Agenda Items.**
Conclusion 21/45	**–**	**Transition to WAFS Internet file Service(WAFS) from ISCS-G2**
Conclusion 21/46	**–**	**Improvements to WAFS Implementation**
Conclusion 21/47	**–**	**Improvements to VA and TC advisories**
Conclusion 21/48	**–**	**Update of SADIS and ISCS User Guide**
Conclusion 21/49	**–**	**Implementation of OPMET reception**
Conclusion 21/50	**–**	**MET/ATM seminar**
Conclusion 21/53	**–**	**Elimination of ATM Air Navigation deficiencies.**
Conclusion 21/54	**–**	**Aerodrome Deficiencies**
Conclusion 21/55	**–**	**Removal of APANPIRG Air navigation deficiency AP-MET-13**
Conclusion 21/56	**–**	**Cost recovery guidance material update**

Conclusion 21/58 – Establishment of RASG - Consequent revision to ToR of APANPIRG

Conclusion 21/59 – Development of New RANP

List of Decisions

Decision 21/9	**–**	**Develop Sub- Regional volcanic Ash Contingency Plan**
Decision 21/11	**–**	**ATM/AIS/SAR Task List**
Decision 21/16	**–**	**ATNICG Subject/Tasks list**
Decision 21/18	**–**	**Regional ATN/AMHS implementation Planner**
Decision 21/29	**–**	**PBN Task Force List**
Decision 21/34	**–**	**PBN task Force continuation**
Decision 21/37	**–**	**Subject/Tasks List of ADS-B Study and Implementation Task force**
Decision 21/51	**–**	**Performance Framework Forms**
Decision 21/52	**–**	**Updated Subject/Tasks List of the CNS/MET Sub Group**
Decision 21/57	**–**	**APANPIRG Contributory Bodies structure Review Task force (ABSRTF)**

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PART II — REPORT ON AGENDA ITEMS

AGENDA ITEM 1: FOLLOW-UP ON THE OUTCOME OF APANPIRG/20 MEETING

Agenda Item 1.1: Review of the action taken by the ANC and the Council on the Report of APANPIRG/20

Agenda Item 1.2: Review status of implementation of APANPIRG/20 Conclusions and Decisions

Agenda Item 1.3: Review status of implementation of APANPIRG outstanding Conclusions and Decisions

Agenda Item 1: Follow-up on the Outcome of APANPIRG/20 Meeting

1.1 Review of the ANC actions on the APANPIRG/20 Report

1.1.1 The meeting was presented with actions taken by the Air Navigation Commission (ANC) during its review and approval of the Report of the twentieth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/20) which was held in Bangkok, Thailand from 7 to 11 September 2009. The meeting noted the specific actions taken by the ANC and the follow-up by the States and Secretariat on conclusions and decisions of the Meeting as contained in **Appendix A** to **Agenda Item 1.2 of the Report**. In the case of APANPIRG/20 Report, the meeting noted that as there were no specific items that required Council action, the said report was not submitted to the Council. The meeting was informed of the following highlights of the review undertaken by the Commission.

1.1.2 Referring to Conclusion 20/2 regarding the adoption of 18 regional performance objectives, the meeting noted that the ANC welcomed the approach and confirmed the need for States to derive national performance objectives based on the regional objectives. Appreciating the efforts of APANPIRG in identifying four Asia/Pacific metrics, the Commission emphasized the importance of having a set of common metrics for all the regions so as to facilitate comparative analysis of regional developments.

1.1.3 With reference to ATFM the meeting noted that the ANC, while noting Conclusion 20/12 regarding the adoption of the *ATFM Communications Handbook for the Asia/Pacific Region*, was apprized that the Secretariat is in the process of developing globally applicable ATFM guidance material with a target date of completion in 2011.

1.1.4 Confirming the request of APANPIRG in Conclusions 20/37 (PBN guidance material), 20/42 (PBN safety assessment) and 20/48 (Flight inspection and validation of flight procedures), the meeting was informed that the Commission called upon the Secretary General to address these PBN issues through the appropriate Panels and Study Groups.

1.1.5 On the subject of frequency spectrum, the meeting was pleased to note that the Commission appreciated the ongoing contribution of APANPIRG in addressing this issue in a number of regional forums. As the frequency bands allocated to aviation use are highly attractive to commercial users, the ANC noted Conclusion 20/58 concerning preparations for the forthcoming International Telecommunication Union (ITU) World Radio Communication Conference 2012 and requested the Secretary General to urge States to continue to participate at various levels in different forums to provide support to the ICAO position.

1.1.6 Endorsing APANPIRG request in Conclusion 20/69 concerning new provisions in Annex 3, the meeting noted that the ANC invited the International Airways Volcano Watch Operations Group (IAVWOPSG) to consider the need for developing additional ICAO provisions related to SIGMET on radioactive clouds and requested the Secretariat to consider the need for developing additional ICAO provisions related to aerodrome warning on tsunami.

1.1.7 The meeting thanked the ANC for their valuable guidance on various activities of the APANPIRG and that it would be taken into account in the development of ongoing work programme of the region.

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1.2 Review of Status of Implementation of APANPIRG/20 Conclusions and Decisions

1.2.1 The meeting reviewed the progress made on the APNPIRG/20 Conclusions and Decisions.

1.2.2 The actions taken by States and the Secretariat on the above mentioned Conclusions and Decisions were reviewed and the updated list is provided in **Appendix A** to the Report on Agenda Item 1.2. This updated list is in the new format in line with the ICAO Business Planning and Performance based approach

1.2.3 The meeting noted that out of the 64 Conclusions and 12 Decisions action has been taken to close/complete 58 Conclusions and 12 Decisions. Action on the remaining 6 Conclusions is ongoing.

1.2.4 The meeting acknowledged that significant progress had been made in completing required action on the APANPIRG/20 Conclusions and Decisions and recommended continued action for completion of the few outstanding items in the list.

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APANPIRG/20 Conclusions/Decisions – Action Plan

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/1	**Performance Framework Workshop/Seminar**	That, ICAO be invited to conduct additional Workshop(s)/Seminar(s) on performance frameworks to provide guidance to the States in developing their national performance frameworks.	**Prepare Issue Form**	**ICAO APAC Office**	**Issue Form transmitted to HQ**	**Dec 2009**	**COMPLETED** Issue Forms transmitted on 21 October 2009	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/2	**Asia Pacific Regional Performance Objectives**	That, the Asia Pacific Regional Performance Objectives and associated Performance Framework Forms (PFFs) as contained in **Appendix A** to the APANPIRG/20 Report on Agenda Item 3.0 be adopted.	**a) Notify States** **b) Include on Regional Office website under APANPIRG**	**ICAO APAC Office** **ICAO APAC Office** ICAO HQ/ ANB ICAO HQ/ ANB	**State Letter** **Available on website** Brief to ANC Convene ALLPIRG/6 Meeting	**Dec 2009** **Dec 2009** **Jan 2010** **2011**	**COMPLETED** S L dated 29 January 2009 **COMPLETED**	Noted Welcomed the approach and confirmed the need for the States to derive national performance objectives based on the regional objectives. Requested the Secretariat to provide a brief to ANC on performance framework and its rollout plan Requested to convene ALLPIRG meeting for harmonizing the implementation of performance framework

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/3	**Align Regional & National Performance Objectives**	That, the Regional Office encourages use by States of the PFF template adopted for the regional PFFs and circulate MS Word soft copy versions of the regional PFFs adopted by APANPIRG to enable States to derive national performance objectives based on the regional objectives.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Dec 2009**	**COMPLETED** **State letter dated 10 December 2009.**	**Noted**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/4	**Asia/Pacific Performance Metrics**	That the following metrics be adopted as a part of Asia/Pacific regional performance monitoring and measurement: **APAC Metric 1** Percentage of RMA sub-regions achieving the regional Target Level of Safety (TLS) for RVSM operations, referenced as of April each year. **APAC Metric 2** Percentage of instrument runway ends with an approach procedure with vertical guidance. **APAC Metric 3** Percentage of en-route and terminal PBN routes implemented on a sub-regional basis in accordance with the regional PBN plan. **APAC Metric 4** Average delays for departures at State's primary international airports for the busiest hour on a weekly basis	**a) Notify States** **b) Include on Regional Office website under APANPIRG** ICAO Headquarters ANB	**ICAO APAC Office** **ICAO APAC Office**	**State Letter** **Available on website** A common set of performance metrics	**Dec 2009** **Dec 2009** **2011**	**COMPLETED Issued SL.** **COMPLETED**	Noted Requested the Secretariat to develop a common set of performance metrics for all the regions so as to facilitate comparative analysis of regional developments

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/5	**Data Collection for Regional Metrics**	That States, organizations and stakeholders collect and process data to support the regional metrics adopted by APANPIRG, leveraging to the extent possible all existing data and ongoing efforts, and provide a progress report to APANPIRG/21.	**a) Notify States** **b) Provide data to regional meetings**	**ICAO APAC Office** **APAC States**	**State Letter** **Data available to regional meetings and APANPIRG to support metrics**	**Dec 2009** Continuous	**COMPLETED** **SL dated 1 Feb 2010**	**Noted**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
D 20/6	**Dissolution of Western Pacific/South China Sea RVSM Scrutiny Working Group**	That, having completed the Terms of Reference established by APANPIRG, a) the Western Pacific/South China Sea RVSM Scrutiny Working Group (WPAC/SCS RSG) be commended for the swift and effective outcomes in satisfactorily addressing RVSM safety performance in the WPAC/SCS area, and b) the WPAC/SCS RSG be dissolved and any residual work items be allocated to Southeast Asia ATS Coordination Group (SEACG) and/or the Regional Airspace Safety Monitoring Advisory Group (RASMAG) and ATM/AIS/SAR Sub-Group as necessary.	**a) Notify States** **b) Transition any remaining items to South East Asia ATS Coordination Group (SEACG)**	**ICAO APAC Office** **ICAO APAC Office, SEACG**	**State Letter** **Remaining items covered by SEACG**	**May 2010** **May 2010**	**COMPLETED** **COMPLETED**	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/7	**Adopt Interim Strategy for Implementation of New Flight Plan Format**	That the '*Interim Strategy for the Implementation of new ICAO Flight Plan Format and Supporting ATS Messages*' provided in **Appendix A** to the APANPIRG/20 Report on Agenda Item 3.2 be adopted and published as the interim edition, and States and users be urged to commence implementation planning based on the interim strategy.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Dec 2009**	**COMPLETED** AP003/10 (ATM), 8 January 2010	**Noted**
C 20/8	**Notification of State Transition Date to New Flight Plan Format**	That, in order to align regional implementation planning, States inform the Regional Office by 1 July 2010 of their scheduled date and implementation methodology for transition to the new Flight Plan and ATS Message formats.	**States formulate implementation strategies**	**APAC States**	**Notify Regional Office of methodology and target implementation date**	**Not later than 1 July 2010**	On Going AP119/10 (ATM), 28 July 2010 (To notify urgently not later than 22 October 2010 SL sent to all contracting States **except** Australia, Hong Kong, Japan, New Zealand, Rep of Korea	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/9	**SSR Code Coordination with ORCAM Secretariat**	That, recognizing that four of the ten European (EUR) region SSR code Participating Areas (PAs) border Asian States, the Regional Office facilitate coordination with the European Originating Region Code Assignment Method (ORCAM) Secretariat to implement code management arrangements that avoid SSR code conflicts at the EUR/ASIA interface.	**Invite ORCAM Secretariat to join coordination**	**ICAO APAC Office**	Letter to ORCAM Secretariat via EUR/NAT Office to invite coordination	**Feb 2010**	**CLOSED**	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/10	**ATFM Compliance-Advice to Airlines and Airports**	That, on behalf of the ATFM/TF, the Regional Office seeks assistance in properly complying with ATFM procedures from the specific airlines and airports identified by the ATFM/TF as contributing to poor ATFM performance because of early or late departures.	**Advise affected States and Airlines**	**ATFM/TF, ICAO APAC Office**	**Data provided to ICAO APAC Office** **Letters containing data transmitted to affected States and Airlines**	**Dec 2009** **Dec 2009**	**COMPLETED** ATFM/TF/13 **COMPLETED** AP-ATM0038	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/11	**ATFM Steering Group and Concept of Operations**	That a regional ATFM Steering Group be constituted and tasked with preparing an Asia/Pacific Regional ATFM Concept of Operations based on analysis of regional data and traffic flows. The ATFM Steering Group should consider the outcomes and recommendations from the October 2008 ATFM Seminar/Workshop (Fukuoka, Japan) and information about the CAR/SAM ATFM Project contained in IP/3 to APANPIRG/20 as guidance in deriving its Objectives and Terms of Reference.	**Conduct first meeting of Steering Group**	**ICAO APAC Office**	**First meeting of Steering group conducted**	**Second half 2010**	On Going ATFM Steering Group planned to be conducted in Tokyo, 7-10 December 2010	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/12	**Adopt ATFM Communications Manual**	That the *Air Traffic Flow Management (ATFM) Communications Handbook for the Asia/Pacific Region*, as shown in **Appendix B** to the APANPIRG/20 Report on Agenda Item 3.2, be adopted and circulated as regional guidance material.	**Notify States**	**ICAO APAC Office** ICAO HQ ANB/ATM	**State Letter** Global guidance	**Dec 2009** **2011**	**COMPLETED** AP007/10 (ATM), 13 January 2010	Noted Noted that the Secretariat is in the process of developing globally-applicable ATFM guidance material
C 20/13	**Conduct Regional ATFM Survey**	That a survey of Asia/Pacific States be conducted based on the questionnaire at **Appendix C** to the APANPIRG/20 Report on Agenda Item 3.2, with the objective of benchmarking the current status of Air Traffic Flow Management (ATFM) activities in the Asia/Pacific Region.	**Conduct survey**	**ICAO APAC Office**	**Survey conducted and outputs compiled**	**March 2010**	**COMPLETED** AP038/10 (ATM), 8 March 2010	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
D 20/14	**Support for Global ICD for AFTN AIDC**	That recognizing the benefits to be gained from globally harmonized interface arrangements for AIDC, APANPIRG supports the work being undertaken by the United States to coordinate a global Interface Control Document for AFTN AIDC and invites the Asia/Pacific Regional Office to act as the regional point of contact for this work.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Feb 2010**	**COMPLETED** AP-ATM0041, 26 January 2010	**Noted**
C 20/15	**Survey of RNP 4 Equipage and Approvals**	That during 2010 the Regional Office conducts a regional survey to establish the current and near term equipage and approvals status for RNP 4 operations.	**Conduct survey**	**ICAO APAC Office**	**Survey conducted and outputs compiled**	**March 2010**	**On Going** **SL** AP07410 (ATM), 10 May 2010	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/16	**Assistance to States to Implement Electronic Terrain and Obstacle Data (eTOD)**	That, in light of the fact that: a) within the Asia and Pacific region, there is a varying degree of implementation status and readiness for the existing Annex 15, Chapter 10 eTOD Standards and Recommended Practices (SARPs); b) significant cost and institutional issues prevail as impediments to global eTOD implementation; and ICAO consider providing short- and long-term assistance to States in order to build their capacity to provide eTOD in a sustainable and cost efficient manner. *Note: An appropriate form of providing assistance could include establishment of an ICAO Technical Cooperation Project with funding sought from donor agencies.*	**Prepare Issue Form**	**ICAO APAC Office**	**Issue Form transmitted to HQ**	**Dec 2009**	**COMPLETED** Issue Forms transmitted on 21 October 2009	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/17	**SAR Guidance on 121.5 MHz Search Planning**	Recognizing that large populations of aircraft would continue to use 121.5MHz distress beacons after the February 2009 cessation of COSPAS SARSAT Satellite tracking capability, States consider the guidance material *"Search Planning for Audible 121.5 Distress Beacon Alerts"* contained in **Appendix G** to the APANPIRG/20 Report on Agenda Item 3.2 when developing SAR procedures and training documentation.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Feb2010**	**COMPLETED** AP027/10 (ATM), 8 February 2010	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/18	**Provide SAR 121.5 MHz Guidance to ICAO/IMO JWG**	That the Regional Office seek the assistance of the United States in providing a copy of the guidance material *"Search Planning for Audible 121.5 Distress Beacon Alerts"* contained in Appendix G to the APANPIRG/20 Report on Agenda Item 3.2 to the ICAO/IMO Joint Working group on SAR for consideration as an amendment to the *International Aeronautical and Maritime SAR (IAMSAR) Manual.*	**Coordinate with USA**	**ICAO APAC Office**	**Regional Office Letter**	**Feb 2010**	COMPLETED AP-ATM0057, 16 February 2010	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
D 20/19	**ATM/AIS/SAR Task List**	That the ATM/AIS/SAR Sub-Group Task List and attachments contained in Appendix A to the ATM/AIS/SAR/SG/19 Report on Agenda Item 10 be adopted as the current work programme for the ATM/AIS/SAR Sub-Group of APANPIRG.	**Notify ATM/AIS/SAR Sub Group**	**ICAO APAC Office**	**Working Paper to next ATM/AIS/SAR Sub Group meeting**	**June 2010**	CLOSED ATM/AIS/SAR/SG Task List was reviewed by the ATM/AIS/SAR/SG/20 meeting and incorporated the above changes as in **Appendix A** to the Report on Agenda item 10. The meeting did not recognize the need to include any new work item for consideration by APANPIRG.	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/20	**Adopt RVSM Minimum Monitoring Requirements**	That the RVSM Minimum Monitoring Requirements (MMRs) shown in **Appendix B** to the APANPIRG/20 Report on Agenda Item 3.3 be adopted as the MMRs applicable for the Asia/Pacific Region.	**a) Notify States** **b) Include on Regional Office website under "APAC eDocuments"**	**ICAO APAC Office** **ICAO APAC Office**	**State Letter** **Available on website**	**Dec 2009** **Dec 2009**	**COMPLETED** AP014/10 (ATM), 18 January 2010 **COMPLETED**	**Noted**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
D 20/21	**Expand use of safety monitoring data**	That the arrangements for annual month of December traffic sample data by all States to satisfy airspace safety monitoring analysis called for by APANPIRG Conclusion 16/4 be expanded to enable this data to also be available for airspace planning and implementation purposes. This will apply only where such data is not otherwise available to regional or State implementing bodies and only with specific written authority of the ICAO Asia/Pacific Regional Office on each occasion.	**Notify States prior to annual December traffic sample data collection**	**ICAO APAC Office**	**State Letter**	**Nov 2009**	**COMPLETED** AP165/09 (ATM), 11 November 2009	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/22	**Provide Annual Update of RVSM Approvals to RMAs**	That, in addition to the continuous update of RVSM Approvals data called for by Conclusion 19/15 and APANPIRG RMA requirements, States provide an update of RVSM Approvals data in conjunction with the annual December traffic sample data submission required by Conclusion 16/4.	**a) Notify States prior to annual December traffic sample data collection** **b) States provide RVSM Approvals data**	**ICAO APAC Office** **APAC States**	**State Letter** **States provide update of RVSM Approvals status to APANPIRG RMAs as part of December traffic sample data submission**	**Nov 2009** **Jan 2010**	**COMPLETED** State letter issued	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/23	**Adopt RVSM Monitoring Impact Statement**	That the *Asia/Pacific Regional Impact Statement – RVSM Global Long Term Height Monitoring Requirements effective from November 2010*, as shown in **Appendix C** to the APANPIRG/20 report on Agenda Item 3.3, be adopted and circulated as Asia/Pacific regional guidance material.	**a) Notify States** **b) Include on Regional Office website under "APAC eDocuments"**	**ICAO APAC Office** **ICAO APAC Office**	**State Letter** **Available on website**	**Dec 2009** **Dec 2009**	**COMPLETED** AP153/09 (ATM), 2 November 2009 **COMPLETED**	Noted and welcomed the initiative of APANPIRG in preparing an impact statement for RVSM long-term height monitoring requirements.
D 20/24	**En-route Monitoring Agency (EMA)**	That the term En-route Monitoring Agency (EMA) be used to describe an organization providing airspace safety assessment, monitoring and implementation services for international airspace in the Asia/Pacific Region to support implementation and operation of reduced horizontal (lateral and longitudinal) separation.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Dec 2009**	**COMPLETED** AP163/09 (ATM), 10 November 2009	**Noted**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/25	**Adopt En-route Monitoring Agency (EMA) Handbook**	That the *Asia/Pacific En-route Monitoring Agency (EMA) Handbook*, as shown in **Appendix D** to the APANPIRG/20 report on Agenda Item 3.3, be adopted and circulated as Asia/Pacific regional guidance material.	**a) Notify States** **b) Include on Regional Office website under "APAC eDocuments"**	**ICAO APAC Office** **ICAO APAC Office**	**State Letter** **Available on website**	**Dec 2009** **Dec 2009**	**COMPLETED** AP163/09 (ATM), 10 November 2009 **COMPLETED**	**Noted**
D 20/26	**Revision of Subject/Tasks List of ATNICG**	That, the revised Subject/Tasks List of ATNICG provided in **Appendix A** to the Report on Agenda Item 3.4 be adopted.	**Notify ATNICG WG/6 and ATNICG**	**ICAO APAC Office**	**ATNICG informed and paper prepared**	**Sept 2009** **May 2010**	**COMPLETED** ATNICG WG/6 held from 22 to 25 Sept 2009 informed. . ATNICG/7 notified	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/27	**ATN/AMHS Guidance Material**	That, the following guidance materials for ATN/AMHS Implementation be adopted and published. – Version 3.1 of the Asia/Pacific IDRP Routing Policy provided in **Appendix B** to the Report on Agenda Item 3.4**;** – AMHS/ATN Network Management Operational Procedure Guidelines provided in **Appendix C**; – Amended AMHS Conformance Testing (AMHS Manual provided in **Appendix D;** and – Aeronautical Telecommunication Network Security Checklist provided in **Appendix E.**	**Publish on website**	**ICAO APAC Office**	**Published on website. States notified**	**Oct 2009**	**COMPLETED** State Letter dated 12 October 2009 issued	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/28	**Short-term procedure for Global AMHS address Coordination**	That, ICAO request States to register their AMHS addresses with EUROCONTROL AMC through Aeronautical Radio of Thailand (Aerothai) and provide a copy of this information to ICAO Asia/Pacific Office.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Nov 2009**	**COMPLETED** State Letter dated 3 November 2009 issued	
C 20/29	**AMHS Addressing Scheme**	That, a) States be urged to update information in respect of their administrations in the regional AMHS Naming Register; and b) States hosting BBIS hubs be requested to process both the XF and CAAS addressing schemes.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Nov 2009**	**COMPLETED** State Letter dated 3 November issued	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/30	**Revision of FASID Tables CNS-1B, CNS-1C and CNS-1E**	That, FASID Tables CNS-1B, 1C and 1E for ATN Router Plan, AMHS Routing Plan and AIDC Routing Plan be replaced with the revised CNS Tables provided in **Appendices F, G** and **H** respectively to the Report on Agenda Item 3.4.	**Prepare amendment proposal**	**ICAO APAC Office**	**Amendment proposal to HQ**	**March 2010**	**COMPLETED** State letter issued on 26 March 2010	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/31	**State and Operator aircraft information for GOLD**	That, a) States be urged to provide Region & State Information for inclusion in the GOLD Appendix E, by sending the completed forms(s) provided in **Annex 1** to the Report on agenda item 3.4 for their flight information regions (FIRs) or control areas (CTAs) by 30 October 2009; and a) IATA be urged to coordinate with member airlines for providing operator & aircraft information for the GOLD Appendix F by sending completed form(s) as provided in **Annex 2** to the Report on agenda item 3.4 for each variance, clarification, or addition to applicable aircraft type by 30 October 2009.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Sept 2009**	**COMPLETED.** State Letter dated 25 September 2009.	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/32	**Second Satellite Data-link Operational Continuity Meeting**	That, ICAO be invited to organize 2nd Satellite Data-link Operational Continuity Meeting in 2010 for stakeholders to review the developments on the performance and provision of satellite data link communication in the Asia/Pacific Region and develop a solution.	**Coordination and organize SOCM/2 Meeting**	**ICAO APAC Office**	**Meeting conducted**	**Oct 2010**	On Going Postponed to end of 2010 or early 2011 due to FANS SATCOM Improvement Team Meeting (FSIT) had not been reconvened as planned	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/33	**Coordinate Implementation of Reduced Horizontal Separations with CSPs**	That, recognizing the technical limitations in satellite data link communications capability for the provision of ADS-C and CPDLC, States intending to implement reduced horizontal separations based on RNAV 10 and RNP 4 PBN specifications in oceanic and remote area commence early coordination with Communication Service Providers (CSPs) in order to ascertain adequate data link communication/surveillance capability to support the proposed implementation. Outcomes should be recorded in a formal Service Level Agreement (SLA) between implementing States and CSPs, jointly or severally, to ensure that capabilities are available to properly support RCP 240/D specifications contained in Appendices B and C to the GOLD on an ongoing basis.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Jan 2010**	**COMPLETED** State Letter dated 7 January 2010 issued	**Noted**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/34	**Technical Limitations in Satellite Data Link Communications Capability**	That, recognizing current technical limitations in satellite data communications capability that impacts PBN based separation applications particularly for RNAV10 and RNP 4 in the remote and oceanic areas, ICAO be invited to address this issue at global level.	**Prepare Issue Form**	**ICAO APAC Office** **ICAO HQ** ANB/CNS ATB	**Issue Form sent HQ** **Global monitoring**	**Dec 2009** **On going**	**COMPLETED**	Noted Noted and that ICAO will undertake a case study on the ownership and control of the air navigation services infrastructure, including the development of a draft service level agreement for use by air navigation service providers. Furthermore, usage of two or more autonomous networks by States and international organizations will provide much better availability. The Secretariat to monitor further developments.

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/35	**Asia-Pacific Flight Procedure Programme**	That, States be encouraged to participate in the Asia-Pacific Flight Procedure Programme in order to build or improve their instrument flight procedure capabilities, meet the PBN implementation goals of Assembly Resolution A36-23 and enhance flight safety, efficiency and environmental protection.	**Notify States**	**ICAO APAC Office** ICAO HQ ANB/ATM	**State Letter**	**July 2009** **2011**	**COMPLETED** State Letter T6/13.11.2-AP089/09 issued on 29 July 09 & follow-up letters had been issued	Noted Welcomed the imitative and requested the Secretariat to follow it up for with a similar approach for AFI region.
C 20/36	**Preparation for PBN Implementation**	That, States that have not done so, are urged to develop their State PBN Implementation Plans, and take action in accordance with those plans to implement WGS-84 and Electronic Terrain and Obstacle Data in their States.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Nov 2009**	**COMPLETED** State Letter dated 4 November 2009 issued	Noted

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/37	**Guidance material for PBN Implementation**	That, ICAO be invited to develop guidance materials on: a) establishing common implementation rules and technical standards for GNSS reporting and prediction requirements; b) assigning PBN capability to GPS IFR aircraft in the first instance without the need for recertification; and c) PBN-specific aspects of en-route safety assessment.	**Prepare Issue Form**	**ICAO APAC Office** ICAO HQ/ ANB/ATM ICAO HQ/ ANB/ATM	**Issue Form sent HQ** Guidance material for PBN implementation Status report	**Dec 2009** **2011** **June 2010**	**COMPLETED**	Noted To address these PBN issues through appropriate ANC Panel and Study Groups. Requested the Secretariat to provide a status report on global implementation of PBN.
D 20/38	**Regional RAIM prediction System**	That, PBNTF be tasked to examine the feasibility of establishing a regional RAIM prediction system.	**Notify PBNTF**	**ICAO APAC Office**	**PBNTF informed and paper prepared**	**Feb 2010**	**COMPLETED** PBN TF/6 notified about the task through WP/8	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/39	**RNAV Human Factors**	That, RNAV safety message provided in **Appendix J** to the Report on Agenda Item 3.4 be distributed to the States for further distribution to all operators involved in RNAV operations in order to apply the lessons learnt.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Nov 2009**	**Completed** State Letter dated 3 November 2009 issued	
C 20/40	**PBN Implementation Progress Report Template**	That, States be urged to use the PBN Implementation Progress Report Template provided in **Appendix K** to the Report on Agenda Item 3.4 for all future reporting of their status of PBN implementation. The Report should be submitted at each of the future PBN Task Force Meeting.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Jan 2010**	**Completed** A SL had been sent to States on 4 Aug09) urging States to provide progress report using the template. .	
C 20/41	**Asia/Pacific Regional PBN Implementation Plan**	That, the Asia/Pacific Regional PBN Implementation Plan provided in **Appendix L** to the Report on Agenda Item 3.4 be adopted as Version 1.0.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Nov 2009**	**Completed** State Letter dated 4 November 2009 issued	**Noted**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/42	**PBN Safety Assessment Training**	That, ICAO be requested to assist in addressing the PBN safety assessment training needs in the region.	**Prepare Issue Form**	**ICAO APAC Office** ICAO HQ ANB/ATM	**Issue Form sent HQ** PBN safety assessment training needs	**Dec 2009** **2012**	**Completed**	**Noted** To address this performance based navigation issue through appropriate ANC Panels and Study Groups.
C 20/43	**RNP AR Approach Implementation**	That, States be urged to give detailed considerations to the operational need, safety and cost benefits prior to deciding on RNP AR Approach implementation.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Nov 2009**	**Completed** State Letter dated 4 November 2009.	
D 20/44	**PBN Task Force Activities**	That, the PBN Task Force continues with the current TORs for two additional meetings in 2010.	**Notify PBNTF**	**ICAO APAC Office**	**PBNTF informed and paper prepared**	**Feb 2010**	**Completed** PBN TF/6 informed about APANPIRG Conclusion through WP	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/45	**Sharing Information on ICAO Panels/SGs**	That, ICAO be requested to consider sharing information on ICAO Panels and Study Groups activities/outcome regularly with regional planning/implementation groups**.**	**Prepare Issue Form**	**ICAO APAC Office** **ICAO HQ**	**Issue Form sent HQ**	**Dec 2009**	**Completed**	
C 20/46	**Revision of the Strategy for the Provision of Navigation Services in the Asia/Pacific Region**	That, the updated Strategy for the provision of navigation services provided in **Appendix M** to the Report on Agenda Item 3.4 be adopted and published.	**Notify States**	**ICAO APAC Office**	**State Letter Updated Strategy posted on website**	**Nov 2009**	**Completed** State Letter dated 5 November 2009	
D 20/47	**Guidance material for flight inspection/validation of ADS-B ground stations**	That, ADS-B SITF be tasked to study the need for developing guidance material for flight inspection/validation of ADS-B ground stations.	**Notify ADS-B SITF**	**ICAO APAC Office**	**ADS-B SITF informed and paper prepared**	**May 2010**	**Completed** ADS-B SITF/9 will be notified. The meeting held in Aug.10	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/48	**Flight Inspections and Validation of Flight Procedures**	That, ICAO be invited to: a) carry out a study for use of DGPS as a positioning reference system for flight inspection; b) provide guidelines for selecting GP reference point for flight inspection; c) review areas of possible misinterpretations in ICAO Doc 8071 such as the ones shown in **Appendix N** to the Report on Agenda Item 3.4 and provide necessary guidance on the interpretation of the ICAO requirements in order to avoid inconsistency of interpretations and to harmonize application of ICAO Standards and Recommended Practices; d) review information on flight validation as contained in ICAO Doc 8071 Volume II consequent to new Doc 9906 Volume V becoming applicable; and e) develop templates for flight validation reports for PBN IFPs including RNP APCH procedure. A sample template developed by Aerothai for RNP APCH is provided in **Appendix O** to the Report on agenda item 3.4.	**Prepare Issue Form**	**ICAO APAC Office** ICAO HQ/ ANB/ATM	**Issue Form sent HQ** Flight Inspections and Validation of Flight Procedures	**Dec 2009** 2011	**Completed**	**Noted** To address this performance based navigation issue through appropriate ANC Panels and Study Groups.

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/49	**Update of procedures and infrastructure**	That, the States be a) reminded of the contents of State Letter AN 7/5-01/52 dated 11 May 2001 on ILS maintenance procedures; b) reminded to provide updates to information as contained in the eighth edition of the flight inspection catalogue; and c) urged to consider upgrading their FIS to include the flight inspection requirements of GNSS, Interference, ADS-B, Multi-lateration etc. as necessary.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Nov 2009**	**Completed** State Letter dated 5 November 2009.	
D 20/50	**Subject/Tasks List of ADS-B Study and Implementation Task Force**	That, the Subject/Tasks List for ADS-B Study and Implementation Task Force provided in **Appendix P** to the Report on Agenda Item 3.4 be adopted.	**Notify ADS-B SITF**	**ICAO APAC Office**	**ADS-B SITF informed and paper prepared**	**April 2010**	**Completed** ADS-B SITF/9 will be Informed. Meeting held in Aug.10	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/51	**Workshop on ADS-B OUT equipage requirement**	That, ICAO be invited to organize a workshop on ADS-B OUT equipage requirement before May 2010 with the assistance from Australia and USA.	**Organise the workshop**	**ICAO APAC Office, Australia and USA**	**The workshop conducted**	**April 2010**	**Completed** The workshop held in Aug.10	
C 20/52	**Table CNS 4A and Table CNS 4B**	That, the FASID Table CNS 4A and Table CNS 4B be replaced with updated Tables provided in **Appendix Q** and **Appendix R** to the Report on Agenda Item 3.4 in accordance with the established procedure.	**Prepare amendment proposal**	**ICAO APAC Office**	**Amendment proposal to HQ**	**March 2010**	**Completed** SL issued on 29 March 2010	
C 20/53	**Revised Guidelines for Development of ADS-B Implementation Plan by States**	That, the revised guidelines for Development of ADS-B Implementation Plan by States provided in **Appendix S** to the Report on Agenda Item 3.4 be adopted.	**Notify States**	**ICAO APAC Office**	**State Letter Updated Strategy posted on website**	**Nov 2009**	**Completed** State Letter dated 4 November 2009 issued	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/54	**Regional ADS-B Equipage Requirement**	That, States be urged to issue ADS-B authorizations for the interim period 2010-2020 (or until requirements can be harmonized globally) in Non-Radar Areas (NRA) airspace based on: – AMC20-24 certification or – Approval by CASA Australia or – The requirements of the CASA Civil Aviation Order 20.18 Amendment (No. 1) 2009 and Advisory Circular AC21-45 *Note: States that have not yet published regulations should implement necessary regulations that recognize that any one of the above requirements is acceptable and not specify an individual requirement.*	**Notify States**	**ICAO APAC Office**	**State Letter**	**Dec 2009**	**Completed** State Letter dated 18 December 2009 issued	
C 20/55	**Forward Fitment Requirements for SA Aware and FDE functionality**	That, ICAO recommends States concerned to adopt forward fitment requirements which include SA aware and FDE functionality as soon as reasonable.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Dec 2009**	**Completed** State Letter dated 18 December 2009	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/56	**Coordination for SSR MODE S II Codes**	That, a) the Table on SSR Mode S Interrogator Identifier Codes as provided in **Appendix T** on Agenda Item 3.4 to the Report be adopted; and b) States be advised to provide the required information as specified in the Table on SSR Mode S Interrogator Identifier Codes to the ICAO Asia/Pacific Office for coordination and registration.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Jan 2010**	**Completed** State Letter dated 27 October 2009 issued	
C 20/57	**Planning Criteria for SSR Mode S II Code Assignment**	That, the Planning criteria for SSR Mode S II code coordination and assignment as provided in **Appendix U** to the Report on Agenda Item 3.4 be adopted as a provisional guidance material for use in the Asia/Pacific Region.	**Notify States**	**ICAO APAC Office**	**State Letter**	**Jan 2010**	**Completed** State Letter dated 27 October 2009.	**Noted**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/58	**ICAO Position for the World Radio Communication Conference – 2011 (WRC-11) Agenda Items**	That, States be urged to: a) integrate ICAO Position on WRC-11 Agenda Items into their State Position presented to the regional telecommunication forum (APG) involved in the preparation of joint regional position on the Agenda Items; b) include ICAO Position on WRC-11 Agenda Items into the State Position to the extent possible; c) undertake to provide experts from their civil aviation authorities to participate in the development of State and regional positions; and d) ensure to the extent possible, State delegation to regional conferences, ITU Study Groups and WRC should include experts from Civil Aviation authorities.	**Notify States**	**ICAO APAC Office** **States**	**State Letter** Support to ICAO position on WRC agenda through participation in WRC 2011 now postponed January 2012	**October 2009** **Jan 2010**	**Completed** State Letter dated 12 October 2009	Appreciated the ongoing contribution of APANPIRG in addressing this issue in a number of forums and requested the Secretary General to urge States to continue to participate at various levels in different forums to provide support to the ICAO position.

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
D 20/59	**Use of the public Internet to access OPMET data and WAFS forecasts**	That, OPMET data and WAFS forecasts currently distributed through the ISCS, if only used for flight planning, can be considered non-time critical and therefore, can be accessed through the public Internet. *Note: Relevant ICAO guidance will be updated accordingly, subject to consideration of a similar decision by the WAFSOPSG/5 Meeting and subsequent endorsement by ANC.*	**(with regards to the note) – ANC consideration**	**ICAO HQ** ICAO HQ/ ANB/MET /AIM	**Updated guidance material if clarity is needed** **Updated guidance material**	**Nov 2010** **2010**	**Completed** Issue form submitted to HQ Oct2009	Noted Requested the Secretariat to update the guidance in Doc 8896

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/60	**Extension of the ISCS-G2 and the implementation of the WAFS Internet file server (WIFS)**	That, WAFC Washington Provider State advise the ISCS user States about its intentions to: a) continue to work on extending the current ISCS-G2 service through 30 June 2012 to allow users sufficient time for transition to replacement services; and b) provide an operational WAFS Internet File Server (WIFS) by March 2010.	**Inform States of ISCS-G2 cessation date** **Develop WAFS Internet File Server (WIFS)**	**WAFC Washington Provider State/ APAC Office** **WAFC Washington Provider State**	**ISCS website update/ State Letter** **WAFS products available by Internet**	**Dec 2009** **Mar 2010**	**Completed** SL dated 10 May 2010 **Completed** SL dated 10 May 2010	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/61	**Replacement of ISCS-G2**	That, a) the ICAO Regional Office, in coordination with the ISCS Provider State, prepare a survey to be circulated to the ISCS user States and focal points on their intentions as to the future reception of OPMET data and WAFS forecasts, i.e. ISCS-G3 vs. WIFS; *Note 1: the survey would include pros and cons of the two systems, together with the associated cost estimates, to be provided by the ISCS Provider State and seek information about the States' capability to assume these costs in view of establishing possible funding arrangements.* *Note 2: the Secretariat request States to revalidate their respective focal point to further promote coordination between the ISCS Provider State and the user States in the Asia/Pacific Region.* b) after completion of action under a) above by 1 December 2009, the ISCS Provider State inform the ISCS user States concerning their plans for the replacement of the ISCS-G2; and	**Develop and disseminate survey** **Update ISCS focal points** **Inform ISCS user States of ISCS-G2 replacement system plans**	**ISCS Provider State / ICAO APAC office** **ICAO APAC office** **ISCS Provider State / ICAO APAC office**	**Survey results** **Updated ISCS focal point list** **Update ISCS website / State Letter**	**1 Dec 2009** **Nov 2009** **Feb 2010**	**Completed** (SL- dated 22Oct09 **COMPLETED** (SL- 22Oct09) **COMPLETED** SL dated 10 May 2010	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
		Note 3: the ISCS Provider State is expected to indicate its future plans concerning ISCS-G3 and the WIFS c) the WAFSOPSG be invited to consider preparing an amendment to all ICAO regional procedures in the ANP/FASID to render WIFS and SADIS FTP Service as an alternative to the respective satellite broadcasts as the primary means of obtaining WAFS forecasts and OPMET data for flight planning purposes. *Note 4: WAFS user States are responsible for the procurement of the necessary tools to access WAFS forecasts and OPMET data provided by the WAFCs.* *Note 5: The adoption of this Conclusion reinstates the APANPIRG Conclusion 19/45, Transition to ISCS 3rd Generation.*	**Update ANP/FASID**	**ICAO HQ (through WAFSOPSG)**	**Amendment Proposal to ANP/FASID (if deemed necessary by WAFSOPSG/5)**	**Jan 2010**	**COMPLETED** FASID approved 22 Jan 2010 {APAC 09/23 – MET:AP016/10 (MET)} ANP approved 18 Mar 2010 {APAC 09/22 – MET:AP047/10 (MET)}	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/62	**Harmonization of procedures for OPMET data issuance**	That, ICAO Regional Office be invited to a) Include examples of correct methods of issuing OPMET data for inclusion in the ROBEX Handbook; b) After completion of a) above request States in the Asia/Pacific Region to implement these methods as a matter of priority; and c) Consult the RODBs to monitor the progress of OPMET data issuance in compliance with the Regional Air Navigation Plan for reporting at the OPMET/M TF/8 Meeting.	**Update ROBEX Handbook** **Inform States** **RODB monitoring of OPMET compiling/filing times**	**ICAO APAC Office** **ICAO APAC Office** **RODBs / ICAO APAC Office**	**Updated ROBEX Handbook** **State Letter** **Inclusion of monitoring results in OPMET/M TF/8 Report**	**Oct 2009** **Oct 2009** **Apr 2010**	**COMPLETED** **COMPLETED** SL dated 28 Sep 2009 **COMPLETED** (reinstated in CNS/MET SG/14 draft Conclusion 14/33)	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/63	**Improvement of OPMET data availability for AOP aerodromes**	That, after the next round of harmonization of OPMET data between SADIS and ISCS Provider States, a) IATA be invited to monitor the availability of OPMET data for AOP aerodromes; and b) ICAO Regional Office, based on the results of the monitoring in a) above, remind States concerned of unavailability of OPMET data. *Note: the aim will be an availability of 95% of all OPMET data (METAR and TAF) from AOP aerodromes on SADIS and ISCS.*	**SADIS/ISCS harmonization** **IATA OPMET monitoring** **Inform States**	**ISCS and SADIS Provider States/ ICAO APAC Office** **IATA** **ICAO APAC Office**	**ISCS/SADIS OPMET harmonization** **Table of AOP aerodromes not available on SADIS** **State Letter**	**Oct 2009** **Dec 2009** **Jan 2010**	**Completed** (reinstated SADISOPSG/15 C15/9) **Completed** (reported to OPMET/M TF and CNS/MET SG meetings) **Completed** (reinstated in CNS/MET SG/14 draft Conclusion 14/33)	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/64	**Improvement of OPMET data availability for non-AOP aerodromes**	That, after the next round of harmonization of OPMET data between SADIS and ISCS Provider States, a) IATA be invited to monitor the availability of OPMET data for non-AOP aerodromes; and b) ICAO Regional Office, based on the results of the monitoring in a) above, approach States concerned to confirm their agreement to continue providing OPMET data *Note: the aim will be an availability of 90% of all OPMET data (METAR and TAF) from non-AOP aerodromes on SADIS and ISCS.*	**SADIS/ISCS harmonization** **IATA OPMET monitoring** **Inform States**	**ISCS and SADIS Provider States/ ICAO APAC Office** **IATA** **ICAO APAC office**	**ISCS/SADIS OPMET harmonization** **Table of AOP aerodromes not available on SADIS** **State Letter**	**Oct 2009** **Dec 2009** **Jan 2010**	**Completed** (reinstated SADISOPSG/15 C15/9) **Completed** (reported to OPMET/M TF and CNS/MET SG meetings) **Completed** (reinstated in CNS/MET SG/14 draft Conclusion 14/33)	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/65	**Replace FASID Tables MET 4A and 4B by the ROBEX Handbook**	That, the FASID Tables MET 4A and 4B be replaced with the ROBEX Handbook when referencing the ROBEX Scheme in the Basic ANP and FASID in accordance to **Appendices V** and **W** to the APANPIRG/20 Report on Agenda Item 3.4. Subsequently, FASID Tables MET 4A and 4B will be removed from the FASID.	**Update ANP/FASID**	**ICAO APAC Office**	**Amendment Proposal to ANP/FASID**	**Dec 2009**	**COMPLETED** FASID approved 22 Jan 2010 {APAC 09/23 – MET:AP016/10 (MET)} ANP approved 18 Mar 2010 {APAC 09/22 – MET:AP047/10 (MET)}	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/66	**Replace FASID Table MET 4C by the Asia/Pacific regional OPMET data banks interface control document**	That, the FASID Tables MET 4C be replaced with the Asia/Pacific regional OPMET data banks interface control document when referencing the responsibilities of the ASIA/PAC OPMET data banks for collection and dissemination of OPMET bulletins to support the ROBEX Scheme in the Basic ANP and FASID in accordance to **Appendices V** and **W** to the APANPIRG/20 Report on Agenda Item 3.4. Subsequently, FASID Table MET 4C will be removed from the FASID.	**Update ANP/FASID**	**ICAO APAC Office**	**Amendment Proposal to ANP/FASID**	**Dec 2009**	**COMPLETED** FASID approved 22 Jan 2010 {APAC 09/23 – MET:AP016/10 (MET)} ANP approved 18 Mar 2010 {APAC 09/22 – MET:AP047/10 (MET)}	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/67	**Cost Recovery by Volcano Observatories**	That, the ICAO CNS/MET Sub-group VA/TC Implementation Task Force, in coordination with the VAAC Provider States and the ICAO Secretariat, be invited to investigate examples of agreements between State volcanic observatories and the civil aviation authorities that may be used by other States in considering the recovery of the cost in accordance with ICAO provisions.	**Investigate cost recovery examples by volcanic observatories**	**VA/TC I TF/ VAACs/ ICAO HQ (IAVWOP SG)/ ICAO APAC Office**	**State Letter**	**June 2010**	**COMPLETED** (SL-T4/9.1.1:AP058/10 (MET) sent 29Mar2010	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/68	**Expanded WV SIGMET Test Development**	That, a) Japan be invited to further develop an expanded WV SIGMET Test utilizing automated templates in consultation with the Darwin VAAC; and b) upon completion of a) above, Japan conducts the expanded WV SIGMET Test and produce an analysis to the OPMET/M TF/8 meeting for further review and subsequent reporting to the CNS/MET SG/14 meeting to determine the next phase of the test.	**Develop WV expansion SIGMET test** **Conduct and report on trial test**	**Japan/ VAAC Darwin** **Japan**	**Updated WV expansion SIGMET Test** **Test results included in OPMET/M TF/8 and CNS/MET SG/14 reports**	**Apr 2010** **Apr 2010 Jul 2010**	**ON GOING Trial test expected in later half of 2010**	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/69	**Implementation of SIGMET on Radioactive Clouds and Aerodrome Warnings on Tsunami**	That, in view of clarifying existing Annex 3 provisions, a) the IAVWOPSG consider developing Annex 3 provisions and guidance material, as necessary, related to the issuance of SIGMET on radioactive clouds; and b) ICAO considers developing Annex 3 provisions and guidance material as necessary related to the issuance of aerodrome warnings on Tsunami.	**Proposals to develop provisions and guidance material on radioactive cloud SIGMET and Tsunami aerodrome warnings**	**ICAO HQ** ICAO HQ ANB/MET /AIM	**Amendment criteria to be included in Am. 76 or 77 to Annex 3, as necessary; guidance** Annex 3 provisions and guidance material as necessary related to the issuance of aerodrome warnings on tsunami.	**2013 or 2016**	**COMPLETED** **ISSUE Form submitted to HQ** IAVWOPSG/5 C5/24 development of guidance on issuance of SIGMET for accidental release of radioactive material into the atmosphere (for inclusion in Doc 9691 to report back to IAVWOPSG/6) Tsunami aerodrome warnings to likely be discussed at METWSG/3 to Montréal, Nov 2010	Noted Invited the IAVWOPSG to consider the need for developing additional ICAO provisions related to SIGMET on radioactive clouds and requested the Secretariat, with the assistance of the METWSG, to consider the need for developing additional ICAO provisions related to aerodrome warnings on tsunami

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/70	**Training on QMS**	That, WMO, in coordination with ICAO, be invited to organize a seminar/workshop on QMS related to aeronautical meteorological services during the first half of 2010.	**Conduct QMS Seminar/ Workshop**	**WMO/ ICAO HQ/APAC Office** ICAO HQ ANB/MET /AIM	**Seminar/ Workshop** **Harmonized QMS**	**June 2010** **TBD**	**On Going** (WMO in coordination with the Finnish Meteorological Institute conducted workshop in Tonga in July 2010 – 15 States attended) (follow-up mock audit for Niue, Cook Is, and Fiji and another 3 day wk shop in Fiji expected – **update**)	Requested the Secretariat to invite WMO to conduct, in coordination with ICAO, a seminar/ Workshop on QMS. Requested the Secretariat to harmonize QMS methodology for all fields of air navigation systems.

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
D 20/71	**Updated Terms of Reference and Subject/Tasks List of the CNS/MET Sub-group**	That, the revised Terms of Reference and Subject/Tasks List of the CNS/MET Sub-group provided in **Appendices Y** and **Z** to the Report be adopted.	**Notify CNS/MET SG**	**ICAO APAC Office**	**CNS/MET SG informed and paper prepared**	**July 2010**	COMPLETED	
C 20/72	**Ionospheric Data Collection – Focal Point of Contact**	That, the States be urged to: a) cooperate with each other to collect data and characterize ionosphere model in the APAC region that will lead to smooth introduction of GNSS in ASIA/PAC Region; and b) provide the name and contact details of the Focal Point of Contact to ICAO Regional Office for coordinating collection and exchange of ionospheric data with the ultimate objective of establishing a standard ionospheric model for the region.	**Notify States**	**ICAO APAC Office**	**State Letter**	**January 2010**	**COMPLETED**	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/73	**Adopt GOLD to replace FOM**	That, upon release of the Global Operational Data Link Document (GOLD) by the Ad-Hoc GOLD Working Group in first quarter 2010, the FANS-1/A Operations Manual (FOM) be withdrawn and replaced by the GOLD as Asia/Pacific regional guidance material for use by States and airspace users as the basis for operating Automatic Dependent Surveillance – Contract (ADS-C) and Controller Pilot Data Link Communications (CPDLC), in conjunction with *Annex 10 – Aeronautical Telecommunications Volume II – Communications Procedures including those with PANS status* and the *Procedures for Air Navigation Services – Air Traffic Management (PANS–ATM Doc 4444).*	**Notify States**	**ICAO APAC Office**	**Upon release of the GOLD by the AD-Hoc GOLD Working Group, transmit State Letter**	**First quarter 2010**	**Completed** (SL - dated 28 June 2010)	**Noted**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/74	**Removal of the APANPIRG Air Navigation Deficiency AP-MET-15**	That, the air navigation deficiency AP-MET-15 be removed from the APANPIRG air navigation deficiencies list.	**Update list of APANPIRG air navigation deficiencies**	**ICAO APAC Office**	**Updated list of APANPIRG air navigation deficiencies**	**Dec 2009**	**COMPLETED**	
C 20/75	**MET deficiencies to be added to the APANPIRG list of Air Navigation Deficiencies**	That, the list of proposed air navigation deficiencies in **Appendix F** to the APANPIRG/20 Report on Agenda item 4, obtained by the ICAO TCB CAEMSA-SP reports be added to the list of APANPIRG air navigation deficiencies list tagged with the U status.	**Update list of APANPIRG air navigation deficiencies**	**APAC Office**	**Updated list of APANPIRG air navigation deficiencies**	**Dec 2009**	**COMPLETED**	

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status as of 31 August 2010	ANC action
C 20/76	**Continuation of CAEMSA-SP**	That, the DGCA/46 conference considers funding and resources be allotted by donor States, WMO, and ICAO for the continuation of the CAEMSA-SP in order to meet international requirements in the provision of meteorological services which would achieve the necessary safety and efficiency levels for airlines operating in the South Pacific.	**Provide necessary means for the continuation of CAEMSA-SP**	**DGCA Conference**	**Continuation of CAEMSA-SP**	**Oct 2009**	**COMPLETED** through DGCA action item 46/11 – Technical Cooperation) Also planning for Phase II workshop in second half of 2010	Noted and requested the Secretary General to urge States to develop and implement an action plan for each deficiency and to provide information to the Bangkok Regional Office.

*** Note:** ICAO has established the following Strategic Objectives for the period 2005-2010:

A: Safety - *Enhance global civil aviation safety*; **B: Security** - *Enhance global civil aviation security*; **C: Environmental Protection** - *Minimize the adverse effect of global civil aviation on the environment*; **D: Efficiency** - *Enhance the efficiency of aviation operations*; **E: Continuity** - *Maintain the continuity of aviation operations;* **F: Rule of Law** - *Strengthen law governing international civil aviation.*

1.3 Review of Status of Implementation of APANPIRG Outstanding Conclusions and Decisions

1.3.1 The meeting reviewed the progress made on the APANPIRG Outstanding Conclusions and Decisions up to its eighteenth meeting.

1.3.2 The actions taken by States and the Secretariat on the above mentioned Conclusions and Decisions were reviewed and the updated list is provided in **Appendix A** to the Report on Agenda Item 1.3.

1.3.3 The meeting noted that out of the 8 outstanding items, the follow-up actions on the 7 Conclusions have been completed/closed and action on 1 conclusion is ongoing. The meeting acknowledged that significant progress had been made in completing required action on the Outstanding APANPIRG Conclusions and Decisions.

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Status of Outstanding Conclusions/Decisions – Action Plan

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 18/23 **D**	**Discontinuation of Asia/Pacific Regional Plan for New CNS/ATM Systems**	That a) in order to harmonize planning process with the Global Air Navigation Plan, Regional Plan for New CNS/ATM Systems be discontinued; and b) ICAO be invited to develop detailed proposals for incorporating the useful information contained in the Regional Plan for the CNS/ATM Systems into the Asia Pacific Regional Air Navigation Plan (Doc 9763) and completed by 2009.	Notify states Establish proposals	ICAO APAC Office ICAO APAC Office	State letter Proposal for the consideration at APANPIRG 20 in September 2009	Oct 2007 2009	COMPLETED. State Letter AP0112/07 (CNS) issued on 16 Oct. 07 CLOSED Task in b) was undertaken in coordination with HQ Some useful information has been transferred to Regional PBN plan. This Conclusion is considered closed. **MET:** consensus between HQ and RO that necessary information is currently provided in Annex 3, Global ANP, and RANP for which the latter is updated routinely based on global groups. This Conclusion is considered close

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 18/53 **D**	**Development of State PBN Implementation Plans**	That, the Regional Office encourages States to begin development of their State PBN implementation plans in harmony with the development of the Asia/Pacific Regional PBN implementation plan being coordinated by the Asia/Pacific PBN Task Force for submission to APANPIRG/19 (2008).	Encourage States to develop State PBN implementation plan by 2009	ICAO APAC Office	State Letter based on regional PBN implementation plan to be developed by PBN task force	2009 Revised 2010	COMPLETED. PBN/TF has developed models for such plans. More than 20 States have submitted their PBN Implementation Plan for review by the PBNTF.
C 18/59 **D**	**Resolution of ATM and OPS Deficiencies in the South West Pacific Small Island Developing States (SIDS)**	That, in recognizing the safety implications of the long-standing ATM and OPS deficiencies in the South-West Pacific SIDS included in the APANPIRG Deficiency Data Base, ICAO, in coordination with the international organizations and regional bodies concerned, considers providing urgent assistance to these States in order to build their capacity to provide the required services in a sustainable and cost-efficient manner	Assist in establishment of TC project	ICAO HQ	TC Project	2008	**CLOSED** As several types of deficiencies are involved TC project is not practicable and suitable. Superseded by new APANPIRG/21 Conclusion

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 19/3 **A D**	**Assistance in South West Pacific Small Island States and Mongolia, Myanmar and Timor Leste in implementing the requirements of aerodrome certification and SMS**	That, in recognizing the importance on the implementation of Annex 14, Volume I provisions related to aerodrome certification and SMS in the South West Pacific Small Island States and Mongolia, Myanmar and Timor-Leste, ICAO considers providing assistance to these States in order to build their capacity to provide the required services in a sustainable and cost efficient manner. [*Note: An appropriate form of providing assistance could include establishment of an ICAO technical cooperation project with funding sought from donor agencies.]*	Assist in establishment of TC Project	ICAO HQ/ICAO APAC Office	appropriate assistance Project	2009/ 2010	**CLOSED** APANPIRG/21 noted that IFFAS grant is approved and TC project Documentation is under Preparation. ANC: Supported for the establishment of ICAO TC Project. .

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 19/18 **A D**	**ATS Message Management Center (AMC) Software**	That, to facilitate implementation and management of ATN in Asia/Pacific Region, ICAO be urged to facilitate transfer of Eurocontrol AMC Software to Aerothai and to allow Aerothai to modify the Software to suit the requirements of Asia/Pacific Region.	Coordinate with parties concerned.	ICAO HQ	MOU signed and AMC software transferred.	May 2009. Revised June 2009.	ANC: Noted that the secretariat is reviewing the feasibility. **CLOSED** ICAO HQ issued State Letter on 19 April 2009 asking all States to use European AMC service for the off-line address management. AMC also provides other guidance to the States and conducted training for users in regions.

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 19/43 **D**	**Training for the new WAFS gridded forecasts**	That, in order to facilitate the implementation by the States of the new WAFS gridded forecasts, a) WAFC Provider States, in coordination with ICAO and WMO, be invited to organize training on the use of the new WAFS gridded forecasts for icing, turbulence and cumulonimbus clouds; and b) WAFSOPSG be invited to consider, in addition to the planned regional training seminars, developing alternative methods for provision of training to the States on the new gridded forecasts for icing, turbulence and cumulonimbus clouds in order to ensure that a maximum number of WAFS users in the States will have access to the training in the most efficient way. *Note: The alternative training methods include computer based training products distributed to States and web-based training.*	a) Organize training b)Develop alternative methods for provision of training to the States on the new gridded forecasts for icing, turbulence and cumulonimbus clouds	ICAO HQ ICAO HQ	conduct training programme Alternative training methods	Dec 2010 Dec 2010	ON GOING Revised target date Dec 2010. ANC action-Noted and invited the Secretary General to invite WAFC provider States in coordination with ICAO and WMO to organize the required training. Web-based training package being developed by WAFCs Provider States in coordination with ICAO and WMO to be reviewed at WAFSOPSG/6 in first half of 2011

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 19/45 **A D**	**Transition to ISCS 3rd Generation**	That, in view of the plans by the ISCS Provider State to upgrade the ISCS broadcast to a new 3rd Generation service (ISCS 3G) by the end of 2009: a) the ISCS Provider State be urged to provide timely information to the ISCS user States on the planned changes including specifications of the hardware and software changes, transition timeline and expected cost implications for the users if any; and b) the ISCS user States be urged to keep abreast of the planned developments through the established channels of communication with the ISCS Provider State and plan well in advance any resources required for the transition to the ISCS 3G; *Notes:* *1) The ISCS Provider State will use the established network of ISCS focal points as its basis for keeping States informed.* *2) The Secretariat will undertake the task to keep the list of ISCS focal points up-to-date to ensure efficient communication between the ISCS Provider State and the ISCS user States in the ASIA/PAC Region.* *3) All information on the planned transition will be available on: http://www.weather.gov/iscs*	Provide specifications Notify ISCS user States	ISCS provider State ICAO APAC Office	Specification information available State Letter	Mar 2009 Apr 2009	COMPLETED C 19/45 reinstated in C 20/61 which was completed through SL- T4/8.4, T 4/8.4.1: AP073/10 (MET) sent 10 May 2010

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 19/53 **D**	**Convening MET/ATM TF meeting and organizing MET/ATM seminar**	That, a meeting of MET/ATM Task Force be convened in 2009 to review and update the Work Programme of the group and prepare a programme for the second ASIA/PAC MET/ATM Seminar to be held in 2010. *Note: Coordination with the ATM/AIS/SAR Sub-group is essential for the planned meeting of the MET/ATM TF.*	Organize meeting	ICAO APAC Office	Meeting convened	Dec 2009	COMPLETE D (MET/ATM TF/1 Meeting 2-4 Dec 2009) MET/ATM Seminar to be held in Jan 2011

*** Note:** ICAO has established the following Strategic Objectives for the period 2005-2010:
A: Safety - *Enhance global civil aviation safety*; **B: Security** - *Enhance global civil aviation security*; **C: Environmental Protection** - *Minimize the adverse effect of global civil aviation on the environment*; **D: Efficiency** - *Enhance the efficiency of aviation operations*; **E: Continuity** - *Maintain the continuity of aviation operations;* **F: Rule of Law** - *Strengthen law governing international civil aviation.*

AGENDA ITEM 2: GLOBAL AND INTER REGIONAL ACTIVITIES

Agenda Item 2: Global and Inter Regional Activities

2.1 REPORT ON OUTCOMES OF INITIATIVES REGARDING NEXT GENERATION OF AVIATION PROFESSIONALS

2.1.1 The meeting recalled that the next generation of aviation professionals (NGAP) initiatives were launched by ICAO to ensure that enough qualified and competent aviation professionals are available to operate, manage and maintain the future international air transport system. As a follow-up, in May 2009, the NGAP Task Force was created and was instrumental in supporting the preparatory work for the NGAP Symposium conducted at ICAO in March 2010.

2.1.2 The NGAP Task Force held its second meeting on 5 March 2010 to review the outcome of the symposium and established a work programme that will address the enhancement of training for flight crew, air traffic management and aircraft maintenance personnel to meet the demands of new procedures and increasingly complex technologies. The Task Force deliverables include voluntary ICAO endorsement of aviation training institutions by the end of 2010, developing competencies for flight crew in the left seat, check airmen and instructors for large aeroplanes, air traffic controllers and air traffic safety electronics personnel by December 2011 and implementing a communication strategy to reach out to the next generation of aviation professionals. ICAO is also planning to convene the next global symposium on NGAP in 2012. The meeting, noting the global developments in the field of recruitment, education, training and retention of the next generation of aviation professionals, agreed to take these developments into account in defining the regional strategy/work programme.

2.2 TRANSITION TOWARDS AERONAUTICAL INFORMATION MANAGEMENT

2.2.1 The meeting recognized the need for an ICAO strategy to migrate to AIM in a manner that will ensure the availability of aeronautical information to any ATM user in a globally interoperable and fully digital environment. The meeting was apprized the progress made by ICAO in the transition towards AIM by addressing the recommendations resulting from the 2006 Global Aeronautical Information Services (AIS) Congress and through amendments to Annexes 4 and 15 that are designed to progress the global framework required for the implementation of AIM.

2.2.2 The meeting noted that ICAO Council adopted the Amendments to Annexes 4 and 15 that conform with the *Roadmap for the Transition from AIS to AIM* and contribute to a basis for AIM through further provisions for quality management; enabling clauses for the use of digital data exchange; revised provisions related to the automated pre-flight briefing; an improved NOTAM format; amendment to strengthen aeronautical information regulation and control (AIRAC) adherence; and new provisions for the e-AIP. The meeting, noting the global developments in the field of AIM, confirmed the need to take these developments into account in defining the regional work programme.

2.3 CIVIL/MILITARY COOPERATION – IN SUPPORT OF OPTIMUM AIRSPACE USE

2.3.1 The meeting was informed about the outcome and follow-up to the Global Air Traffic Management Forum on Civil/Military Cooperation, held in Montréal from 19 to 21 October 2009. The Forum emphasized that a flexible and efficient use of the airspace for both civil and military operations would provide benefits in terms of more efficient aircraft operations and improvement of the environment. One of the key conditions for increasing the effective use of available airspace,

while maintaining safety and security, was a commitment from both civil and military authorities to improve cooperation and coordination.

2.3.2 The follow-up to the Forum includes the use ICAO as an open forum for civil/military cooperation, collaboration and the sharing of best practices; developing an ICAO manual on civil/military cooperation; work together toward ensuring the safe and efficient integration of unmanned aircraft systems into non-segregated airspace; strengthening States' commitment to enhancing cooperation between civil and military authorities; PIRGs and all partners to collaborate in supporting regional civil/military events; and ICAO to convene a second global forum at an appropriate time to measure progress in civil/military cooperation.

2.3.3 The meeting was pleased to note that for the first time, APANPIRG meeting was being attended by military personnel as part of the delegation of Thailand. In concluding the discussions on this subject, the meeting urged States working with air navigation service providers and their militaries, to take action to establish political will, develop institutional arrangements, set performance objectives, formulate practical and operational measures so to enhance civil/military cooperation in optimizing safe and efficient use of airspace for all users.

2.4 A GLOBAL CNS TECHNOLOGY ROADMAP – A TOOL TO AID INVESTMENT DECISIONS

2.4.1 The meeting recognized that existence of many CNS technologies with similar names yet very different capabilities caused confusion. In addition to this, the operational benefits that can be achieved with the various technologies are not clear. This makes it difficult for States and aircraft operators to make long-term investment decisions. Many roadmaps exist however, they are limited in scope.

2.4.2 The meeting noted that a global CNS roadmap applicable to international aviation as a whole, that informs all States of the prospective capabilities of aircraft and also the implementation programmes of progressive ATS providers is missing. Consequently, the meeting was informed that ICAO proposes the development of a global CNS technology roadmap that will assist States and other stakeholders with their implementation decisions. The benefits of this roadmap would include predictable implementation with early achievement of operational benefits and returns on investment and wide spread deployment, which will ease transition issues.

2.4.3 This web based global CNS roadmap will be an interactive, graphics-based, information tool. This interactive roadmap will address who it applies to, where it applies and what/when/why equipment and capability is required. The development of a global CNS roadmap will require the cooperation of all stakeholders and they will be consulted on a regular basis. It was noted that many ICAO CNS Panels and working groups now enjoy regular participation by industry stakeholders. As a result, updates to the CNS Technology Roadmap will be made a standing agenda item for these ICAO CNS Panels and working group meetings. In discussing this proposal for a CNS roadmap, the meeting emphasized that such a CNS roadmap will need to be driven by ATM requirements rather than technology. The meeting invited States to take this roadmap, scheduled to be available in 2012, into consideration for the regional and national planning and implementation of air navigation systems.

2.5 TACKLING THE GLOBAL ISSUE OF RUNWAY SAFETY

2.5.1 The meeting noted that runway-related accidents and serious incidents continue to be a serious safety concern. While runway incursions (RI) remain a significant problem, runway excursions (RE) are shown to greatly exceed all other occurrence categories in the ICAO Accident/Incident Data Reporting (ADREP) system. The meeting was provided with an update on

ICAO Runway Safety Programme, which was initiated in 2002 with an education and awareness campaign that consisted of a series of seminars in ICAO regions. This was followed in 2005 with the *ICAO Runway Safety Toolkit CD-ROM* and, in 2007, the *Manual on the Prevention of Runway Incursions* (Doc 9870). As the frequency and severity of RE became more apparent through the analysis of ADREP data, it was considered appropriate to address all runway-related safety issues in a comprehensive manner. Therefore, the ICAO Runway Safety Programme has been expanded to cover both RI and RE, as well as other runway-related safety occurrences and activities.

2.5.2 In terms of runway excursion, the meeting noted that ICAO is reviewing Annex 14, Volume I specifications for runway end safety areas (RESA), and it is expected that new and amended SARPs and guidance material will be developed to help States and operators conduct risk assessments in relation to the provision of RESA and other mitigating measures to manage RE. The prevention of RE is also enhanced by provisions for standardized visual aids that provide consistent situational awareness of flight crews and by the advent of performance based navigation (PBN) that provides for better stabilized approaches. ICAO is currently working with IATA, with assistance from other industry partners, toward the development of a joint Runway Excursion Risk Reduction Toolkit which will comprehensively address the fields of aerodrome operations, air traffic management and flight operations. Current solutions to help prevent RI include the use of aerodrome ground radar systems and standardized controller-pilot-driver communications. Standardized operations and communication phraseology are provided for in the PANS-ATM (Doc 4444) and in the *Manual of Radiotelephony* (Doc 9432). In 2004, a definition of RI was introduced into the PANS-ATM to standardize the terminology and collection of data. Also, related to other runway-related safety occurrences and activities, ICAO has introduced new and amended provisions concerning, among others, revised quantities of extinguishing agents and rescue and fire fighting (RFF) during low visibility operations to increase the safety and survivability of passengers and crew in the event of a catastrophic accident. The *Airport Services Manual* (Doc 9137) Part 1, *Rescue and Fire Fighting* provides guidance material in this regard.

2.5.3 As a part of future work programme, the meeting noted that ICAO is planning to organize a global runway safety conference in April 2011, which, in addition to strengthening the implementation of ICAO provisions for the prevention and mitigation of RE, RI and other runway-related occurrences, will assist in the initiation of the regional runway safety summits.

2.5.4 The meeting, noting the global developments on the issue of runway safety, urged States, which has not yet done so, to establish runway safety programme to prevent and mitigate runway related accidents and serious incidents.

2.6 KEEPING STANDARDS RELEVANT

2.6.1 The meeting was informed that an extensive analysis of the NextGen and SESAR programmes was conducted to determine their impact on ICAO Standards, manuals and circulars. Although both programmes are based on the *Global Air Navigation Plan* (GANP, Doc 9750), it was found that the programmes have significant differences; and the programmes will result in a significant number of changes to the Standards. It was noted that each programme contains deliverables termed “operational improvements”. These are supported by various “enablers”. The enablers are technical, operational, procedural or even policy or legal prerequisites, required to achieve the operational improvements. The operational improvements are generally defined at the same level of technical detail that Air Navigation Commission panels deal with. This simplified the task of analysis as it was easier to identify the appropriate bodies to perform the analysis for each particular operational improvement. Both operational improvements and enablers were evaluated to determine if additions to international Standards and Recommended Practices (SARPs), Procedures for Air Navigation Services (PANS) and other documentation were required.

2.6.2 The work identified was divided into two categories: clearly defined document changes; and new concepts that require further development. In total, over 300 changes to ICAO documentation were identified. Of these approximately 170 are in the first category, while over 130 are in the second category. The second category could be grouped into sixteen unique concept areas. Further work on these is needed in order to determine their impact on the standards development activities. For each category, ICAO has initiated the "standards roundtable" process in which ICAO will meet regularly with the management personnel of NextGen and SESAR and the various industry standards-making bodies. In the standards roundtable process, work schedules will be driven by implementation dates. Standards development will be treated like a project and will adopt a multi-disciplinary approach to SARPS development.

2.6.3 The meeting also noted that many other States have developed next generation plans for air navigation modernization. As the number of modernization plans increases, so too does the challenge of ensuring harmonization. ICAO is about to begin the task of ensuring harmonization between NextGen and SESAR and sees benefit in extending this to all new air navigation modernization plans. The benefits of this approach include: the availability of best practices to all; and a reduction in transition problems. ICAO will amend the GANP to include a framework for the definition of other States' air navigation modernization plans requiring them to define the objectives of each air navigation modernization programme in terms of desired operational improvements and define the necessary enablers to support these improvements. States should then submit this information to ICAO for review so that the impact on ICAO's work programme and standards development activities can be determined. The information would then be forwarded by ICAO to the air navigation service providers concerned with appropriate recommendations which may be as follows: for clearly defined needs, engagement in appropriate standards development work; and, if necessary; and a standards roundtable process like that applied to NextGen and SESAR.

2.6.4 The meeting acknowledged the need for ICAO to amend GANP to include a framework which will allow ICAO to easily analyze the impact of other States' air navigation modernization plans on the global ATM system and then take appropriate action needed to ensure global harmonization. Consequently, the meeting adopted the following conclusion:

Conclusion 21/1: States' air navigation modernization plans

That, States developing their national air navigation modernization plans which may have an impact on ICAO SARPs, be urged to share those plans in a timely manner with ICAO for review and assessment, to ensure global compatibility and harmonization.

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AGENDA ITEM 3: REGIONAL AIR NAVIGATION PLANNING AND IMPLEMENTATION ISSUES

Agenda Item 3.0: Regional and National Performance Framework

Agenda Item 3: Regional Air Navigation Planning and Implementation Issues

3.0 Regional and National Performance Framework

3.0.1 PERFORMANCE-BASED GLOBAL AIR NAVIGATION SYSTEM – DEVELOPMENTS IN IMPLEMENTATION

3.0.2 The meeting recalled that, ICAO in 2008 completed the development of relevant guidance material so as to facilitate the realization of a performance-based Global air navigation system. As a follow-up, APANPIRG/19, while adopting a regional performance framework invited States to implement a national performance framework for air navigation systems on the basis of ICAO guidance material and aligned with the regional performance objectives, the regional air navigation plan and the Global ATM Operational Concept.

3.0.3 Following the adoption of performance- based approach to air navigation planning and implementation by APANPIRG, the next step entails performance monitoring through an established measurement strategy. This strategy should provide a set of measures in terms of performance indicators and performance metrics. While APANPIRG is progressively identifying a set of regional performance indicators and metrics, States in the meantime have recognized that data collection, processing, storage and reporting for the identified regional performance metrics are fundamental to the success of performance-based approach. The meeting was informed that in review of APANPIRG/20 report by the Air Navigation Commission, it was noted that it would be useful to have harmonized performance indicators and metrics among the ICAO regions so as to facilitate comparison and coordinated actions for improvements, but however acknowledged that different levels of development in the regions may lead to different indicators and metrics.

3.0.4 In the current practice, all PIRGs review the status of implementation of various conclusions of earlier meetings so as to assess the regional performance in enhancing the air navigation infrastructure. In addition to this, and as a part of air navigation systems performance monitoring and measurement process, the meeting noted that it is proposed to introduce at every PIRG meeting a "regional performance review report (RPRR) for air navigation systems". In order to facilitate a uniform approach, ICAO HQ, in consultation with Regional Offices and PIRGs, will develop by 2011 a standardized format for this RPRR.

3.0.5 On the subject of new concepts, the meeting received information pertaining to the FF-ICE (flight and flow information- Information for a collaborative environment), which is being developed to achieve the vision as outlined in the *Global Air Traffic Management Operational Concept* (Doc 9854).The intent of FF-ICE is to define the information requirements for flow management, flight planning, and trajectory management associated with the operational concept components. Implementation of the FF-ICE concept is envisaged during the timeframe through 2025.

3.0.6 The meeting noting the developments in the implementation of performance-based global air navigation systems, requested those States, which have not done so, to establish a mechanism for data collection, processing and storage and provide the information to the regional office for the identified regional performance metrics.

National Performance Objectives and Performance Framework Forms

3.0.7 India provided information on initiatives taken to implement performance based Air Navigation Planning and Implementation through development of National performance framework leading to a seamless global ATM system. In this regard National Performance Frameworks are being developed in line with the Regional performance objectives as adopted by ICAO APAC regional office and National Performance Framework Form will also be prepared

accordingly. The meeting noted India's initiatives and commitment for harmonized implementation of performance based Global Air traffic management (ATM) system.

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AGENDA ITEM 3.1: AOP

Agenda Item 3: Regional Air Navigation Planning and Implementation Issues

3.1 Aerodrome Operations and Planning (AOP)

3.1.1 Implementation of Annex 14, Volume I Requirements on wildlife strike hazard reduction.

3.1.2 The meeting recognized the importance of wildlife strike hazard reduction at airports and noted that Aerodrome Certification requires certificated airports that have a record of wildlife strikes to conduct a wildlife hazard assessment and develop a wildlife hazard management plan that documents the procedures the airport will implement to control wildlife at or near the airport.

3.1.3 The meeting noted from the ICAO survey on the states practices concerning the implementation of Annex 14, Volume I requirements on wildlife strike hazard reduction that:

- 11 States have informed that a national procedure for recording and reporting wildlife strikes to aircraft as stated in Annex 14, Volume I, Para 9.4.1 a) is in place;

- 10 States have informed that information from aircraft operators, aerodrome personnel and other sources on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations as stated in Annex 14, Volume I, Para 9.4.1 b) is collected. One State informed that as part of certification, aerodromes are required to have a wild life hazard management procedure;

- 11 States have informed that competent personnel for evaluation of the wildlife hazard at their airports as stated in Para 9.4.1 c) is available;

- 11 States have informed that a standardized wildlife reporting format such as the IBIS bird strike reporting format is used. One state has clarified that a standardized format is available for bird strike reporting and is not provided for wildlife reporting;

- 7 States have informed that their State has established a national committee to address wildlife strike and take preventive measures;

- 9 States have informed that their State has established a national policy aimed at reducing wildlife strikes at airports;

- 11 states have informed their State has carried out appropriate wildlife assessment in the vicinity of the airport; and

- 11 States have informed that due consideration is given to aviation safety concerns related to land developments in the vicinity of aerodromes that may attract wildlife.

3.1.4 The meeting urged States who have not participated in the ICAO survey to provide the information to ICAO Regional Office at the earliest possible and adopted the following conclusion.

Conclusion APANPIRG 21/2 - Wildlife hazard reduction

That, States confronting problems of wildlife/bird strike hazard to consider developing and implementing an effective wildlife hazard management plan with procedures to control wildlife at or near airports.

3.1.5 The meeting expressed appreciation for the Department of Civil Aviation Malaysia's gesture to host a seminar from 1 to 3 December 2010 in Malaysia on wildlife control and management and FAA for graciously accepting to provide speakers for the seminar.

Status of implementation of Annex 14, Volume I requirements - Aerodrome Certification and SMS

3.1.6 The meeting noted the updated information on the status of implementation of aerodrome certification and SMS in the APAC region and urged States who are yet to implement aerodrome certification and SMS to allocate high priority and adequate resources. The meeting also noted that the level of implementation of SMS at certified airports is low.

Need for AGA SG to address aerodrome matters

3.1.7 The performance-based approach to planning stems from requirements associated with the results based environment that ICAO, industry and States have been steadily moving toward. The *ICAO Global ATM Operational Concept* (Doc 9854) provides a clear statement of the expectations of the Air Traffic Management (ATM) Community. Eleven of these expectations also referred to as key performance areas (KPAs), have been identified in the operational concept, which envelopes gate to gate operations. Also, Global Plan Initiatives (GPIs) - 13 and 14 calls for action by States to implement relevant tasks to enhance efficiency and safety of aerodrome operations.

3.1.8 In view of above the meeting recognized the importance of addressing aerodrome matters and acknowledged in principle the formation of a contributory body under the framework of APANPIRG to address these issues. Furthermore, APANPIRG/20 invited all States to develop and implement their national performance framework. It is therefore essential that as a part of performance framework, all AGA issues need to be addressed in a cohesive manner. The meeting urged ICAO Regional Office to examine the feasibility for establishing an appropriate entity such as an AOP/SG considering States resources and readiness to support the sub group. The Regional Office will follow up with a State letter requesting States to nominate an expert and suggest topics for consideration in the draft agenda.

Amendment 10 to Annex 14, Volume I-Aerodrome Design and Operations

3.1.9 The meeting noted that Amendment 10 to Annex 14, Volume I has become applicable with effect from 19 November 2009 except for paragraphs 1.5.1, 1.5.2, 1.5.3 and 1.5.4 which will become applicable on 18 November 2010. The Fifth edition (July 2009) of Annex 14, Volume I-*Aerodrome Design and Operations* incorporates all amendments adopted by the Council prior to 5 March 2009 and supersedes on 19 November 2009 all previous editions of Annex 14, Volume I. The meeting urged member States to incorporate the requirements of Amendment 10 to Annex 14, Volume I in their national regulations and ensure its implementation.

Amendment 4 to Annex 14, Volume II- Heliports

3.1.10 The meeting noted that Amendment 4 to Annex 14, Volume II has become applicable with effect from 19 November 2009. The Third edition (July 2009) of Annex 14, Volume II- Heliports, incorporates all amendments adopted by the Council prior to 5 March 2009 and supersedes on 19 November 2009 all previous editions of Annex 14, Volume I. The meeting urged member States to incorporate the requirements of Amendment 4 to Annex 14, Volume II in their national regulations and ensure its implementation.

Development of PANS – Aerodromes

3.1.11 The meeting noted that Annex 14, Volume I is primarily used as a design document and the Standards and Recommended Practices therein were appropriate for designing new aerodromes. As regards existing aerodromes where, due to various constraints, a full compliance with design standards cannot be achieved and alternative measures, operational procedures and operating restrictions are required in order to accommodate specific types of aircraft. A review of the aerodrome design provisions in Annex 14, Volume I would not resolve all of the safety and efficiency challenges facing existing aerodromes worldwide in their day-to-day operations. The Air Navigation Commission at the seventh meeting of its 180th Session on 26 February 2009, reviewed AN-WP/8379 and agreed to the establishment of a study group (PASG) to assist the ICAO Secretariat to progress the task of developing a *Procedures for Air navigation Services- Aerodromes* document to address procedures for aerodrome operational management.

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Agenda Item 3.2: ATM/AIS/SAR

Agenda Item 3: Regional Air Navigation Planning and Implementation Issues

3.2 ATM/AIS/SAR

Report of the 20th Meeting of the ATM/AIS/SAR Sub-Group

3.2.1 The meeting reviewed the outcomes of the 20th meeting of Air Traffic Management/Aeronautical Information Services/Search and Rescue Sub-group (ATM/AIS/SAR/SG/20, July 2010), which was held at the Hotel Pan Pacific in Singapore. ATM/AIS/SAR/SG/20 was attended by 80 participants from 20 States, 2 Special Administrative Regions of China and 3 International Organizations.

3.2.2 ATM/AIS/SAR/SG/20 formulated one draft Decision and nine draft Conclusions for consideration by APANPIRG/21. A copy of the full report of the meeting (239 pages including appendices) is available on the website of ICAO Asia and Pacific Office at http://www.bangkok.icao.int/ under the "Meetings" menu.

Review the APANPIRG/20 Report and Subsequent ANC/Council Actions

3.2.3 With respect to Conclusion 20/8 – Notification of State Transition Date to New Flight Plan Format, it was noted that, regarding the due date of 1 July 2010, only Australia, Hong Kong China and Japan had submitted their scheduled date and implementation methodology to ICAO. ATM/AIS/SAR/SG/20 therefore requested the Secretariat to urge States to submit their plans as soon as possible.

3.2.4 In relation to paragraph 5.6 of the report, the Air Navigation Commission (ANC) noted that Japan had proposed to position APANPIRG as a platform to discuss the future ATM of the Asia/Pacific region and establish a new Sub-Group or a dedicated project under APANPIRG, which, after considerable discussions, decided to refer the subject to the 46th Directors General of Civil Aviation (DGCA) Conference (October 2009, Osaka) for its review. ANC noted that the DGCA Conference agreed (Action item 46/1 of the 46th DGCA Conference refers) to use the existing mechanism of APANPIRG as the starting platform to discuss the issues.

Regional Performance Framework and Metrics

3.2.5 ATM/AIS/SAR/SG/20 noted that the *Manual on Global Performance of the Air Navigation System* (Doc 9883) provides a step-by-step approach to performance-based planning on the basis of the Key Performance Areas (KPAs) identified in the ATM Operational Concept. Recognizing that the work process requires a globally coordinated effort, the aviation community was encouraged to follow a common approach towards development and implementation of a performance-based approach to safety of aviation, and air navigation planning and implementation. It was recalled that APANPIRG/19 (September 2008, Bangkok) in its Conclusion 19/1 adopted the Regional Performance Framework in order to assist States to achieve a performance-based global ATM system through the implementation of air navigation systems and procedures in a progressive, cost-effective and cooperative manner.

3.2.6 The meeting reviewed the Performance Framework Forms (PFFs) updated by ATM/AIS/SAR/SG/20 as in **Appendix A** to the Report on Agenda Item 3.2.

3.2.7 ATM/AIS/SAR/SG/20 recognized that a common set of performance metrics for all regions should be available and States would carry on following the existing four APAC Metrics.

3.2.8 The meeting formulated the following Conclusion:

Conclusion 21/3 – Common Set of Performance Metrics for All the ICAO Regions

That, ICAO be invited to:

a) develop a common set of performance metrics for all the ICAO regions so as to facilitate comparative analysis; and

b) establish the globally harmonised guidance on methodology of how to collect the data in order to achieve commonality.

Air Traffic Management

Report on the Second Meeting of ICAO Flight Plan and ATS Messages Implementation Task Force

3.2.9 ATM/AIS/SAR/SG/20 reviewed outcomes of the Second Meeting of ICAO Flight Plan and ATS Messages Implementation Task Force (FPL&AM/TF/2, November 2009). FPL&AM/TF/2 adopted an Asia/Pacific approach using a phased transition, where air navigation service providers (ANSPs) would implement NEW, followed by users. The transition period was sub-divided as follows:

- **Phase 1** - ANSPs software delivery and internal testing
  1 January to 31 March 2012,
- **Phase 2**– ANSPs external testing and implementation
  1 April to 30 June 2012, and
- **Phase 3** – Airspace users testing and implementation.
  1 July to 15 November 2012

3.2.10 ATM/AIS/SAR/SG/20 noted the phased implementation. It was particularly noted that both the PRESENT and the NEW flight plan formats would be accepted during the Phase 3 from 1 July to 15 November 2012 by ANSPs, and users could file either format. ATM/AIS/SAR/SG/20 adopted Decision SG 20/3 – Phased Approach to Implement the NEW Flight Plan Format.

3.2.11 FPL&AM/TF/2 prepared the draft document titled *Asia/Pacific Guidance Material for the Implementation of Amendment 1 to Procedures for Air Navigation Service – Air Traffic Management, (PANS-ATM, DOC 4444), 15th Edition.*

3.2.12 The meeting reviewed the document and adopted a Conclusion as follows:

Conclusion 21/4 – Regional Guidance Material for the Implementation of Amendment 1 to PANS-ATM

That, in order for States to clearly understand what is intended in Amendment 1, the '*Asia/Pacific Guidance Material for the Implementation of Amendment 1 to the 15th Edition of the Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444)'* provided in **Appendix B** to the APANPIRG/21 Report on Agenda Item 3.2 be adopted and published as regional guidance material.

3.2.13 The meeting noted that the *Interim Regional Strategy for Implementation of the New ICAO Flight Plan Format and Supporting ATS Messages* which had been adopted by APANPIRG/20 was reviewed by ATM/AIS/SAR/SG/20 on the basis of the updated and firm information, and the regional approaches agreed by the Task Force. After the review, the meeting agreed that the Interim Strategy could be a final authorized version and accordingly adopted the following Conclusion:

Conclusion 21/5 – Strategy for Implementation of New Flight Plan Format

That, the '*Strategy for the Implementation of new ICAO Flight Plan Format and Supporting ATS Messages'* provided in **Appendix C** to the APANPIRG/21 Report on Agenda Item 3.2 be adopted and published. States and users to be urged to continue implementation planning based on the strategy.

3.2.14 The meeting noted that the Chairman of ATM/AIS/SAR/SG had expressed the view that implementation of the NEW flight plan format would be a problem if it is not implemented in a uniform manner globally. He had further stated that there would be huge problems if no fall back arrangement was to put in place. It was therefore considered important for States to review urgently the status and readiness for implementation. It was recognized that despite the action taken two years ago by establishing the Task Force, there were still a number of concerns on its implementation. Concern was raised that some States might not be able to meet the target date of implementation. IATA stated that it was not just FPL but also expected huge problems associated with the changes in numerous ATS message formats. It was recognized that it was high time that States came up with strategies and timelines for implementation of the transition plan. In view of the above, the Task Force was expected to make a firm decision in a timely manner. It was emphasized that global harmonized implementation could only be achieved through timely coordination work carried out by ICAO Headquarters.

Flight Plan Implementation Tracking System (FITS)

3.2.15 It was noted that ICAO Flight Plan Implementation Tracking System (FITS) provides information regarding the implementation status of the NEW flight plan format in each State along with guidance and harmonized solutions to any difficulties encountered in the implementation process. It can be accessed at http://www2.icao.int/en/FITS/Pages/home.aspx. A State letter was issued by ICAO Headquarters requesting States to inform the respective ICAO regional office accredited to States of actions completed toward implementation of the PANS-ATM provisions regarding the NEW flight plan content which will ensure current status of FITS in each State. This issue was discussed and some updates were provided.

3.2.16 In view of this, the meeting formulated a Conclusion as follows:

Conclusion 21/6 – Notification of State Transition Date to the NEW Flight Plan Format

That, in order to keep the ICAO Flight Plan Implementation Tracking System (FITS) website updated, States which have not yet provided data, inform the Regional Office of the initial set of data required in the FITS website, such as scheduled date and contact person, by 22 October 2010, and subsequently update the data as required.

Southeast Asia Route Review Task Force (SEA-RR/TF)

3.2.17 The Task Force recognized that crossing routes needed to be accommodated with economically efficient levels. The crossing routes were presently bidirectional and mostly of a shorter distance than the major traffic flows, however, by duplicating each of these routes with a spacing of 60 NM and introducing unidirectional procedures on all of these crossing routes, fewer levels would be required for these aircraft and as a consequence, additional levels could to be transferred to the more densely populated northeast-southwest primary traffic flows. In summary, the following proposals were put to the Task Force:

- unidirectional parallel routes replacing present bi-directional crossing routes;
- distance between these unidirectional routes of 60 NM;
- fewer levels required for crossing routes - less aircraft;
- possibility of some levels being used by primary traffic flow;
- divergence and convergence of routes under radar coverage; and
- consideration in the reduction of longitudinal spacing on all present routes

3.2.18 The Task Force considered that the overall proposal had merit; however, further discussions were needed to fully clarify the benefits to the airlines as well as ATC.

Proposed Changes to the Operational Letter of Agreement between States for the Monitoring of Aircraft Navigation Errors in the South China Sea Area

3.2.19 Singapore informed ATM/AIS/SAR/SG/20 that South East Asia Safety Monitoring Agency (SEASMA) had been set up as the En-route Monitoring Agency (EMA) to provide airspace safety assessment and monitoring services to support the introduction and continued safe use of horizontal-plane separation minima in the South China Sea area. In light of the above, the need to revise the current Operational Letter of Agreement (LOA) was identified to reflect the change in the name of monitoring authority from the Civil Aviation Authority of Singapore (CAAS) to SEASMA. ATM/AIS/SAR/SG/20 requested State representatives to take the LOA back to their States and provide comments to Singapore.

3.2.20 The LOA among States concerned was signed during the meeting.

Volcanic Ash Developments

3.2.21 ATM/AIS/SAR/SG/20 noted that in response to the disruptions to commercial air traffic in Europe and beyond caused by the eruption of Iceland's Eyjafefjallajökull volcano on 14 April 2010, ICAO had established International Volcanic Ash Task Force (IVATF) to develop a global safety risk management framework that would make it possible to determine the safe levels of operation in airspace contaminated by volcanic ash.

Update on the Development of ICAO EUR/NAT Regional Database for the Five-Letter Name-Codes Allocations

3.2.22 ATM/AIS/SAR/SG/20 noted that the duplication issue of Five-Letter Name-Codes (5LNC) was still being reported partly because of the fact that most States were not yet using ICAO 5LNC and Route Designators Database (ICARD) or using either the codes which are not in ICARD or have not reserved codes in ICARD.

3.2.23 The meeting therefore felt the need to overcome this problem by further encouraging those States who had not joined ICARD to join it and formulated the following Conclusion:

Conclusion 21/7 − Use of Global Database for Allocation of Five-Letter Name-Codes in the Asia and Pacific Regions

That, States which have not yet done so be urged to:

a) nominate an ICARD authorized user in order to make use of the ICARD system and improve the process of allocation of Five-Letter Name-Codes (5LNCs);

b) review the list of allocated 5LNCs with respect to each State, identify non-used, duplicate or non-ICAO 5LNCs and take actions to rectify the situations;

c) update the ICARD database by adding missing information, e.g. latitude and longitude coordinates, etc; and

d) take necessary actions to implement the widespread use of the ICARD system.

ICAO Asia and Pacific Seamless ATM Workshop

3.2.24 As a first step toward the Seamless Sky agreed at the DGCA Conference, ATM/AIS/SAR/SG/20 considered it important to extend knowledge about ICAO Global ATM Operational Concept and the future ATM visions such as NextGen (United States), SESAR (Europe) and CARATS (Japan). To achieve this objective, the Federal Aviation Administration (FAA) and Japan Civil Aviation Bureau (JCAB) proposed to hold a workshop on the future air traffic systems in collaboration with ICAO Asia and Pacific Office in early 2011.

3.2.25 The meeting thanked Japan and the United States for taking this important initiative for the region and adopted the following Conclusion:

Conclusion 21/8 − ICAO Asia/Pacific Seamless ATM Workshop

That, ICAO be invited to organize the Asia and Pacific Seamless ATM Workshop to be held in early 2011 inviting the APANPIRG member States and other parties of interest in order to foster discussion and action for the Asia and Pacific States in the planning of the future air traffic management system, considering the overall vision for the region for seamless ATM.

3.2.26 In this regard, the meeting noted that the ICAO Headquarters was not only harmonizing the NextGen and SESAR programmes through round table mechanism but also developing future ATM concepts with the assistance of number of ANC Panels and study Groups.

Air Traffic Flow Management (ATFM) Survey for Asia/Pacific

3.2.27 ATM/AIS/SAR/SG/20 noted that an ATFM survey was conducted in accordance with Conclusion 20/13 of APANPIRG from March to April 2010 based on the ATFM Survey Questionnaire that had been prepared by the ATM/AIS/SAR and the CNS/MET Sub-Groups in order to facilitate the work of the AFTM Steering Group. Replies to the survey were received from Australia, Hong Kong China, Macau China, Fiji, India, Japan, Malaysia, Mongolia, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Thailand and the United States. The meeting noted the result of survey and that the MET aspect of the ATFM was passed on to the MET/ATM Task Force for review.

Global ATS Inter-Facility Data Communications (AIDC) Interface Control Document (ICD)

3.2.28 ATM/AIS/SAR/SG/20 took note of activities carried out by the United States for the development of the global document and appreciated the work carried out. With respect to the approval procedure of the document, it was informed that the same procedure undergone for approval of the *Global Operational Data Link Documents* (GOLD) would be also applicable for the Global ICD. The document, however, was expected to be completed for consideration by APANPIRG in 2011, and the meeting felt that it was too early to formulate a Conclusion. The meeting suggested the United States to submit the document to the CNS/MET Sub-Group meeting to be held in Jakarta from 19 to23 July 2010. The Secretariat informed that the Asia/Pacific AIDC Implementation Seminar would be held in Bangkok on 12 and 13 October 2010, and advised that the forum could be used to seek comments.

Aeronautical Information Services

Fifth Meeting of the AIS-AIM Implementation Task Force

3.2.29 ATM/AIS/SAR/SG/20 noted that the Fifth Meeting of ICAO AIS-AIM Implementation Task Force (AAITF/5) was held on 25 and 26 June 2010. Australia advised AAITF/5 that information on the progress made by AIS-AIM Study Group was valuable and the activities of the group should be followed by AAITF to suitably reflect the progress in the work programme of the Task Force. In this regard, ATM/AIS/SAR/SG/20 adopted Decision SG 20/7 – Monitor the Progress at the AIS-AIM Study Group.

3.2.30 ATM/AIS/SAR/SG/20 noted that States proposed a Draft Decision where AIS and MET could be matched together under ATM/AIS/SAR/SG of APANPIRG. During the discussion on this issue, IATA recalled that APANPIRG had in the past conducted the CNS/MET and the ATM/AIS/SAR Sub-Group meetings concurrently on two occasions at the same venue to foster better coordination. However, due to high workload in the respective fields, the desired result had not been achieved. The meeting was of view that AIS being closely associated with the ATM function, it should not be detached from ATM/AIS/SAR Sub-Group. In the absence of strong justification in supporting of the draft conclusion formulated by the Task Force, the meeting did not support the Draft Decision proposed by the Task Force.

Review of ATS Coordination Group Meetings by ATM/AIS/SAR/SG/20

17th Meeting of Southeast Asia ATS Coordination Group (SEACG/17)

3.2.31 ATM/AIS/SAR/SG/20 recalled that during the discussion on the draft terms of reference (TOR), the 17th Meeting of South-East Asia ATS Coordination Group (SEACG/17, May 2010) also considered the needs to reflect the development of aviation and to harmonize with ICAO terminology, and proposed to revise the title of the group from Southeast Asia ATS Coordination Group to Southeast Asia ATM Coordination Group. ATM/AIS/SAR/SG/20 reviewed and adopted the proposed draft TORs and the title, and reached Decision SG 20/11 − Terms of Reference (TORs) of the South East Asia ATM Coordination Group.

Volcanic Contingency Arrangements

3.2.32 In view of the recent volcanic activity in Europe, IATA considered that there was a need for States in Southeast Asia area to review existing contingency arrangements and consider establishing an effective coordination arrangement amongst States.

3.2.33 In view of this, the meeting formulated the following Decision:

Decision 21/9 − Develop Sub-Regional Volcanic Ash Contingency Plan

That,

a) in view of the recent volcanic activity in Iceland, the CNS/MET Sub-Group be requested to develop sub-regional volcanic ash contingency plans; and

b) urge States to designate appropriate contact points to establish/maintain contacts in the interim period until the sub-regional volcanic ash contingency plans become available.

Review Outcomes of RASMAG/12 by ATM/AIS/SAR/SG/20

3.2.34 ATM/AIS/SAR/SG/20 had a lengthy discussion on the Central Reporting Agency (CRA) arrangement. ATM/AIS/SAR/SG/20 felt that a region-wide safety monitoring arrangement for data link operations with oversight by the Regional Airspace Safety Monitoring Advisory Group (RASMAG) would be preferred.

Review Developments Relating to CNS/ATM Implementation

Review Result of the First Meeting of MET/ATM Task Force

3.2.35 ATM/AIS/SAR/SG/20 noted that it was considered practical to move and maintains the Facilities and Services Implementation Document (FASID) Table ATS 2, HF radiotelephony VOLMET broadcasts from Table ATS 2 to the MET part of FASID. It was also noted that requirements for VOLMET are contained in Annex 3. Historically, this table was maintained by ATS since this was considered as an ATS operational requirement. The proposed change would facilitate timely review and updating of the Table.

3.2.36 In view of the foregoing, the meeting endorsed the following Conclusion, of which draft was also referred to CNS/MET/SG/14:

Conclusion 21/10 − Transfer FASID Table ATS 2 from ATS to MET

That, ICAO considers the transfer of FASID Table ATS 2, HF radiotelephony VOLMET broadcasts, from ATS to MET, which would involve moving the Tables related to VOLMET broadcasts from the ATS part to the MET part of all ANP/FASID, where applicable.

Improvement of the State Letter Consultation Process on Amendment Proposals to SARPS and PANS

3.2.37 ATM/AIS/SAR/SG/20 noted that ICAO issued the State letter Ref.: AN 1/1-10/32 on 29 March 2010 regarding the improvement of State letters as a consultation tool with States and international organizations on amendment proposals to Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS) proposing a re-designed State letter format.

ADS/CPDLC Operational Trial and the Proposed Action Plan for Transition from the Trial to the Operational Implementation in the Ujung Pandang FIR

3.2.38 ATM/AIS/SAR/SG/20 was informed that Indonesia had conducted the ADS/CPDLC operational trial on oceanic ATS routes A461, B462, B583, B472, B473, B584 and R340/R590 in the Ujung Pandang FIR for all aircraft equipped with FANS-1/A from 3 July 2008 to 3 June 2010. During the first year of the trial, some problems were experienced, which were resolved by 2009. However, AIDC test continued. Indonesia has prepared the AIP Supplement on ADS/CPDLC operation in the Ujung Pandang FIR for publication on 29 July 2010 to notify the operation effective from 23 September 2010. The revised Supplementary Letter of Agreement (SLOA) on transfer of ADS/CPDCL between Brisbane ACC and Ujung Pandang ACC was approved and signed on 3 June 2010.

ATM/AIS/SAR Review of the Deficiencies in the Air Navigation Field

3.2.39 The meeting noted that the following information was provided to ATM/AIS/SAR/SG/20 while reviewing the List of Deficiencies,:

a) China informed the meeting of the status of route R216;
b) Indonesia and Singapore would provide an update on W36 at APANPIRG/21;
c) Cook Island had completed the draft of the new AIP.

3.2.40 The meeting noted that ATM/AIS/SAR/SG/20 reviewed and updated the APANPIRG List of Deficiencies based on information provided. It was noted that several States in the Pacific area had not taken firm corrective action to eliminate deficiencies, which had remained in the List for some time. The meeting recognized the need to urge States to take necessary action for implementation and also advise the Regional Office if difficulties are encountered in implementation so that the Regional Office with available resources could assist implementation and formulated a Draft Conclusion (Agenda Item 5 refers).

Update the ATM/AIS/SAR Task List

3.2.41 The meeting was informed that ATM/AIS/SAR/SG/20 reviewed and updated the Sub-Group Task List as in **Appendix D** to the Report on Agenda Item 3.2. While reviewing the List, amendments were made in editorial nature and consequential changes were made such as the words PBN “Concept” and AIS to read AIS/AIM. In addition, Mongolia agreed to notify APANPIRG/21 of their RVSM implementation plan.

3.2.42 The meeting agreed that the Task List suitably reflected the work programme of the Sub-Group and formulated the following Decision:

Decision 20/11 – ATM/AIS/SAR Task List

That the ATM/AIS/SAR Sub-Group Task List and attachments contained in Appendix D to the APANPIRG Report on Agenda Item 3.2 be adopted as the current work programme for the ATM/AIS/SAR Sub-Group of APANPIRG.

Any Other Business

Lack of Adequate Resources in the ATM at the Regional Office

3.2.43 The meeting noted the comment made by ATM/AIS/SAR sub group Chairman on lack of adequate resources in the APAC office ATM section and requested ICAO to resolve this concern on priority.

Seamless ATM Operations in Asia/Pacific Region

Japan

3.2.43 Japan recalled that ICAO Headquarters had taken an initiative to harmonize the air navigation modernization plans of member States in accordance with ICAO Global Air Navigation Plan. From the perspective of the Asia/Pacific region, the future plans of the member States of the Asia/Pacific region should be completely harmonized with ICAO Global Air Navigation Plan, but for this harmonization, the Asia/Pacific region should participate in the global discussion as well as reflect the global discussion to the regional level. In this regard, member States of the Asia/Pacific region need to discuss the future plans for Seamless Sky from their perspective in response to the global discussion of ICAO Headquarters, and such discussion should be facilitated under APANPIRG.

3.2.44 Discussion on seamless ATM of Asia/Pacific Region may require a series of intensive meetings. Because such meetings require resource and time, member States and ICAO Asia and Pacific Office needed to consider the appropriate discussion platform under APANPIRG taking into consideration the available resource and clarifying the demarcation between existing meetings and new one.

3.2.45 Japan noted that APANPIRG currently had three Sub-Groups, namely, ATM/AIS/SAR/SG, CNS/MET/SG and RASMAG. Under the Sub-Groups, several subordinate meetings such as Task Force discuss more detailed issues. Recognizing the role of the existing meetings, Japan suggested three options for consideration.

3.2.46 The first option was to use the existing Sub-Group for the discussion on future ATM. In this case, ATM/AIS/SAR/SG is the appropriate body for this purpose. The second option was to establish a new Sub-Group for the discussion on future ATM system. The third option is to discuss future ATM system on an ad-hoc basis.

IATA

3.2.47 IATA took CARATS, NextGen and SESAR as examples of future ATM modernization projects based on the ICAO ATM Operational Concept, which programs emphasize environmental protection and benefits as key elements of success. At DGCA/46, discussions took place to determine a way forward for the region that would address the seamless sky concept. It was generally agreed that a planning mechanism similar to that in place in Europe (SESAR) and in the US (NextGen) was required to progress initiatives on a Regional basis and in a coordinated fashion.

3.2.48 IATA supported Japan' proposal that APANPIRG be the platform to specifically progress regional interoperability, harmonization and co-ordination of the various current plans and more specialized APANPIRG Sub-Group efforts. IATA proposed to establish the Network Manager (NMAS) who would act on behalf of all Asian States to initially identify capability gaps to a seamless and interoperable Asian sky. A single entity planning and implementation body has proven effective in the NextGen and SESAR programs. While the establishment of an NMAS will take some time, it is important to continue and to start considering regional or sub-regional cooperation of this nature in the short term to ensure we are ready as a region to absorb the future requirements of the ATM system.

Discussion at the Meeting

3.2.49 In response to a query from Japan, ICAO informed that the Regional Office after DGCA 46th Conference had taken up the matter with Hong Kong, China as well as Singapore, and was coordinating with ICAO Headquarters on the Seamless ATM Workshop proposed by Japan and the United States.

3.2.50 With regard to Japan's three proposals, the Chairman of ATM/AIS/SAR/SG was of view that the way it would be addressed should be in a holistic manner taking into account all areas. Singapore supported him.

3.2.51 Hong Kong, China thanked Japan for the initiative. Japan and IATA brought up important issues in regard to the Seamless Skies. Hong Kong, China supported the review of Sub-Group working arrangement.

3.2.52 Japan expressed that the possibly the third option to have an ad-hoc meeting could be the best way forward. Australia supported Japan in the idea of the ad-hoc meeting to find ways to look at present initiatives. Similarly, India and IATA supported the ad-hoc meeting arrangement.

3.2.53 Indonesia was of view that APANPIRG should review the present sub-groups but did not necessarily mean establishing another Sub-Group.

3.2.54 Singapore supported the holistic approach and stated that planning should be for the medium- and long-term. Singapore was of view that the Ad-hoc meeting should be formed and commences to review the issues.

3.2.55 Hong Kong, China reiterated that Sub-Group tasks should be reviewed in the long run. However, in parallel, the ad-hoc meeting should be established to start looking at short-term suggestions. Japan and Thailand supported this idea as well as the Chairman of ATM/AIS/SAR/SG.

3.2.56 The meeting agreed to the proposed ad-hoc meeting arrangement. The Secretariat suggested that the first meeting could be held during or after the Seamless ATM Workshop in February 2011. The Chairman and IATA preferred an early date for the first ad-hoc working group meeting. In view of the foregoing, the meeting formulated the following Conclusion.

Conclusion 21/12 – Convening of the Seamless ATM Ad-Hoc Meeting

That, while recognizing the seamless ATM needs to be addressed in a holistic manner, ICAO Regional Office be invited to organize a seamless ATM Ad Hoc working group meeting as soon as possible.

CANSO Seamless Airspace Guidance Document

3.2.57 CANSO informed the meeting that CANSO was in the process of finalising a Seamless Airspace Guidance Document.

3.2.58 This document would be completed and made available on the CANSO website www.canso.org by the end of 2010 and CANSO hoped that it would provide a useful framework to further its work on the subject of seamless ATM operations for the Region.

3.2.59 The first section of this document sets the foundation for achieving seamless airspace. The ANSP community, as well as all stakeholders, needs to reach consensus on seamless airspace definitions and terms.

3.2.60 The CANSO Seamless Airspace Working Group (SAWG) proposes the following definition for Seamless Airspace: *Seamless airspace is contiguous airspace that is technically and procedurally interoperable, universally safe, and in which all categories of airspace users transition between Flight Information Regions, or other vertical or horizontal boundaries, without requiring a considered action to facilitate that transition and without any noticeable change in: 1) Type or quality of service received, 2) Air navigation and communications performance standards, and 3) Standard practices to be followed.*

3.2.61 It is particularly beneficial to describe a minimum set of seamless airspace requirements. Globally, there is a wide variation among CANSO members with regard to levels of traffic density, traffic complexity, and ATM infrastructure. A single global solution should not be imposed on all service providers. Therefore, the SAWG developed a minimum set of requirements for those with lesser needs. This minimum set of seamless airspace requirements is important because seamless airspace can only be realised if all parties adopt a standardised minimum level of interaction.

3.2.62 Finally, information gathered from surveys and case studies by CANSO highlighted specific high-priority areas for improving seamless airspace. In the near term, efforts should be concentrated on phraseology, consistency in procedures, and common measurement units, i.e. metric system. Longer term efforts must be focused on automation alignment. In particular, information exchange/data transfer and avionics standards, so that one avionics works across FIRs.

3.2.63 Specifically the following from the Guidance Document were worth noting:

a) Operations in a seamless airspace must be performance-driven.

b) The individual levels of ATM sophistication provided will be different throughout the world as each instance will be determined by the performance requirements of ANSPs and all airspace users at every boundary and system interface. However the strategic aim of achieving a harmonised seamless airspace can only be realised if all parties adopt a standardised minimum level of interaction supported by a set of clearly defined requirements.

3.2.64 CANSO informed the meeting that they would hold the ATM Operations Best Practices Seminar on 11-12 November 2010 where they planned to have a panel discussion involving Asia/Pacific ANSPs and various stakeholders on the subject of Seamless Sky in the region.

ICAO New Flight Plan Format Issue

Japan and the Republic of Korea

3.2.65 Japan advised that problem would happen if some States or some airspace users do not comply with NEW flight plan format. The transition should be done in a coordinated manner targeting the applicability date. ICAO has established the guidance material for smooth transition, and urged the contracting States to transit to the NEW.

3.2.66 If the implementation status is different by States or regions, it would be a significant problem to the operation of air traffic service, especially, if the adjacent States use different flight plan format. The consequences could be that the stability of air traffic service could not be secured.

3.2.67 The meeting was strongly urged that all States should commit to apply the NEW flight plan format by 15 November 2012.

3.2.68 States not notifying their schedule date and implementation methodology should notify to ICAO Bangkok office as early as possible.

3.2.69 Further, Japan was of view that each State needed to know the transition plan of adjacent States in order to start the coordination earlier.

3.2.70 If the case more than three FIRs are close, trilateral coordination would be needed.

3.2.71 The meeting agreed that Contracting States should start close coordination as early as possible with adjacent States based on the transition plan that was notified by each State.

3.2.72 The meeting thanked Japan for the working papers. The meeting agreed that it is important that coordination between States/FIRs should start as soon as possible to ensure a smooth transition. The meeting adopted the following Conclusion:

Conclusion 21/13 - Coordination for the Transition to the NEW Flight Plan Format among States

That, as the global and the regional harmonization is crucial in implementing the NEW flight plan format by 15 November 2012, States start close coordination soon with adjacent States/FIRs on transition about, but not limited to:

i) difference of timing for transition between the States/FIRs;

ii) operations in the mixed environment of PRESENT and NEW;

iii) operational transition for AIDC; and

iv) procedures when ATS messages are not processed properly.

Review of the Third Meeting of the FPL&AM Implementation Task Force

3.2.73 The meeting reviewed the outcomes of FPL&AM/TF/3 (August 2010, Bangkok).

Items of Interest from other Regional Task Forces Implementing Amendment 1 to PANS-ATM, Doc 4444, 15th Edition

3.2.74 United States informed FPL&AM/TF/3 that a number of ICAO regions had established TF to develop transition plans. The coordination between them would substantially ease

the transition for global users of aviation. A summary of conclusions and concerns from regional TF meetings was presented.

Differences between Asia/Pacific Guidance Material, and the FAA and EUROCONTROL Coding Guidance

3.2.75 Further, FPL&AM/TF/3 was informed that the United States noted a few specific differences between the draft Asia/Pacific guidance, and the FAA's guidance and EUROCONTROL's latest directive in the areas of PBN/ consistency checking and determining whether a flight plan is NEW or PRESENT.

3.2.76 In developing transition plans, EUROCONTROL in particular encountered difficulty in establishing filing practices within the Amendment 1 constraints that meet the requirements and permit filing of all required information in a way that is adequately detectable by automation. They therefore will use at least one non-standard indicator, "EUR/." This is at odds with the draft Asia/Pacific Guidance Material which states "*Systems should not accept indicators in Item 18 which are not defined in the PANS-ATM."* Australia wondered why the RMK/element wasn't used for this purpose.

Status of the FAA Transition Activities for the Implementation of Amendment 1 to Doc 4444, 15th Edition

3.2.77 United States recalled that FPL&AM/TF/2 agreed to a draft Regional Strategy for the Implementation, and provided an update and status on U.S. progress towards the schedule identified in the strategy.

3.2.78 FAA had adopted the Asia/Pacific transition strategy agreed to during FPL&AM/TF2. The following sections describe FAA plans and status relative to each phase.

Phase 1 (1 January to 31 March 2012) – Air Navigation Service Providers (ANSPs) Software Delivery and Internal Testing

3.2.79 Ocean21 (O21) – O21 is the primary oceanic air traffic automation system for the United States and is used in oceanic airspace at Anchorage, New York and Oakland Centers. Engineering changes for O21 are being coded now for delivery during 2011.

Phase 2 (1 April to 30 June 2012) – ANSPs External Testing and Implementation

3.2.80 The FAA's plan is to test between offline development systems before testing using operational systems. Initially, operational testing will be done using off-line operational systems followed by testing with live systems during periods of low traffic volume.

Phase 3 (1 July to 15 November 2012) – Airspace Users Testing and Implementation

3.2.81 The final phase will involve education, off-line testing, and live testing with airspace users and flight plan filing services.

Airspace User Testing

3.2.82 Prior to testing with live FAA systems, users will be provided the opportunity to submit Filed Flight Plans (FPL) and changes in NEW format to an off-line system for testing. This testing will be scheduled on a per-user basis and spread over the available time period.

3.2.83 FAA is investigating the possibility of developing a website that would enable users to check the format of test NEW FPLs against the Amendment 1 rules prior to any testing with actual systems. Upon successful completion of offline testing, approved users will be given the opportunity to file NEW format FPLs with operational systems during prescribed times at a limited number of sites. IATA reaffirmed their offer from previous meetings that their members were willing test partners and would support States where they can.

Clarification of the Difference between AFTN Message Routing and the Data Handled by Automated ATM Systems

3.2.84 Japan advised FPL&AM/TF/3 that it was important to clearly understand that flow of AFTN messages and process of the data that is handled by automated ATM systems such as the Flight Data Processing (FDP) or the ATS Inter-Facility Data Communication (AIDC) are different.

Hong Kong, China

3.2.85 As for other regions, there is no deadline published by ICAO for contracting States to notify their implementation date. It could therefore be at a very late stage when certain States declare non-compliance affecting a smooth global transition. Nevertheless, it is encouraging to learn that an "ICAO New Flight Plan Format Study Group" has been established in the Middle East region and the first meeting was held in Cairo, Egypt in February 2010.

3.2.86 In addition to the readiness of ANSPs, Hong Kong, China has concerns over a view that airlines would file PRESENT flight plans until the last day of the transition period. The subsequent switching over to NEW flight plan format on the same day by all airlines with insufficient testing may pose a high risk of serious and widespread coordination problem on that day. This problem might induce interruption of flight data availability to ATC, with airline operators eventually suffering from long ground delay.

3.2.87 Hong Kong, China would have no problem in meeting the target dates of the phased transition plan adopted by the FPL&AM Task Force with a tentative transition date on 30 June 2012.

New Zealand

3.2.88 New Zealand reported that Airways was aiming to have all software changes completed by the 17 November 2011 AIRAC allowing the New Zealand implementation to occur in the three phases.

Converted Flight Plan and AIDC

3.2.89 Japan informed the meeting that some States handled AIDC messages through AFTN as other ATS messages. On the other hand, some States such as Japan handled AIDC as a kind of ATC boundary information transfers through the dedicated leased lines, besides other ATS messages are handled through AFTN.

3.2.90 If a flight goes through three FIRs and only the second FIR has not yet commenced accepting NEW, it might be possible that the third FIR has a NEW flight plan format through AFTN and a PRESENT flight plan format (CPL) through AIDC at the same time. Concerning legitimacy, it may be a probable opinion that both of flight plans from AFTN and AIDC are equally legitimate even if some differences are existed. Another idea might be that the FPL messages which are obtained through AFTN should be always legitimate because AIDC messages could be converted. Or it might be possible that NEW FPL should be legitimate whenever a State has a NEW FPL and a PRESENT FPL for a single flight at the same time.

Comments on Draft Asia/Pacific Guidance Material

3.2.91 Japan presented comments to the draft Asia/Pacific Guidance Material. Particularly, the meeting noted that by adopting this, "S" would mean "VOL" in both PRESENT and NEW after 1 April 2012.

AIDC Messages Change Considerations

3.2.92 Australia, New Zealand and the United States informed FPL&AM/TF/3 that the ICD included the fields by reference to the PANS-ATM, so while there will be a minimal change to the ICD in this area, there were potentially significant impacts to the interfaces.

3.2.93 A PAC message, being preactivation before a flight is airborne, may require linking to a flight plan with a DOF element. Another possible exception is when an ABI is received before or when no DEP message has activated the Flight Plan.

3.2.94 It is important that the ANSPs involved in each interface coordinate a plan for testing the interface, and for operations in the Phase 3 when some filers can be potentially filing NEW and others PRESENT. It is possible to design systems to maintain operational messages in PRESENT format regardless of what format was filed, or to transmit AIDC messages using the format in which the flight plan was received. Presence of both NEW and PRESENT flight data on each interface also implies that the receiving system will be able to recognize which format a flight plan is in.

India

3.2.95 India took for example a flight being delayed and a new EOBT being 0100 UTC on next day, e.g. 18 August 2010. As per recommendations of ICAO HQ change (CHG) message is to be originated as the flight is delayed over midnight.

3.2.96 Suppose the flight is further delayed and new EOBT is 0230. Since the flight is not delayed over midnight a delay (DLA) message is to be generated. Doubt exists in this case about DOF to be used in the delay message: DOF/100817 or DOF/100818.

3.2.97 For unique identification of a flight, DOF of the original flight plan (i.e., DOF/100817) should be used in ATS messages. But the system would change the DOF of AIC555 on receipt of CHG message and the delay message will be rejected.

Singapore

3.2.98 Singapore reported that identical FPLs were received from different sources - besides receiving FPL from the ATS Reporting Office, identical FPL was also received directly from the airline operator (AO). Additionally, States with automatic flight plan management systems are also sending out RPLs as FPLs based on the filed EOBT. These not only load the communication channels used between the ATS units but also raised the question of which is the acceptable or approved source for FPL.

3.2.99 IATA contributed to a discussion regarding multiple flight plan submission and pointed out that many operators had to either auto file or file manually depending on individual State requirements.

Thales Update

3.2.100 Based on the advice from Thales that software supporting Amendment 1 changes could be integrated into Thales systems and be disabled until the correct implementation date, FPL&AM/TF/3 accepted the recommendation from Australia that there be no restriction for an earlier software delivery than proscribed in the Phase 1 of the regional transition strategy.

Regional Guidance Material for the Implementation of the NEW flight Plan Format

3.2.101 The meeting was informed that FPL&AM/TF/2 discussed the complexity of the matters at hand, noting that a standardised interpretation of Amendment 1 to PANS-ATM was absolutely critical to a successful implementation. It was evident that a number of different interpretations were already being made by States. A number of other issues had developed that would require interpretation/decision by the Task Force, and it was likely that this would continue to be the case as more States commenced implementation activities and sought to more clearly understand what was intended by Amendment 1. FPL&AM/TF/2 agreed that codification of all this information into a suitable regional guidance material would be very beneficial in facilitating a common understanding of issues across the region.

3.2.102 In order to record the approaches, interpretations and resolutions agreed by the Task Force for use as Asia/Pacific guidance material, FPL&AM/TF/2 commenced work on a repository of coding guidelines and associated material for application in affected automation systems. A draft document titled *Asia/Pacific Guidance Material for the Implementation of Amendment 1 to Procedures for Air Navigation Service – Air Traffic Management, (PANS-ATM, DOC 4444), 15th Edition,* was prepared as in **Appendix B** to the Report on Agenda Item 3.2.

Australia

3.2.103 Australia recalled that the current ICAO model flight plan form was universally adopted and implemented by States. PRESENT was defined as the present flight planning and ATS message formats as defined in the current version of the PANS-ATM. NEW is defined as the flight planning and ATS message formats as specified in Amendment 1 to the PANS-ATM.

3.2.104 State letter AN 13/2.1-09/9 dated 6 February 2009 - Guidance for implementation of flight plan information to support Amendment 1 of the P*rocedures for Air Navigation Services — Air Traffic Management,* Fifteenth Edition (PANS-ATM, DOC 4444) advised States that the flight plan changes had considerable consequences on ANSP flight data processing systems that check and accept flight plans and related messages, use flight plan data in displays for controller reference, use data in ANSP automation and which support communication between ANSPs as the flight progresses. Preparation for the changes should therefore be made well in advance of the applicable date. The changes also have consequences for airspace users. If a flight plan with new content is sent to an ANSP that has not prepared to accept the new content then it is likely that some information will be lost, misinterpreted or cause a rejection of the flight plan.

3.2.105 Additionally, State Letter AN 13/2.1-09/9 states that "to allow performance case considerations to drive individual airspace user and ANSP implementation schedules, the ATM system will need to simultaneously support both PRESENT and NEW for a period of time." However, from 15 November 2012, ANSPs are not required to accept and process PRESENT and airspace users are expected to file NEW as using PRESENT is not assured.

3.2.106 At FPL&AM/TF/2 a number of risks associated with implementation were identified during development of the region's implementation strategy. These risks are summarised as follows:

a) IATA advised that in order to ensure compliance by States the changes to the flight plan format should be issued as SARPs to ensure uniform application by all States as it is necessary in the interests of safety or regularity of international air navigation. Amendment 1 to PANS-ATM 4.4.1.3 still only advises operators and ATS units that they ***should*** comply with the instructions for completion of the flight plan form. With the almost total reliance placed on FPL and ATS message formats in today's automated ATM systems, IATA firmly believes the FPL format should be adopted as a standard.

b) On FITS located at http://www2.icao.int/en/FITS/Pages/home.aspx, it is apparent that there is a great majority of States that are still only evaluating there current systems with no update regarding implementation.

c) State Letter AN 13/2.1-09/9 provides a conversion table for flight plan data from NEW to PRESENT however no conversion from PRESENT to NEW is available. Therefore if an aircraft transits FIRs which alternately support NEW, PRESENT and NEW data will be irretrievably lost.

d) If there is no universal adoption by States of the NEW flight plan format there is a possibility that airspace users will not be prepared to adopt the changes as there would be a requirement to update their flight planning systems to allow filing of flight plans in two formats in circumstances where a region or ANSP only supports NEW or PRESENT.

3.2.107 There would be a significant financial investment to be made by States and airspace users to implement the 2012 ICAO Flight Plan. States require a level of certainty to be provided through ICAO's PANS and SARPs that the changes to be implemented are going to be adopted by all States and airspace users.

United States

3.2.108 United States informed the meeting that the following instruction for Item 18 is included in the Amendment: *Note: Use of indicators not included under this item may result in data being rejected, processed incorrectly or lost.*

3.2.109 European Region signaled intent to document a difference in Regional Supplemental Procedures (Doc. 7030). They plan to require filing of an indicator that is not defined in the PANS-ATM to contain region-specific information.

3.2.110 It was recognized that it could be useful to segregate region-specific data in order to avoid confusion or training difficulties for other regions. For example, the fact that a flight is exempt from European requirements for VHF RTF with 8.33 kHz spacing is of no relevance to other regions.

3.2.111 United States, however, advised the meeting that the presence of "EUR/" may subject flight plans to rejection in other regions, depending on the automation system in particular States.

3.2.112 United States further advised that documenting a non-standard filing practice in SUPPS would therefore seem to be insufficient if the non-standard practice affects automated flight plan processing in other regions. Such actions need coordination among all affected regions.

3.2.113 There were several potential solutions to this problem, including but not limited to:

1) **Avoid use of non-standard indicators**. Regional filing requirements should make use of only the defined indicators.

2) **Allow unrecognized indicators.** Automation systems would accept and pass along any such information received, but would otherwise ignore it. Regions would document any non-standard indicators in their Regional Supplemental Procedures (Doc 7030) which would allow other regions to program for them if desired.

3) **Define an indicator for each region**. The content for each indicator would be managed within the region (e.g. EUR/, NAM/, SAM/). Automation systems could add this controlled list of parameters at the same time as the changes for Amendment 1, and each region would know to ignore any information filed for other regions.

3.2.114 In any case, if region-specific indicators are allowed, there should be no expectation that ANSPs in other regions would be able to understand, maintain or otherwise communicate with filers or pilots about the contents of them.

3.2.115 For more information, contact should be made to Mr. Ray Ahlberg, Safety and Operations Support and the FAA representative to FPL&AM/TF, at ray.ahlberg@faa.gov.

IATA

3.2.116 IATA recalled that ICAO issued the State letter AN 13/2.1-08/50 on 25 June 2008 amending the 15th edition of PANS-ATM. The effective date of 15 November 2012 gave industry stakeholders more than four years to make necessary preparations for changes to the NEW ICAO FPL and associated ATS messages.

3.2.117 IATA maintained that due to the importance of the changes, the formats should be adopted as a Standard and not simply a Recommendation. The reliance on messaging with every automated system is such that a single “point of failure” (or non compliance) could have a wide ranging impact.

3.2.118 APANPIRG/19 recognized the implication of these changes when establishing the FPL&AM/TF while also noting that they considered that ICAO global leadership was critical in addressing the issues to ensure a smooth transition.

Regional/State Readiness

3.2.119 IATA observed that there continued to be significant variation in preparation and approach of both States and regions. Some regions had only just started their preparations and some larger States have already indicated that they have no intention of meeting the effective date.

3.2.120 In this region, most States missed the APANPIRG deadline to notify the ICAO Regional Office its transition plans and target dates by 1 July 2010 in accordance with Conclusion 20/8. The ASPAC TF itself however, has been instrumental in developing some excellent guidance material and has attempted to highlight its concerns globally.

Cutover Plan

3.2.121 IATA informed the meeting that the actual timeline for airlines to cutover to the NEW format had not been defined with no guidelines for handling of traffic already airborne. Without clearly defined plans and timelines, the ability for airlines to prepare was limited. The only date available was 15 November 2012 which would potentially lead to every airline in the world switching to the new Format on the same day, potentially at the same time.

Regional Variations

3.2.122 While the NEW format may not be the best for every circumstance, it represents a significant step forward, particularly with respect to PBN notifications. If a revision to the guidelines is considered necessary, it should either be adopted on a global basis or else rejected. Regional or State solutions should be strongly discouraged.

3.2.123 Variations in any part of the format would likely create problems for both airlines and ANSPs. AIDC messaging in particular creates an enormous problem with States reliant on the ability of other States "upstream" to process messaging appropriately.

Global Leadership

3.2.124 Despite calling for global leadership, IATA continued to see State/regions largely left to own devices. It appeared that the only contribution to facilitate improved planning was the establishment of a website. While useful for increased information, this is not providing increased guidance.

3.2.125 IATA needed urgent action by the ICAO Headquarters to assess the global state of readiness, identify and agree necessary changes and harmonise plans/guidance on a global basis.

3.2.126 Without it, the potential risk to aviation globally was enormous.

Review by the Meeting

3.2.127 States felt that a contingency plan should be formulated which should cover eventualities where a State or group of States is not in a position to receive flight plans in the NEW Format. ICAO advised that FPL&AM/TF agreed that it was premature to develop the contingency plan as no State in the Region has explicitly expressed that the effective date of 15 November 2012 would not be met. The task Force would continue to urge States to implement the NEW flight plan format by the due date. Nevertheless, FPL&AM/TF was aware of the possibility for the need to develop the contingency plan and had included the task in the task list of the Task Force to be commenced in the first quarter of 2012.

3.2.128 In regard to making the NEW flight plan format an ICAO Standard, ICAO advised that the proposal had been discussed at the ANC. The ANC was of view that the NEW flight plan format should remain in the PAN status.

3.2.129 The meeting thanked Australia, the United States and IATA for their working paper. The meeting agreed that the regional and the global coordination be further enhance and issue to be raised with the ICAO headquarters and possibly with the DGCA/47 in October 2010, and adopted the following Conclusion:

Conclusion 21/14- - Enhancement of the Global Coordination for Implementation of the NEW Flight Plan Format

That, in light of the varying degree of States in implementing the NEW flight plan format, ICAO:

i) urge all the States, including those outside the Asia/Pacific Region, to record their readiness in the FITS;

ii) take action to ensure that any States or ICAO regions not use non-standard local procedures; and

iii) ensure appropriate coordination take place between ICAO regional planning and implementation groups (PIRGs) to address implementation issues.

3.2.130 With reference to global coordination, the meeting received an update from ICAO Headquarters that the ANB has now an expert appointed exclusively to address all new flight plan issues. His main tasks include supporting regional subgroups meetings on Flight Plan, continuously monitor FITS to identify any concerned issues and provide interregional harmonization.

3.2.131 The Regional Office informed the meeting that the next FPL&AM/TF/4 will be held in late March 2011 and invited all the States to join the meeting.

Global Operational Data Link Document

3.2.132 United States informed the meeting that the Global Operational Data Link Document (GOLD) was intended primarily for those who were involved in planning and implementation of data link services and day-to-day operations, and would harmonize oceanic and continental (domestic) data link operations worldwide.

3.2.133 The meeting noted that the GOLD had effectively replaced the *Guidance Material for ATS Data Link Services in North Atlantic Airspace* (NAT Data Link GM) and the *FANS-1/A Operations Manual* (FOM) for Asia/Pacific (APAC), South American (SAM) and African/Indian Ocean (AFI) Regions. The GOLD also includes provisions for the aeronautical telecommunication network (ATN) implementation in the European Region.

3.2.134 The First Edition of GOLD is available for download on the following public websites:

FAA:
http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/enroute/oceanic/data_link/;

Airways New Zealand:
http://www.ispacg-cra.com; and

ICAO Asia and Pacific Office:
http://www.bangkok.icao.int/edocs/index.html.

3.2.135 This document is maintained as a regional document in coordination with all ICAO PIRGs providing data link services within their region. Each participating PIRG establishes a mechanism for submitting and administering change proposals.

3.2.136 It was noted that Change proposals (CPs) could be submitted by any stakeholder participating in data link operations. The stakeholder should submit a CP to any ICAO regional office concerned. The ICAO regional office would coordinate the CP within its own region, and with other regions and ICAO Headquarters to determine the acceptability of the CP. Regions concerned would need to accept the CP before the GOLD could be amended by any region. Once the ICAO regional office has completed coordination and the PIRGs concerned accept the change proposal, the change would be concluded by each of the PIRGs.

3.2.137 A global configuration management process will need to be put in place by ICAO whereby the document would be maintained in coordination between the concerned PIRGs and the ICAO Secretariat. In the initial period, the GOLD Ad-Hoc Working Group will assist the Secretariat in the global coordination of future amendments to the GOLD.

IATA Route Optimization Proposals – between Europe and Northeast Asia

3.2.138 IATA advised the meeting that the improvements would be evident for flights from Europe to Japan (Tokyo, Osaka, and Nagoya) and Republic of Korea (Seoul) and vice versa.

3.2.139 IATA proposed 15 route proposals with their start and end point and a comparison between new and existing routes including distance and time savings. Benefits in fuel savings were estimated at an average of 31 000 tonnes of fuel (approximately 100 million kg of CO_2) on a yearly basis with all routes implemented.

3.2.140 Japan responded that military considerations should be taken into account and coordination would be required among Japan, DPR Korea and Russia Federation.

3.2.141 China agreed with Japan and stated that military coordination was an issue. This was the first time to hear about this proposal from IATA.

3.2.142 Republic of Korea agreed with China and Japan. Also mentioned about lack of detailed information and suggested that when developing the route optimization proposal, current status and specific situation of each state concerned such as possible coordination between the States and military coordination should also be considered.

3.2.143 IATA advised that more detailed presentation would be made to individual States and at this meeting wanted to present this intention to States. In this regard, the Regional Office advised that the requests should be brought to the attention of the Third Meeting of the Trans-Regional ATM and Supporting ATM Systems Steering Group in October 2010 with more detailed data.

Optimization Efforts by India

ATS Routes in Enroute Airspace Conditional/Connector of ATS Route

3.2.144 India started implementing new series of "V" ATS routes as "Conditional/Connector" routes. The Conditional routes had been designed based on the concept of the flexible use of airspace that transit through military areas. The Connector routes have been implemented where suitable connectivity from airport to ATS route is not available thus increasing the operational efficiency of flights and reducing fuel consumption and aviation emissions.

Optimization of International ATSs Routes

i. L626 from Katmandu to Delhi was made operational in November 2009.

ii. M875 from Delhi to DI VOR in Pakistan was made operational in July 2009.

iii. L516 from KITAL to ELKEL was commissioned as a User Preferred Route.

iv. L899 from Trivandrum to Hanimadhoo (Male) has been commissioned.

v. R457 will be extended [18 November 2010] from Trivandrum to Chennai.

Connector/Conditional ATS Routes

3.2.145 Connector routes (V1 and V2) were established on 24 September 2009 in Mumbai TMA to enhance the operational efficiency and provide direct connectivity to RNAV routes L505/L301 and N571 which are passing abeam Mumbai VOR.

3.2.146 Similarly, connector routes (V3 to V8) were established on 22 October 2009 in Chennai TMA for smooth transition from enroute phase to PBN STARs/SIDs.

3.2.147 Conditional route (V007) had been established through military area (Tambaram airspace) in coordination with military authorities to provide direct connectivity which resulted in considerable savings in time, distance, fuel and reduced emissions.

AIS/AIM Automation

3.2.148 India informed the meeting that all their four International NOTAM Offices as well as the AIS headquarters office had acquired ISO certification.

3.2.149 The new system is an integrated computer network, based on AICM/AIXM concepts, to assist and support the workflow of the AIS offices using a common database of aeronautical information, from which the data can be exploited, to produce automated document outputs such as AIP and its amendments/supplements, aeronautical charts, Aeronautical Information Circulars.

3.2.150 The Central Database of the system hosts all information common to civil aviation such as FIRs, Aerodromes, NAV facilities, maps, rules etc., and related NOTAM. All units of AIS can access this database through their connected workstations using specific applications for creating and maintaining relevant aeronautical products. Specific security policy related to access and authentication for different users are configured to ensure the highest level of data quality and integrity to meet international safety requirements.

3.2.151 The client workstations connected to the Central Database foresees desired functional requirements of different units with appropriate application tools featuring:

- **Aeronautical Data Management**
  To allow management of aeronautical data through customized database to support data manipulation including insert/extract/update information and aeronautical spatial features (with their attributes).

- **Airspace/Procedure Design Management**
  To allow flight procedure designers to create, visualize, check and modify 3-D flight procedures and 3-D airspace elements for conventional non precision/precision, RNAV, GBAS, SBAS, VNAV flight procedures.

- **Aeronautical Chart Maintenance**
  This tool provides automatic extraction and charts symbolization according to the release cycles by retrieving aeronautical data stored in the central database using the CAD/GIS engines.

- **AIP production/publication Management**
  A publishing tool that temporally extracts information from central database and automatically generates ICAO aeronautical publication products such as an AIP, AIP Amendment or AIP Supplement for the current cycle based on pre-defined rules and document templates. Charts or other graphic objects inclusion is also automatically treated.

- **Navigation Aids Performance Assessment related to designed Instrument Flight Procedures**
  An analysis tool devoted to inspecting the radio electrical features of installed nav aids and model the real propagation phenomena found in airport scenario where signals (VOR, DME, ILS, ATC Radar) interfere with artificial or natural obstructions.

PACIFIC PROJECT

3.2.152 IATA proposed that a specific project and work group ("Pacific Project") be established to collectively plan the future of all operations between North America and Asia. The aim of this project is to improve operational efficiency and environmental outcomes by enabling aircraft to utilize current on board technology efficiently with User Preferred Routes the primary navigation means on this traffic flow. The project requires the involvement of key stakeholders Canada, Japan, Russia, USA and IATA/ Airlines whereas the project will also need to involve China, Democratic People's Republic of Korea, Philippines and the Republic of South Korea during the process to facilitate connector routes.

3.2.153 IATA believed it was vital that this project be established to collectively consider the traffic flow between North America and Asia. The project potentially could deliver the greatest environmental benefits, on a per flight basis, than any other ATM project in the world.

Status of ATM-Related Regional Guidance Material

Guidance Manual for Aeronautical Information Services (AIS) in the Asia/Pacific Region

3.2.154 The meeting was advised that the Fifth Meeting of the AIS-AIM Implementation Task Force (AAITF/5, June 2010) had agreed that States review the draft Chapter 3 and make comments to Japan by 30 July 2010. Taking the comments into account, EURO CONTROL Operational Procedures for AIS Dynamic Data (OPADD) Edition 3.0 (except for Chapter 6, 6.2 Procedures using an Item x) was incorporated in Chapter 3 of the Guidance Manual for AIS in the Asia/Pacific Region. The Secretariat has uploaded the regional guidance manual on the Regional Office's website (Amendment 3 to the First Edition).

3.2.155 The First Edition with the Amendment 3 is now available from the ICAO Asia/Pacific Office website (http://www.bangkok.icao.int/) under the menu "APAC e-Documents".

Asia/Pacific ATS Route Catalogue

3.2.156 The ATS Route Network Review Task Force (ARNR/TF, disbanded) drafted the *Asia/Pacific ATS Route Catalogue.* The catalogue Version 1 was published in August 2005.

3.2.157 On-going updates have been undertaken by the Regional Office based on the information made available from States and airspace users. Version 7 is now available from the ICAO Asia/Pacific Office web site (http://www.bangkok.icao.int/) under the menu "APAC e-Documents".

Guidance Material for End-to-End Monitoring of Data Link Systems

3.2.158 The *Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region* was drafted by the Regional Airspace Safety Monitoring Advisory Group (RASMAG) to provide a set of working principles for ATS data link system performance monitoring that would be applied by all States implementing these systems, as well as providing detailed guidance on the requirements for establishing and operating a FANS Interoperability/Implementation Team (FIT) and a Central Reporting Agency (CRA). Version 3.0 is now available from the ICAO Asia/Pacific Office website (http://www.bangkok.icao.int/) under the menu "APAC e-Documents".

Model National Contingency Plan

3.2.159 Contingency Plan Finalization Meeting (April 2007, Jakarta) reviewed the draft Contingency Plan for Jakarta and the Ujung Pandang and APANPIRG/18 (September 2007, Bangkok) formally adopted the Indonesia Contingency Plan as the model plan. The model contingency plan, "*Indonesia ATS Contingency Plan Jakarta FIR – Part I*", is now available from the ICAO Asia/Pacific website (http://www.bangkok.icao.int/) under the menu "APAC e-Documents".

Guidance Material for Data Link Ground Equipment Procurement and Implementation

3.2.160 Drafting of the *Guidance Material for the Asia/Pacific Region ADS/CPDLC/AIDC Ground Systems Procurement and Implementation* had continued since RASMAG/5 (June 2006, Bangkok) with a number of editorial corrections and enhancements being made. ATM/AIS/SAR/SG/17 (July 2007, Bangkok) and CNS/MET/SG/11 (July 2007, Bangkok) endorsed the guidance material prepared by RASMAG, as amended. In adopting the regional guidance material, APANPIRG/18 formulated Conclusion 18/5 – Adopt Guidance Material for the Asia/Pacific Region ADS/CPDLC/AIDC Ground Systems Procurement and Implementation.

3.2.161 RASMAG/9 updated the Guidance Material for ADS/CPLDC/AIDC Ground Systems Procurement and Implementation. Version 2 is now available from the ICAO Asia/Pacific website (http://www.bangkok.icao.int/) under the menu "APAC e-Documents".

AIDC Interface Control Document

3.2.162 ATM/AIS/SAR and CNS/MET Sub-groups jointly endorsed the AIDC ICD Version 3 document, as amended. In adopting the Version 3 ICD, APANPIRG/18 (September 2007, Bangkok) formulated Conclusion 18/8 – Adopt Version 3 Asia/Pacific AIDC ICD**.** Version 3 is now available from the ICAO Asia/Pacific Office website (http://www.bangkok.icao.int/) under the menu "APAC e-Documents".

RVSM Monitoring Regional Impact Statement

3.2.163 APANPIRG/18 had recognized that the 2010 implementation of Annex 6 global long-term monitoring requirements for airframes used in RVSM operations would have significant impacts in the way regional monitoring was managed, including the need for widespread regional height monitoring infrastructure capability to be made available. The *Asia/Pacific Regional Impact*

Statement RVSM Global Long Term Height Monitoring Requirements Effective from November 210 was prepared by RASMAG and APANPIRG/20 raised Conclusion 20/23 − Adopt RVSM Monitoring Impact Statement. Version 3 is now available from the ICAO Asia/Pacific Office website (http://www.bangkok.icao.int/) under the menu "APAC e-Documents".

En-route Monitoring Agency (EMA) Handbook

3.2.164 In anticipation of more widespread use of the RNP 10 and RNP 4 navigation specifications within the international airspace of the Region, RASMAG agreed that there was a need to develop a handbook aimed at standardizing the principles and practices of the work of the En-route Monitoring Agencies (EMAs) established to assess the safety performance of implementations utilizing reduced horizontal plane separations. Accordingly, RASMAG prepared a regional *En-Route Monitoring Agency Handbook* in order to assist adoption of a common set of principles and practices for safety assessment and ongoing safety monitoring in connection with operational usage of reduced horizontal-plane separation minima based on the application of PBN. The handbook is expected to also help to promote an interchange of information among Asia/Pacific States in support of achieving common operational horizontal monitoring procedures, as well as supporting the acquisition and sharing of data resulting from the application of those procedures. APANPIRG/20 adopted the handbook and agreed to Conclusion 20/25 − Adopt En-route Monitoring Agency (EMA) Handbook. Version 1.2 is now available from the ICAO Asia/Pacific Office website (http://www.bangkok.icao.int/) under the menu "APAC e-Documents".

Global Operational Data Link Document (GOLD)

3.2.165 The meeting recalled that the *Global Operational Data Link Document* (GOLD) replaces the *FANS Operations Manual* (FOM). The First Edition of GOLD is available for download from the public websites of the United States Federal Aviation Administration and Airways New Zealand, as well as that of ICAO Asia and Pacific Office (http://www.bangkok.icao.int/) under the menu "APAC e-Documents".

Air Traffic Flow Management (ATFM) Communications Handbook

3.2.166 The *Air Traffic Flow Management (ATFM) Communications Handbook for the Asia/Pacific Region* recognises that once operational procedures are defined, a key element in removing language barriers is establishing common terms and phrases. Terminology and phraseology differences in the operational application of ATFM procedures can be a potential source of confusion during communications, both written and verbal, between international ATFM units. This Asia/Pacific guidance material is intended to support States in overcoming these issues. APANPIRG/20 adopted the ATFM Communication Manual under Conclusion 20/12. Version 1.0 is now available from the ICAO Asia/Pacific Office website (http://www.bangkok.icao.int/) under the menu "APAC e-Documents".

ATS Coordination Group Activities

3.2.167 The meeting was updated on the activities of the ICAO and State ATS coordination groups that contribute to the work of APANPIRG. A list of ICAO and Non-ICAO ATS Coordination Groups is below:

a) ICAO ATS Coordination Groups

- **Bay of Bengal ATS Coordination Group (BBACG)**

  FANS Implementation Team for the Bay of Bengal (FIT-BOB)
  - FIT-BOB/12 (February 2010, Bangkok, with BOB-RHS/TF/2)

  Asia/Pacific Air Traffic Flow Management Task Force (ATFM/TF)
  - ATFM/TF/13 (September 2009, Bangkok)

  Bay of Bengal Reduced Horizontal Separation Implementation Task Force
  - BOB-RHS/TF/1 (November 2009, Bangkok)
  - BOB-RHS/TF/2 (February 2010, Bangkok, with FIT-BOB/12)
  - BOB-RHS/TF/3 (May 2010, Singapore)

- **Southeast Asia ATS Coordination Group (SEACG)**

  SEACG/17 (May 2010, Singapore, with FIT-SEA/10)

  FANS Implementation Team for South -East Asia (FIT-SEA)
  - FIT-SEA/10 (May 2010, Singapore, with SEACG/17)

- **Asia/Pacific ICAO Flight Plan & ATS Messages Implementation Task Force**

  FPL&AM/TF/2 & Seminar (November 2009, Bangkok)

- **Southeast Asia Route Review Task Force (SEA-RR/TF)**

  SEA-RR/TF/1 (December 2009, Bangkok)
  SEA-RR/TF/2 (March 2010, Bangkok)

b) ICAO Interregional Coordination Meetings

- **China, Mongolia, Russian Federation, IATA ATS Coordination Group (CMRI)**

  Last meeting CMRI/5 (June 2007, Bangkok)

- **Trans-Regional Airspace and Supporting ATM Systems Steering Group (TRASAS)**

  TRASAS/3 postponed (to be convened in Paris, 19-20 October 2010); last meeting TRASAS/2 (March 2008, Bangkok)

c) States' ATS Coordination Groups

- **Informal South Pacific ATS Coordinating Group (ISPACG)**

  ISPACG/24 (March 2010, Brisbane, with FIT/16)

  FANS Interoperability Team (FIT)
  - FIT/17 (with ISPACG/24) (http://www.airways.co.nz/ispacg/index.asp)

- **Informal Pacific ATC Coordinating Group (IPACG)**

  IPACG/32 (May 2010, Honolulu, with FIT/19)

  FANS Interoperability Team (FIT)
  - FIT/19 (Honolulu, 11 May 2010, with IPACG/32) (http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/enroute/oceanic/ipacg/)

- **Asia/Pacific Regional Air Navigation Service Providers Conference (ANSP Conf)**

  ANSP/5 (April 2010, Hua Hin) cancelled

- **Arabian Sea/Indian Ocean ATS Coordination Group (ASIOACG)**

  ASIOACG/5 (April 2010, Dubai)
  (http://ekgroup.com/raws)

3.2.168 The meeting noted the outcomes of the groups as in the following paragraphs.

ICAO ATS COORDINATION GROUPS

Twelfth Meeting of the FANS Implementation Team for the Bay of Bengal (FIT-BOB/12, February 2010, Bangkok)

3.2.169 FIT-BOB/12 was held in conjunction with BOB-RHS/TF/2. The main points of interest arising from FIT-BOB/12 were as follows:

Result of ADS/CPDLC Operational Trial in the Kuala Lumpur FIR

3.2.170 The latest software update of the current ADS/CPDLC systems was carried out which was expected to be completed in May 2010 and full trial can commence on 10 October 2010.

ADS/CPDLC Trial Progress in the Ujung Pandang FIR

3.2.171 ADS-C/CPDLC trial operation for all international routes within the Ujung Pandang FIR was expected to take effect on 7 April and continue until 6 May 2010.

Results of ADS/CPDLC Bench Testing with Chennai and Mumbai Centres

3.2.172 FIT-BOB/12 made a list of the issues identified from dedicated bench test sessions. In addition to issues identified relating directly to auto handoffs, a couple of other related issues were identified. Based on the analysis of the identified problems, recommendations were made encouraging ATSUs to implement them in order to overcome the problems.

3.2.173 There were 88 problem reports identified and the main reason for failures was identified. ATSUs were encouraged to automate the connection sequence. It was recognized that to ensure the connection hand off steps are to be followed correctly to overcome the problem.

Thirteenth Meeting of the Air Traffic Flow Management Task Force
(ATFM/TF/13, September 2009, Bangkok)

Future of the ATFM Task Force

3.2.174 The ATFM Task Force was formed in 2005 to develop and implement an ATFM system to cater for westbound aircraft departing from Southeast and South Asia airports entering the Kabul FIR during the busy night-time period.

3.2.175 Extensive development of the ATFM/BOBCAT system took place over many meetings between States concerned, ICAO and IATA and their airlines, which culminated in an agreed fully operational air traffic flow management system being implemented in July 2007. During ATFM/TF/12 (July 2008) it was agreed that the implementation program dealing with the management of the Kabul FIR transit flights should be considered as completed, apart from small changes to the BOBCAT computer system to enhance the product for the benefit of airlines and States participating in this ATFM programme.

3.2.176 ATM/AIS/SAR/SG/20 agreed that the present ATFM Task Force had achieved the aims of their Terms of Reference and therefore could be dissolved. Consequently, ATM/AIS/SAR/SG/20 agreed to the following Decision:

Decision SG 20/10 – Dissolution of the ATFM Task Force

Taking into account that the ATFM Task Force has completed their work in accordance with the Objectives and Terms of Reference of the ATFM Task Force, it was agreed that the ATFM Task Force be dissolved.

3.2.177 ATM/AIS/SAR/SG/20 congratulated the ATFM Task Force on their positive work in providing an effective ATFM tool to manage the westbound night-time traffic operating through the Kabul FIR. The meeting specially thanked AEROTHAI for their role in planning and provision of the BOBCAT system; an effective and efficient ATFM tool, whose concept of operations could be of benefit in the development of other ATFM initiatives within the Asia and Pacific Region.

Bay of Bengal Reduced Horizontal Separation Task Force
(BOB-RHS/TF/1, November 2009, Bangkok)
(BOB-RHS/TF/2, February 2010, Bangkok with FIT-BOB/12)
(BOB-RHS/TF/3, May 2010, Singapore)

3.2.178 To date, three BOB-RHS/TF meetings had been held, and significant cooperation and progress had been accomplished. The fourth meeting of the Task Force was scheduled to take place in October 2010. This meeting will be a Go/No Go meeting based on the implementation plan mentioned later in this report.

Phased approach to implementation of RNP 10 and RNP 4 PBN

3.2.179 Under the Objectives and the TOR, the Task Force noted that a step-by-step implementation process should be adopted. The first step was to implement widespread 50 NM longitudinal separation using DCPC or CPDLC communications in the Bay of Bengal and the Oceanic Mumbai FIR.

Implementation Strategy for use of 50 NM longitudinal separation in the Bay of Bengal and Arabian Sea

3.2.180 It was noted that RNAV route P762 was scheduled to be a part of the Phase 1 in the above programme. However, satisfactory data link services in both the Colombo and the Yangon FIRs needs to be confirmed prior to implementation of 50 NM longitudinal spacing on this RNAV route.

Exclusive Route and/or Flight Levels for Data Link Equipped Aircraft or Mixed Air Traffic on an Opportunity Basis

3.2.181 There were considerable discussions by the Task Force in trying to come to a satisfactory agreement on the procedures for the three routes of N571, P628 and the crossing route P762 regarding the introduction of exclusive levels for FANS aircraft using 50 NM spacing, or mixed traffic on an opportunity basis. It was brought to the Task Force's attention that RNP 10 50 NM longitudinal separation has been implemented in many parts of the world and that in all cases, there is no implementation of exclusive use by data link aircraft on any route using a 50 NM longitudinal separation procedure. It was also noted that, with the implementation of 50 NM longitudinal separation, no levels were exclusive and the application of 50 nm separation was achieved on an opportunity basis between data link equipped aircraft. In case where one aircraft was non-data link, 10 minutes (80 NM) separation was applied.

3.2.182 After considerable discussion, it was finally agreed that, during the Phase 1 trial period, reduced horizontal separations would be applied on an opportunity basis. However, to enable ATC to become accustomed to the provision of reduced separations, priority handling could be applied to data link equipped aircraft on N571 for a period of two AIRAC cycles after implementation of Phase 1.

Operational Letter of Agreement (LOA) for Monitoring of Aircraft Navigation Errors in the Bay of Bengal, Arabian Sea and Indian Ocean Airspace

3.2.183 The Task Force recalled that the implementation of reduced horizontal separation minima requires continuous monitoring of aircraft navigation errors. This includes the identification and reporting of any Large Lateral Deviations (LLD) or Large Longitudinal Errors (LLE), to ensure that the target level of safety (TLS) of the operations within the airspace in question meets the regionally established TLS.

3.2.184 The first step in the monitoring process would be to identify suitable designated areas where monitoring can be done by means of surveillance. This is usually from the point an aircraft leaves the surveillance coverage till the point where it will again enter surveillance coverage. There are also occasions that the monitoring is done within total surveillance coverage. On day-to-day basis, air traffic controllers carrying out their ATC duties should be the front line first person to initiate the report should they encounter any aircraft with navigational errors.

3.2.185 The Task Force agreed that an LOA should be put in place by the relevant States to ensure that the procedures for reporting of navigation errors and traffic movement counts are administered accurate and consistently by all States involved.

Data collection to provide a business case supporting reduced horizontal separation decisions

3.2.186 Taking into consideration the usefulness of business case data, it was agreed that flight plans and related ATS messages transiting the Bay of Bengal and/or the Oceanic Mumbai FIR would be forwarded to the Bangkok ATFMU at its AFTN Address, VTBBZDZX. In this respect, AEROTHAI would coordinate follow up actions with States and airlines involved regarding this issue.

Seventeenth Meeting of South-East Asia ATS Co-Ordination Group (SEACG/17, May 2010, Singapore, with FIT-SEA/10)

3.2.187 The objective of SEACG was to address implementation and coordination issues, and to develop solutions to overcome the current problems experienced in the provision of ATS by developing an action plan with specified timelines. The main points of interest arising from SEACG/ 17 were as follows:

Fifth Meeting of Southeast Asia Sub-Regional ADS-B Implementation Working Group

3.2.188 SEACG/17 reviewed the outcomes of the Fifth Meeting of South-East Asia Sub-Regional ADS-B Implementation Working Group (ADS-B SEA WG/5, January 2010) hosted by Indonesia.

Australia-Indonesia Data Sharing Project

3.2.189 Australia and Indonesia had provided an update on their data sharing project. Airservices Australia had approved the Phase 1A plan. Indonesia had also approved the Phase 1A and an ADS-B Filter was installed in MAATS, Makassar. The tests were conducted between two States and the result of the test was successful.

3.2.190 The target date of using ADS-B data for situational awareness and safety nets by ATC was set for 2010 for Australia and 2011 for Indonesia. The project was expected to extend to the Phase 1B and possibly to the Phase 2.

Restriction on G581

3.2.191 Japan drew to the attention of SEACG/17 that the current flight level allocation scheme (FLAS) on ATS route G86 was discussed and agreed at the Western Pacific/South China Sea RVSM Scrutiny Group (WPAC/SCS RSG) and EATMCG meetings, and was implemented on 3 July 2008. Subsequently, Hong Kong and Taipei ACCs imposed certain restrictions. In order to overcome this problem Hong Kong, China and Japan had agreed that they would hold a tripartite meeting including Taipei ACC and report the outcomes to the Regional Office as soon as possible.

Harmonisation of State Contingency Plans

3.2.192 It was recognized that it is advantageous for States to harmonise their contingency plans through a coordinated regional effort to ensure that these plans remain effective and relevant. This will not only serve to fulfil States' requirement to meet the ICAO Annex 11 requirements on contingency arrangements but would also ensure that the disruption of international air traffic movements would be minimised across the affected FIRs. At ATM/AIS/SAR/SG/20, IATA pointed out the importance for States to ensure that their contingency plans were robust and catered to multiple scenarios, as well as the need to be kept up-to-date in order that, as and when such plans are required to be activated, the appropriate contact points could be established in the most effective manner. Both Singapore and IATA noted that the RVSM operations only took account of aircraft capability, and the ATM infrastructure in the airspace concerned has no bearing on the operations. Hence, any activation of the contingency plan in an FIR would not impact on the RVSM classification in its airspace.

RNAV 5 Preferential Operation

3.2.193 The circumstance where RNAV 5 routes and VOR routes are established in the same airspace leads to an increase in air traffic controllers' workload. Air traffic controllers always have to be extra cautious in providing separation between aircraft on RNAV 5 route established close to VOR route, because lateral separation between RNAV 5 route and VOR route was not considered while establishing RNAV 5 route. The Sky Highway is to segregate flights on RNAV 5 routes where as VOR routes are operationally at FL 290. The Sky Highway will be in force in October 2010 when the fourth runway of the Tokyo International Airport (Haneda) will be opened.

Establishment and Operation of the CRA for Southeast Asia ADS/CPDLC Operation

3.2.194 Japan announced at FIT-SEA/10 (May 2010, Singapore) that they would no longer be able to provide the FIT-SEA CRA service after March 2011 because of its national budget and other reasons. FIT-SEA/10 recognized the need to establish a formal FIT-SEA CRA as soon as possible but not later than March 2011 by Philippines, Singapore and Viet Nam. In the meantime, Japan would continuous to support ADS/CPDLC implementation in the Manila FIR beyond March 2011 until it can start a regular operation, possibly through Japan International Cooperation Agency (JICA) programme.

Central Reporting Agencies (CRA) - IATA

3.2.195 The data link, i.e. ADS-C/CPDLC, was an enabler for many ATM efficiencies including improved communication, increased capacity and reduced ATC workload. In accordance with ICAO Annex 11 provisions, it is States responsibility to satisfy the safety monitoring requirements for data link as per other ATM systems. This principle has led to the establishment of several CRAs throughout the region that continue to be fundamental in supporting the implementation of reduced separations such as 50 nm longitudinal and RNP4 30/30 as per ICAO Regional Plans. IATA further advised ATM/AIS/SAR/SG/20 meeting that the increasing availability of data link capabilities has presented new challenges to ensure that appropriate monitoring of performance is undertaken by the establishment of CRA arrangements on a regional, sub regional and also on a trans-regional basis, as considered appropriate.

Review by the ATM/AIS/SAR/SG/20 Meeting

3.2.196 In view of the urgent need to continue the CRA function, Singapore had carried out consultations with Philippines and Vietnam with the intention to assume the responsibility of providing the CRA service after March 2011. Subject to further discussion on technical and funding arrangements, Singapore offered to assume the role of CRA after March 2011. It was assured that CRA Japan would continue to assist CRA Singapore as required during the transition period. The meeting appreciated the offer made by Singapore.

3.2.197 In view of the urgent need for the continuation of the CRA functions, Singapore, Philippines and Vietnam had a side meeting. Philippines and Vietnam requested Singapore to assume the role of the CRA after March 2011. Singapore informed the meeting that it would seek management approval and will provide the update at APANPIRG/21 to be held in September 2010. It was assured that CRA Japan would assist Singapore in establishing the formal FIT-SEA CRA as required during the transition period until 31 March 2011. The meeting appreciated the offer made by Japan and Singapore.

Tenth Meeting of FANS Implementation Team for South-East Asia
(FIT-SEA/10, May 2010, Singapore, with SEACG/17))

3.2.198 The Tenth Meeting of the FANS Implementation Team for South-East Asia (FIT-SEA/10) was held in Singapore on 24 May 2010. The main points of interest arising from FIT-SEA/10 as noted by the meeting were as follows:

ADS/CPDLC in the Ho Chi Minh FIR

3.2.199 Viet Nam had officially started providing data link services on eight RNAV routes in the oceanic area of the Ho Chi Minh FIR since 10 April 2008. It was reported that only half of 200 flights had been equipped with both ADS and CPDLC and 65 flights initiated the logon daily and 98 present logged on successfully.

Preparations for ADS/CPDLC Trial in Manila FIR

3.2.200 Philippines informed FIT/SEA-9 that the current system of Manila ACC would be replaced by a system that has built-in data link capabilities. In connection with this, data link trials were planned for the fourth quarter of 2010 with the objective of providing the full operations in 2012. CRA Japan would be able to act as CRA to support for data link implementation in Manila FIR considering it vital and that formal CRA for FIT SEA.

Review of ADS/CPDLC in the Singapore FIR

3.2.201 Boeing had reported that a fix will be provided to the operators. Airborne trials with AIMS-2 (with one test originating from Singapore Changi airport) and AIMS-1 software had been completed. The upgraded AIMS-2 software will be retro-fitted to existing B777s, with AIM-1 software targeted for Jun/Jul 2010. However it is expected it would take time for all the aircraft to be updated. Update to the AIMS-2 software is expected to begin in 4th quarter 2010.

3.2.202 In February 2010, Singapore carried out a detailed study of the occurrences of the marginal downlink performance. Most of the occurrences were found to be in the VHF-SATCOM transition areas. The results validated that the poor downlink performance was correctly attributed to the B777 problem. Singapore will continue to monitor this issue and provide an update at the next meeting.

STATES' ATS COORDINATION GROUPS

The 24th Meeting of the Informal South Pacific ATS Coordinating Group (ISPACG/24, March 2010, Brisbane, with FIT/16)

3.2.203 It was noted that the full and detailed meeting report, including attendees listing, action item tracking, capacity enhancement tables, and report of the Seventeenth FANS Interoperability Team (FIT/17) Meeting are available on the Airways New Zealand web site. All documentation relating to ISPACG/24, including the final report, supporting papers and presentations, and a complete attendees listing are available at http://www.airways.co.nz/ispacg/index.asp.

Thirty-first and Thirty-second Meetings of the Informal Pacific Air Traffic Control (ATC) Coordinating Group (IPACG/31 & 32)

3.2.204 The FAA, USA provided a brief summary of outcome of IPACG/31 and 32 meetings. The group was established to provide a forum for air traffic service providers and airspace users to informally meet and explore solutions to near term ATC problems that limit capacity or efficiency within the Anchorage, Oakland, and Fukuoka Flight Information Regions (FIRs). Many collaborative issues were discussed and agreements reached on efforts to improve the efficiency of air traffic operations in the North and Central Pacific, as well as the cross-polar environment.

3.2.205 Updates were provided on all ongoing activities such as User Preferred Routes (UPRs) trials and Dynamic Airborne Reroute Procedures (DARP) in Asia/Pacific Region.

3.2.206 The FAA presented information and solicited comments on a consolidated Interface Control Document (ICD) for the North Atlantic and Asia/Pacific Regions to provide for harmonized Air Traffic Service Inter-facility Data Communications (AIDC). Comments are due by 31 July 2010 to the FAA. This document will also be coordinated with ICAO regional groups, as appropriate.

3.2.207 The FAA briefed that in the past twelve months, the ASPIRE Partnership has welcomed two new members: the Civil Aviation Bureau of Japan (JCAB) on 11 October 2009 and the Civil Aviation Authority of Singapore (CAAS). The cumulative fuel savings of the ASPIRE flights is 32 386 kg, leading to an overall carbon dioxide (CO_2) reduction of 101 986 kg.

The 5th Meeting of the Arabian Sea/Indian Ocean ATS Coordination Group (ASIOACG/5, April 2010, Dubai)

Update from ANS

3.2.208 Australia confirmed that RNP 4 had been implemented throughout all oceanic airspace within the Brisbane and the Melbourne FIRs. User Preferred Routes (UPRs) were now operational within the Melbourne FIR (Indian Ocean area).

3.2.209 India was working to meet the government deadlines for the implementation of the AUTOTRAC3 system at Delhi and Mumbai. AIDC trials between Mumbai OCC and Muscat ACCs were likely to start shortly.

3.2.210 Oman informed that "Auto-Trac II" ATM system had been installed and fourth area control sector. Plans for the fifth sector were to be completed by the end of 2010. Oman was ready to test AIDC with the Mumbai FIR AFTN based on the latest technology had been upgraded to 64 kbps link. Oman was ready for the introduction of 50/50 NM separation standards or 30/30 NM once India was ready for implementation.

3.2.211 Sri Lanka had already taken steps to modernise the existing Colombo ACC/Flight Information Centre (FIC) with a new and fully integrated ATM system, e.g., radar, ADS-B, ADS-C, etc. It was expected that this project would be completed by the end of 2011. It was also informed that Sri Lanka had decided to construct the second international airport in the southern part of Sri Lanka (90 NM southeast of VCBI). AASL had already commenced the work of the new airport and planning to complete by the end of 2012.

3.2.212 The representative from Air Traffic and Navigation Services South Africa (ATNS) informed ASIOACG/5 of ATM planning initiatives which had been introduced ahead of the FIFA World Cup (11th June – 11th July 2010). Those included the establishment of a Central Air Traffic Flow Management Unit and the installation of CAT II ILS on all runways at Johannesburg. ATNS was working with Airservices Australia for the enhancement of AIDC messaging between the two ATS Centres.

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(amended 11 September 2009)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 1* **AIRSPACE SAFETY MONITORING TO ACHIEVE REGIONAL TLS**				
Benefits				
Safety	• Improved safety management, • Compliance with regional Target Level of Safety (TLS)			
Strategy **Short term/medium term (2009-2015)**				
ATM OC COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
AOM *(Airspace Organization and Management)*	• Facilitate cooperative arrangements between States to undertake airspace safety assessments • Review airspace safety monitoring that supports reduction in vertical and horizontal aircraft separation standards	2009-2015	RASMAG	In progress
	• Assist States to achieve established regional Target Levels of Safety (TLS) • Provide advice to States to establish aspects of ATS safety management systems that support compliance with the regional TLS	2009-2015	RASMAG SEA RR/TF BOB RHS/TF PBN/TF	In progress
GPIs	GPI/2 Reduced vertical separation minima, GPI/5 Performance based navigation, GPI/7 Dynamic and Flexible ATS route management			
References	• *Asia/Pacific Guidance Material for ADS/CPDLC/AIDC Ground Systems Procurement and Implementation;* • *Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region* • *Asia/Pacific En-route Monitoring Agency (EMA) Handbook* • *Regional Monitoring Agency (RMA) Manual* • *Global Operational Data Link Document (GOLD).*			

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(amended 11 September 2009)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 2* **OPTIMISE TRAFFIC FLOWS**				
Benefits				
Environment	• reductions in fuel consumption			
Efficiency	• reduction in weather and traffic induced holding • improved and smoother traffic flows • improved predictability • optimized demand and capacity balancing through the efficient exchange of information			
Strategy **Short term (2009-2010)** **Medium term (2011–2015)**				
ATM OC COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
DCB *(Demand and capacity management)*	**Bay of Bengal** • Enhance and facilitate the orderly flow of traffic across the Bay of Bengal and south Asia	2009-2010	Air Traffic Flow Management Task Force (ATFM/TF)	Implemented and reviewed regularly by the Bay of Bengal ATFM/TF ATM/AIS/SAR/SG/19 drafted Conclusion to establish regional ATFM steering group
DCB *(Demand and capacity management)*	**South China Sea** • Enhance and facilitate the orderly flow of traffic in the South China Sea area	2011-2015	SEACG	ATM/AIS/SAR/SG/19 drafted Conclusion to establish regional ATFM steering group
DCB *(Demand and capacity management)*	**Northeast Asia/Southeast Asia** • Enhance and facilitate the orderly flow between Northeast Asia and Southeast Asia, as well as within and between the North and the South Pacific regions	2009/2015	IPACG, ISPACG, EATMCG SEA RR/TF (ATS routes)	ATM/AIS/SAR/SG/19 drafted Conclusion to establish regional ATFM steering group
GPIs	GPI/6 air traffic flow management, GPI/7 Dynamic and Flexible ATS route management, GPI/8 Collaborative airspace design and development, GPI/16 Decision support and alerting system			
References	• *Draft Air Traffic Flow Management Communications Handbook for the Asia/Pacific Region* *APANPIRG Conclusions 20/10, 20/11, 20/12 and 20/13*			

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM

(REGIONAL)

(amended 11 September 2009, change proposed 9 July 2010)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 3* **OPTIMISE ROUTE STRUCTURE IN ENROUTE AIRSPACE**				
Benefits				
Environment	• reductions in fuel consumption			
Efficiency	• increase airspace capacity • ability of aircraft to conduct flights more closely to preferred trajectories • facilitate utilization of advanced technologies thereby increasing efficiency • optimized demand and capacity balancing through the efficient exchange of information			
Safety	• enhance safety by use of modern capabilities onboard aircraft			
Strategy **Short term (2010)** **Medium term (2011 - 2015)**				
ATM OC COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
AOM *(Airspace Organization and Management)*	• Implement ATS route enhancements in the Asia Pacific Region, in collaboration with stakeholders, based on new technologies and procedures and in accordance with APANPIRG PBN Regional Plan, to improve en-route airspace efficiency. • Identify ATS and aeronautical communications problems in the Asia Pacific Region including Indian Ocean and the Arabian Sea, and prepare coordinated plans for actions for their resolution.	2009 -2015	**Bay of Bengal and Arabian Sea** BBACG, FIT-BOB, Bay of Bengal Reduced Horizontal Separation Implementation Task Force (BOB-RHS/TF) (Informal Arabian Sea/Indian Ocean ATS Coordination Group - ASIOACG)	Target for 50 NM longitudinal separation in Bay of Bengal is ~~2010~~2011
		2009-2015	**Southeast Asia AR9 Flow** SEACG, FIT-SEA Southeast Asia Route Review Task Force (SEA RR/TF)	ATM/AIS/SAR/SG/19 (2009) established the SEA Route Review Task Force (SEA RR/TF)

		2009-2015	**<u>Pacific Area</u>** No APANPIRG regional working group established (Informal • South Pacific ATS Coordination Group – ISPACG, • Pacific ATS Coordinating Group – IPACG, and • East Asia ATM Coordination Group EATMG)	50 NM longitudinal implemented North Pacific in 2008 30/30 NM (RNP4) implemented Honiara, Nauru, Brisbane, Nadia Auckland Oceanic FIRs in January 2005 30/30 NM Operational trial Oakland FIR commenced 2007, Fukuoka FIR from August 2008, Anchorage FIR estimated 2011
AOM *(Airspace Organization and Management*	**Cross-Polar routes** • Improve alignment and use of cross polar routes at their south (Asian) ends.	2010-2015	Special ATS coordination meeting – China, Mongolia, Russian Federation, IATA (CMRI) Informal Cross Polar Working Group (CPWG)	In progress
GPIs	GPI/5 Performance based navigation, GPI/8 Collaborative airspace design and management			
References	• *Asia/Pacific Regional Performance Based Navigation Implementation Plan* • *ICAO Performance Based Navigation Manual (Doc 9613)* • *Terms of Reference of the ATM Coordination Groups and Task Forces implementing PBN based route structures and reduced horizontal separation minima.*			

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(amended 11 September 2009)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 4* **OPTIMISE ROUTE STRUCTURE IN TERMINAL AIRSPACE**				
Benefits				
Environment	• reductions in fuel consumption			
Efficiency	• increase airspace capacity • ability of aircraft to conduct flights more closely to preferred trajectories • facilitate utilization of advanced technologies thereby increasing efficiency • optimized demand and capacity balancing through the efficient exchange of information			
Safety	• enhance safety by use of modern capabilities onboard aircraft			
Strategy **Short term (2010)** **Medium term (2011 - 2015)**				
ATM OC COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
AOM *(Airspace Organization and Management)* **AUO** *(Airspace Users Operations)*	Implement ICAO Performance Based Navigation (PBN) provisions for terminal area operations in collaboration with stakeholders based on the Regional PBN Implementation Plan agreed by APANPIRG, to improve terminal area efficiency by use of advanced navigation specifications for SIDs, STARs and instrument approach procedures.	In accordance with PBN Regional Plan	Performance Based Navigation Task Force (PBN/TF)	PBN/TF prepared Regional PBN Plan adopted by APANPIRG/19
GPIs	GPI/5 Performance based navigation, GPI/8 Collaborative airspace design and management. GPI/10 Terminal area design and management, GPI/11 GPI-11 RNP and RNAV Standard Instrument Departures (SIDs) and Standard Terminal Arrivals (STARs), GPI-12 Flight Management System (FMS) – based arrival procedures			
References	• *Asia/Pacific Regional Performance Based Navigation Implementation Plan* • *ICAO Performance Based Navigation Manual (Doc 9613)*			

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(amended 11 September 2009)

REGIONAL PERFORMANCE OBJECTIVE*: APAC Objective 5* **IMPLEMENTATION OF NEW ICAO FLIGHT PLAN PROVISIONS**				
Benefits				
Environment	• reductions in fuel consumption and gaseous emissions as a result of efficiency gains.			
Safety	• enhance safety by use of modern capabilities onboard aircraft			
Continuity	• maintains continuity of aviation operations across the region			
Efficiency	• ability of air navigation service providers to make maximum use of aircraft capabilities, • ability of aircraft to conduct flights more closely to their preferred trajectories, • facilitate utilization of advanced technologies thereby increasing efficiency, and • optimized demand and capacity balancing through the efficient exchange of information.			
Strategy **Short/Medium Term (2009-2012)**				
ATM OC COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
SDM *(ATM Service Delivery Management)*	• Implement the provisions of Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444), comprising amended PANS ATM Chapter 4, Chapter 11, Appendix 2 and Appendix 3 provisions relating to the ICAO Flight Plan and associated ATS Message formats, with applicability date 15 November 2012.	2009-2012	ICAO Flight Plan and ATS Messages Task Force (FPL&AM/TF)	APANPIRG/20 adopted the *Interim Strategy for the Implementation of New ICAO Flight Plan Format and supporting ATS Messages* 1
GPIs	GPI/5: Performance based navigation, GPI/9: Situational awareness, GPI/11: RNP and RNAV SIDs & STARs, GPI/17: Implementation of data link applications and GPI/18: Aeronautical Information			
References	• *Amendment 1 to 15th Edition of PANS-ATM (Doc 4444, ICAO State Letter Ref: AN13/2.1-08/50, dated 25 June 2008)* • *ICAO Guidance Material for Implementation (ICAO State Letter Ref: AN 13/2/1-09/9, dated 6 February 2009)* • *Asia/Pacific Region – Interim strategy for the implementation of new ICAO flight plan format and supporting ATS messages* • *APANPIRG Decision 19/6, Conclusions 20/7 and 20/8*			

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM

(REGIONAL)

(amended 11 September 2009, change proposed 9 July 2011)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 6* **ENHANCED PROVISION OF AIS/AIM**				
Benefits				
Efficiency	• enhanced collaboration between flight crew and the ATM system, • improved collaborative decision making, • improved predictability, and • reduction of workload for aircrew and ATC.			
Strategy **Short to Medium term (2009 – 2012)**				
ATM OC COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
~~**SDM**~~ ~~*(ATM Service Delivery Management)*~~	~~• Implement the enhanced provisions for AIM becoming available through the work of the Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG);~~ ~~• Monitor implementation progress~~	~~2009-2016~~	~~AAITF~~	~~In progress~~
SDM *(ATM Service Delivery Management)*	• Implement the enhanced provisions for AIM becoming available through the work of the Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG); • Monitor implementation progress	2009-2016	AAITF	In progress TF will develop detailed monitoring framework to track States implementation of AIM (AAITF Task List – Action Item 6 refers)
	Consolidation: (Refer AIM Roadmap) 1. Monitoring of Annex differences 2. AIRAC adherence monitoring 3. Quality 4. WGS-84 implementation	2009 - 2013	AAITF	As above

	Going Digital: (Refer AIM Roadmap) 1. Data integrity monitoring 2. Data quality monitoring 3. Aerodrome mapping 4. Electronic AIP 5. Obstacles 6. Terrain 7. Integrated aeronautical information database 8. Unique identifiers 9. Aeronautical information conceptual model	2009 - 2014	AAITF	As above
	Information Management: (Refer AIM Roadmap) 1. Aeronautical data exchange 2. Digital NOTAM 3. Communication networks 4. Aeronautical information briefing 5. Training Interoperability with meteorological products 7. Electronic aeronautical charts 8. Agreements with data originators	2013 - 2016	AAITF	As above
GPIs	GPI/18: Aeronautical Information			
References	• *Annex 4 – Aeronautical Charts* • *Annex 15 – Aeronautical Information Services* • *AIS Manual (Doc 8126)* • *Aeronautical Chart Manual (Doc 8697)* • *EUROCONTROL Operating Procedures for AIS Dynamic Data (OPADD)* • *APANPIRG Conclusion 20/16*			

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(amended 11 September 2009)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 7* **ENHANCED SEARCH AND RESCUE CAPABILITY**				
Benefits				
Safety & Efficiency	• cost-efficient use of RCC accommodation and equipment on a shared basis, • development of a pool of experienced SAR mission coordinators skilled across both aviation and maritime domains thus reducing coordination and fragmentation, • proficient services provided near and within States with limited resources, • harmonization of aviation / maritime procedures, and • inter-operability of life-saving equipment			
Strategy **Short to Medium term (2009 – 2015)**				
ATM OC COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
IM *(Information Management)*	Implementation of Annex 12 Standards and Recommended Practices and related APANPIRG Conclusions to ensure appropriate SAR capabilities for the Asia/Pacific regions.			
	• Periodic review of SAR facilities, services and procedures in the region;	2009-2015	States, ATM/AIS/SAR Sub Group	In progress
	• Encourage States to delegate or negotiate SAR services in accordance with Annex 12 provisions;	2009-2015	States, ATM/AIS/SAR Sub Group	In progress
	• APANPIRG Asia/Pacific "SAR Capability Matrix" and "Register of SAR Agreements" be kept up to date and distributed to States for information and action;	2009 - 2015	States, ATM/AIS/SAR Sub Group	In progress
	• States designate an agency for registering ELT Beacons, coded with the country code of the State and unique code of that beacon in a database as required by Annex 10.	2010	States	In progress
GPIs	None applicable			
References	• *Annex 12 – Search and Rescue* • *International Aeronautical and Maritime Search and Rescue Manual (IAMSAR Manual, Doc 9731)* • *APANPIRG Conclusions 18/19, 18/20, 20/17 and 20/18*			

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

Asia/Pacific Guidance Material for the Implementation of Amendment 1 to the 15th Edition of the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444)

Version 1 – 09 September 2010

Issued by ICAO Asia and Pacific Office, Bangkok

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ASIA/PACIFIC GUIDANCE MATERIAL FOR THE

IMPLEMENTATION OF AMENDMENT 1 TO THE 15th EDITION OF

PROCEDURES FOR AIR NAVIGATION SERVICES – AIR TRAFFIC MANAGEMENT

(PANS-ATM, Doc 4444)

1. Background

1.1 In order to ensure a harmonised implementation of the provisions contained in Amendment 1 to the 15th Edition of PANS-ATM relating to comprehensive changes to the ICAO Flight Plan and associated ATS Messages formats, this Asia/Pacific regional guidance material has been developed by APANPIRG's Asia/Pacific ICAO Flight Plan and ATS Messages Task Force (FPL&AM/TF). The material will be further developed during 2010 and presented to APANPIRG/21 in September 2010 for formal adoption.

1.2 Asia/Pacific (APAC) States and Air Navigation Service Providers (ANSPs) are encouraged to use this material as general implementation guidance for the new flight plan and ATS messages formats required by Amendment 1 to PANS-ATM for applicability date 15th November 2012. The material is expected to be of specific assistance when coding software changes in automation systems needed to support the changes to flight plan and ATS message formats

1.3 The FPL&AM/TF considers that it is of critical importance to conduct validity checking of Filed Flight Plans (FPL) and Air Traffic Service (ATS) Messages filed with and between all Asia/Pacific States and ANSPs, and to ensure that Current Flight Plans (CPL) and other messages exchanged between States and ANSPs are likewise formatted and handled in a similar fashion. In this manner, users/filers are assured that FPLs and associated messages are checked with the same level of scrutiny independent of where the flight originates. Additionally, they are assured that critical flight data information is passed intact by each Asia/Pacific State and ANSP along the route of flight.

2. Terminology

2.1 In accordance with International Civil Aviation Organization (ICAO) transition guidance documents, the following terminology is used throughout this guidance material:

- **PRESENT** format is defined as ICAO flight planning and ATS message formats currently in use as specified in DOC 4444, 15th Edition.

- **NEW** format is defined as ICAO flight planning and ATS message formats specified in Amendment 1 to DOC 4444, 15th Edition.

- **Applicability Date** is the 15 November 2012 effective date of Amendment 1 to PANS-ATM (Doc 4444).

3. Transition Period & Phased Implementation

3.1 The FPL&AM/TF considers that applying an implementation strategy whereby all user switchovers to NEW format occur on the same day (i.e. on Applicability Date) would result on an unmanageable impact on ANSPs systems with a very real risk of automation system crashes. As such, the pre-implementation ANSP safety case analyses are expected to identify this implementation scenario as a safety hazard that requires effective mitigation.

3.2 Under the phased arrangements agreed by the FPL&AM/TF for application in the Asia/Pacific Region, ANSP implementation of NEW format (whilst simultaneously retaining PRESENT capability) would take place first, followed by a staggered user switchover to NEW capability.

3.3 The transition period is defined as the declared Asia/Pacific transition period from 1 January 2012 until 15 November 2012, as outlined in the updated Asia/Pacific Region *Strategy for the Implementation of NEW ICAO Flight Plan Format and Supporting ATS Messages* proposed by FPL&AM/TF/2 (November 2009), comprising the following phases:

- **Phase 1** - ANSPs software delivery and internal testing
  - 1 January to 31 March 2012,

- **Phase 2**– ANSPs external testing and implementation
  - 1 April to 30 June 2012, and

- **Phase 3** – Airspace users testing and implementation.
  - 1 July to 15 November 2012

3.4 Under the phased approach, States will not implement NEW capability before the commencement of the ANSPs external testing and implementation period on 1 April 2012 and, insofar as possible, would complete implementation of NEW capability by the end of the ANSPs external testing and implementation period on 30 June 2012. Following this, airspace users would be invited by AIC or NOTAM to commence testing with ANSPs from 1 July 2012. Importantly, ANSPs and users would be encouraged to coordinate appropriate implementation methodologies in order to ensure a staggered migration of airspace users to NEW during the airspace users testing and implementation period (i.e. 1 July – 15 November 2012).

4. DOF/ - Five Day (120 hour) Advance FPL Lodgement

4.1 The Amendment 1 provisions enable flight plans to be lodged up to 5 days (120 hours) prior to the Estimated Off Blocks Time (EOBT) for the flight, a significant change from the 24 hour requirement in the existing provisions.

4.2 Present experience in the Asia/Pacific region with FPLs submitted well in advance of EOBT (within the present 24 hour window) is that this practice precipitates a large number of CHG messages as operators change aircraft type, or tail number on a same type but with different equipage, or vary the ETD, or a variety of other modifications to what has originally been filed. As meteorological conditions change after the FPL has been filed, route changes and altitude changes also manifest, requiring modification messages as well. Overall, the existing 24 hour window generates a significant amount of message traffic that does not add apparent value to the aircraft operator and increases complexity for the many ATS units along the path of flight that have to process the extra modification messages. To address this existing problem, in one instance an Asia/Pacific State has already published a constraint in AIP under which flight plans are not accepted more than 8 hours prior to EOBT.

4.3 The extension of the filing period from 24 hours to 120 hours is expected to compound these effects, particularly in respect to meteorology factors as changes to the flight plan become necessary on the basis of updated weather reports received within the 5 day period before departure.

4.4 Investigations by the FPL&AM/TF have been unable to identify required operational circumstances in the Asia/Pacific Region where FPL lodgement earlier than 24 hours was necessary to meet the medium term needs of States. A similar situation is reported by IATA in respect to Asia/Pacific operators.

4.5 Discussions during the FPL&AM/TF/2 meeting highlighted the difficulties being experienced by many States in terms of civil aviation funding. In the case of the 120 hour lodgement provision, it was difficult for States to justify a business case for changes to what was often a number of legacy systems within a State when there was no clear operational requirement driving the change. Such changes would, of course, be included by States in the specification for new system procurement but, in the absence of a clear operational need, the business case for retrofit by Asia/Pacific States does not appear sound.

4.6 Notwithstanding, some States already have some capacity for DOF, albeit disabled in their systems at the moment. In these cases, where financial impacts were much less, it was logical for such ANSPs to proceed with 120 hour lodgement capability. It is also possible that some States will prefer to proceed with a DOF retrofit to legacy systems in time for the November 2012 implementation. However, the potential impacts of the implementation of an 'island' airspace which was accepting 120 hour lodgement should be considered in terms of the impact of neighbouring airspaces not accepting 120 hour lodgements, particularly in relation to AIDC configuration.

4.8 In light of the issues presently associated with the 5 day (120 hour) lodgement provision, including business case difficulties, the FPL&AM/TF does not support a compulsion on all Asia/Pacific States to meet the 120 hour lodgement provision by 15 November 2012. Accordingly the position adopted in the Asia/Pacific interim regional implementation strategy (Appendix A refers) has been proposed to APANPIRG for strengthening from the current *"..consider a constraint…"* to *"…adopt a regional approach that does not require processing of flight plans more the 24 hours prior to EOBT during the declared transition period…"*.

4.9 This is expected to mitigate the transition issues associated with DOF/ matters and reduce transmission of superfluous modification messages and the associated loading on messaging systems. DOF/ complexities will be further considered by States after the November 2012 implementation and, in any case, would be incorporated into new systems as they were specified, procured and commissioned.

5. Software Coding Considerations

Date of Flight (DOF) and Early Filing

5.1 In Amendment 1, use of a DOF/ indicator in Item 18 is accompanied by the ability to file NEW format up to 120 hours in advance. As it is likely that not all ANSPs will implement the 120 hour requirement by the Applicability Date, the following guidelines regard use of DOF/:

a) An ANSP that does not implement the 120 hour requirement should handle such messages in accordance with normal ANSP error message handling procedures if that message has a DOF/ that is beyond their implemented time frame (i.e. more than *nnn* hours in advance, often limited to 24 hours). This ensures such messages are processed for the intended day of flight.

b) At a defined time before Estimated Off Blocks Time (EOBT), normally within 24 hours, DOF/ can be removed from stored FPLs. In any case, DOF/ should not be transmitted in AIDC messages since flight data is first coordinated by AIDC much less than 24 hours before departure (and in fact, in most cases, is first coordinated after departure).

Use of P1-P9 in Field 10a

5.2 In relation to the use of P1-P9 in Field 10a (Radio communication, navigation and approach aid equipment and capabilities), Amendment 1 identifies alphanumeric entries P1-P9 in Field 10a as "Reserved for RCP." The following guidelines regard filing and processing P1-P9 in Item 18:

a) Even though there is no need for this information now, ANSPs should accept P1-P9 if filed in an FPL and pass the information in AIDC messages, but with no interpretation or processing required. This will avoid transition issues and minimize necessary coordination when these items begin to be used in the future.

Changed definition of "S" in Field 10a

5.3 Amendment 1 changes the definition of standard equipment in Field 10a ("S") so that it no longer includes ADF. An FPL may have elements that uniquely identify it as being in either PRESENT or NEW format. However, it is also possible for an FPL to have no unique elements, and thus be valid as both PRESENT and NEW format. In such an FPL, use of "S" in Field 10a is ambiguous.

5.4 Therefore, it is essential to know whether an FPL is in NEW or PRESENT format before interpreting an "S" filed in Field 10a. The following guidelines regard filing and processing of "S" during Phases 2 and 3 of the transition period, respectively (i.e. 1 April to 30 June & 1 July to 15 November 2012).

a) In conjunction with the beginning of Phase 2 of the transition period (i.e. 1 April 2012), ANSPs should not assume ADF capability when an "S" is filed, regardless of the perceived format of the filed FPL (NEW or PRESENT format). All FPLs received on or after 1 April 2012 with an "S" filed in Field 10a will be processed and/or interpreted as if "V O L" (VHF RTF, VOR and ILS) were filed; and

b) States and ANSPs must provide instructions to their users to file an "F" for ADF in addition to filing of "S" in PRESENT format FPLs, beginning 1 April 2012.

Consistency between Field 10a and PBN/ in Item 18

5.5 The PBN/ indicator introduced by Amendment 1 conveys not only navigational capability with respect to accuracy, but also information regarding what type of navigational equipment is used to achieve it. This introduces a relationship between PBN/ in Item 18 and Field 10a, and it is possible to file inconsistent data (i.e., capabilities in PBN/ that are not supported by data in Field 10a). Consequently, a consistency check should be coded to evaluate NEW FPLs per the following guidelines:

- If B1, B2, C1, C2, D1, D2, O1 or O2 are filed, then a "G" must be included in Field 10a;

- If B1, B3, C1, C3, D1, D3, O1 or O3 are filed, then a "D" must be included in Field 10a;

- If B1 or B4 is filed, then an "O" or "S" and a "D" must be included in Field 10a (i.e., "OD" or "SD" must appear in 10a);

- If B1, B5 or C1 is filed, an "I" must be included in Field 10a; and

- If C1, C4, D1, D4, O1 or O4 is filed, a "D" and an "I" must be included in Field 10a (i.e., "DI" must appear in 10a).

Validity Checking & Processing of Item 18 Indicators

5.6 Amendment 1 indicates that only the specified indicators should be included in Item 18. Furthermore, it makes the order of the indicators mandatory as opposed to preferred. Finally, the rules for some items are quite explicit and could readily be subject to validity checking by automation systems. The following guidelines regard use of Item 18:

a) Systems should not accept indicators in Item 18 which are not defined in the PANS-ATM. If internal requirements create the need to use a 'local' non-standard indicator, measures must be taken to ensure that airspace users filing with multiple FIRs are not impacted, and AIDC coordination does not contain any such indicators.

b) Airspace users should file indicators in the required order to ensure that systems applying truncation do not eliminate more important data. ANSPs should either enforce the required order, or ensure that AIDC messages contain the items in the required order regardless of the order filed.

c) Airspace users should only file a single instance of each indicator, though, when prescribed, multiple entries may follow that indicator, separated by a space (blank). ANSPs should either enforce the filing of a single instance of indicators, or ensure that AIDC messages concatenate (i.e. link together) multiple instances into a single instance followed by multiple entries (each separated by a space).

5.7 ANSPs should, at a minimum, perform a validity check of Item 18 indicator contents that are used for processing, and they are encouraged to check all items not listed as "free text field" in the Table 5-1, Item 18 Indicator Validity Check, below.

Indicator	Contents
STS/	One or more of the approved specified entries, separated by spaces
PBN/	A single string containing up to 8 of the approved alphanumeric descriptors No embedded spaces
NAV/	Free text field
COM/	Free text field

Indicator	Contents
DAT/	Free text field
SUR/	Free text field
DEP/	Free text field
DEST/	Free text field
DOF/	A single string in the specified date format (YYMMDD). No embedded spaces
REG/	A single string. No embedded spaces
EET/	One or more strings. Each string is: 2-5 alphanumeric characters –or- a LAT/LONG followed by a 4-digit elapsed time, from 0000 to 9959 (i.e., 0-99 hours followed by 0-59 minutes)
SEL/	A single string of four letters
TYP/	Free text *Note: Although the entry is structured when used for formation flights, it is also used when no designator is assigned and, therefore, may be any text description.*
CODE/	A single string of 6 hexadecimal characters
DLE/	One or more strings Each string consists of a valid Significant Point followed by a 4-digit elapsed time
OPR/	Free text field
ORGN/	Free text field
PER/	A single letter The letter must be one of those specified in PANS-OPS (Doc 8168), as below: • *Category **A:*** less than 169 km/h (91 kt) indicated airspeed (IAS) • *Category **B:*** 169 km/h (91 kt) or more but less than 224 km/h (121 kt) IAS • *Category **C:*** 224 km/h (121 kt) or more but less than 261 km/h (141 kt) IAS • *Category **D:*** 261 km/h (141 kt) or more but less than 307 km/h (166 kt) IAS • *Category **E:*** 307 km/h (166 kt) or more but less than 391 km/h (211 kt) IAS • *Category **H:*** Specific procedures for Helicopters.
ALTN/	Free text field
RALT/	Free text field
TALT/	Free text field

Indicator	Contents
RIF/	Route information consistent with the format of a valid Field 15c
RMK/	Free text field

Table 5-1: Item 18 Indicator Validity Check

Processing location information in the DEP/, DEST/, ALTN/, RALT/ and TALT/ indicators in Item 18.

5.8 Amendment 1 specifies that Item 18 entries for DEP/, DEST/, ALTN/, RALT/ and TALT/ should contain the name and location of the aerodrome. It also requires that "…*For aerodromes not listed in the relevant Aeronautical Information Publication [AIP], indicate location as follows …"*. The following guidelines will promote common interpretation and filing practices:

a) If the aerodrome identifier is not in ICAO DOC 7910, *Location Identifiers*, but is an approved identifier per the AIP for the State where the aerodrome is located, the name of the aerodrome should be the identifier and no additional location information is needed.

b) If the aerodrome is neither in DOC 7910 nor in a relevant AIP, the name of the airport should be included followed by a location as specified in the amendment. ANSPs should expect to be able to process the last text string provided as a location (Lat/Long, or bearing and distance from significant point, or fix name) to be usable in their flight plan route calculations.

Use of the DLE/ indicator in Item 18.

5.9 Amendment 1 defines a new DLE/ indicator for Item 18, after which a significant point and delay time at the significant point can be filed. The following guidelines regard filing and processing of this indicator:

a) The significant point in the DLE/ indicator should be required to match a significant point in Field 15c (i.e. not an implied point along an ATS route). An FPL designating an unknown point in a DLE/ indicator should be handled in accordance with normal ANSP error message handling procedures.

6. Conversion from NEW format to PRESENT format

6.1 As described in the ICAO material in the attachment to State letter AN 13/2/1-09/9, conversion from NEW to PRESENT format will be required during the transition period and will affect Field 10a, Field 10b, and Field 18. It is extremely important that such conversions from NEW format to PRESENT format are consistently applied by Asia/Pacific ANSPs and, preferably, throughout all ICAO regions. The guidelines contained in the Conversion Tables for respective fields included below record regionally agreed conversions from NEW to PRESENT format for consistent application by ANSPs. During the conversion process, duplication of entries should be avoided at all times. For example, if NEW flight plan contains PBN/B2B3 then the desired resulting Field 18 entry in the corresponding PRESENT plan should be NAV/RNAV5 B2 B3 and not NAV/RNAV5 B2 RNAV5 B3 as might be interpreted from the translation table.

Conversion of Field 10a

6.2 Table 6-1: *Conversion of Field 10a*, as shown below, is to be used for conversion of NEW Field 10a to PRESENT Field 10a. In using the Table, ensure a check is made for the presence of the information in both the "Field 10a" and "Item 18" NEW columns and convert it to the information in both the "Field 10a" and "Item 18" in PRESENT columns. If text is to be inserted in Field 10 or Field 18 as per the Table 6-1, and the text is already present, then it should not be inserted again. When inserting text in Field 18, if any information is already present due to having been filed or having been inserted by an earlier translation insertion, the text should be appended to the end of the existing text preceded by a space. For example, if PBN/B2 NAV/TCAS is filed in a NEW flight plan, then the resulting NAV/ entry in the corresponding PRESENT flight plan will be NAV/TCAS RNAV5 B2.

'NEW' Data Content		**Conversion to 'PRESENT' Data Content**	
Field 10a	**Item 18**	**Field 10a**	**Item 18**
N		N	
S		S	(refer para 5.4)
SF		SF	(refer para 5.4)
A		Z	NAV/GBAS
B		Z	NAV/LPV
C		C	
D		D	
E1		Z	COM/FMC WPR ACARS
E2		Z	COM/DFIS ACARS
E3		Z	COM/PDC ACARS
F		F	
G		G	
H		H	
I		I	
J1		J	DAT/V
J2		J	DAT/H
J3		J	DAT/V
J4		J	DAT/V
J5		J	DAT/S

‘NEW’ Data Content		Conversion to ‘PRESENT’ Data Content	
Field 10a	**Item 18**	**Field 10a**	**Item 18**
J6		J	DAT/S
J7		J	DAT/S
K		K	
L		L	
M1		Z	COM/INMARSAT
M2		Z	COM/MTSAT
M3		Z	COM/IRIDIUM
O		O	
P1-P9		*Reserved- should not be present. **Remove** items if present (i.e. do not make information part of the PRESENT format plan).*	
R	PBN/A1	RZ	NAV/RNAV10 RNP10 A1
R	PBN/B1	RZ	NAV/RNAV5 B1
R	PBN/B2	RZ	NAV/RNAV5 B2
R	PBN/B3	RZ	NAV/RNAV5 B3
R	PBN/B4	RZ	NAV/RNAV5 B4
R	PBN/B5	RZ	NAV/RNAV5 B5
R	PBN/B6	RZ	NAV/RNAV5 B6
R	PBN/C1	RZ	NAV/RNAV2 C1
R	PBN/C2	RZ	NAV/RNAV2 C2
R	PBN/C3	RZ	NAV/RNAV2 C3
R	PBN/C4	RZ	NAV/RNAV2 C4
R	PBN/D1	PRZ	NAV/RNAV1 D1
R	PBN/D2	PRZ	NAV/RNAV1 D2
R	PBN/D3	PRZ	NAV/RNAV1 D3
R	PBN/D4	PRZ	NAV/RNAV1 D4

'NEW' Data Content		Conversion to 'PRESENT' Data Content	
Field 10a	**Item 18**	**Field 10a**	**Item 18**
R	PBN/L1	RZ	NAV/RNP4 L1
R	PBN/O1	PRZ	NAV/RNP1O1
R	PBN/O2	PRZ	NAV/RNP1 O2
R	PBN/O3	PRZ	NAV/RNP1 O3
R	PBN/O4	PRZ	NAV/RNP1 O4
R	PBN/S1	RZ	NAV/RNP APCH S1
R	PBN/S2	RZ	NAV/RNP APCH BARO VNAV S2
R	PBN/T1	RZ	NAV/RNP AR APCH RF T1
R	PBN/T2	RZ	NAV/RNP AR APCH T2
T		T	
U		U	
V		V	
W		W	
X		X	
Y		Y	
Z	COM/nnnn	Z	COM/nnnn
Z	NAV/nnnn	Z	NAV/nnnn
Z	DAT/nnnn	Z	COM/nnnn

Table 6-1: Conversion of Field 10a

Conversion of Field 10b

6.3 Table 6-2: *Conversion of Field 10b*, as shown below, is to be used for conversion of NEW Field 10b to PRESENT Field 10b. Ensure a check is made for the presence of the information in both the "Field 10b" and "Item 18" NEW columns and convert it to the information in both the "Field 10b" and "Item 18" in PRESENT columns.

'NEW' Data Content		Conversion to 'PRESENT' Data Content	
Field 10b	**Item 18**	**Field 10b**	**Item 18**
N		N	
A		A	
C		C	
E		SD	COM/E
H		S	COM/H
I		I	
L		S D	COM/L
P		P	
S		S	
X		X	
B1		D	COM/B1
B2		D	COM/B2
U1		D	COM/U1
U2		D	COM/U2
V1		D	COM/V1
V2		D	COM/V2
D1		D	COM/D1
G1		D	COM/G1

Table 6-2: Conversion of Field 10b

Conversion of Item 18

6.4 Table 6-3: *Conversion of Item 18,* as shown below, is to be used for Conversion of NEW Item 18 to PRESENT Item 18.

'NEW' Data Content	Conversion to 'PRESENT' Data Content
Item 18	**Item 18**
STS/	STS/ copy text over • Except change "ATFMX" to "ATFMEXEMPTAPPROVED"
SUR/	RMK/ SUR <text after SUR/>
DOF/	Maintain data in DOF/ if possible, otherwise remove. While not a documented PRESENT indicator, it is currently in wide use.
DAT/	COM/
DLE/	RMK/ DLE <text after DLE/>
ORGN/	RMK/ ORGN
TALT/	RMK/ TALT <text after TALT/>
PBN/	***See Table 5-1 above***
All other indicators copy over directly, with additions to NAV/, COM/, and DAT/ as specified in Tables 6-1 and 6-2 above.	

Table 6-3: Conversion of Item 18

7. Differentiating between NEW format and PRESENT format

7.1 Although in most cases it will be evident when a FPL is in either the PRESENT or NEW format, situations can arise whereby the presentation of a particular FPL fully meets the parameters of both the PRESENT and NEW formats i.e. the same FPL is able to be interpreted using either of the PRESENT or NEW parameters. However, decoding the FPL using the PRESENT parameters could reach a different outcome than decoding the same FPL using the NEW format. For example, the letter "S" is used for standard equipment in Item 10 of both FPL formats, meaning V, F, O & L (i.e. VHF RTF, ADF, VOR and ILS) in PRESENT format but only V, O & L in NEW format (i.e. no ADF).

7.2 Accordingly, from the commencement of Phase 3 (1 July to 15 November 2012 - Airspace users testing and implementation) of the phased implementation strategy the following criteria should be used to determine if the filed FPL is in PRESENT or NEW format:

a) If the FPL is filed prior to an ANSP accepting NEW, assume the Flight Plan is PRESENT.

7.3 Once an ANSP has announced that it can accept the NEW format, assume the filed Flight Plan is in PRESENT format if any of the following is filed:

a) In Field 10a if the Qualifier E,J, M, P or Q is filed without an associated numeric;

b) In Field 10b if the Qualifier D is filed;

c) In Item 18 an entry used for STS/ is not in the allowed list for NEW; or

d) In Item 18 an entry used for PER/ is more than a single letter.

7.4 Once an ANSP has announced it can accept NEW format, assume the filed Flight Plan is in NEW format if any of the following is filed:

a) In Field 10a if any of the following qualifiers are filed: A, B, E1, E2 , E3 , J1, J2 , J3 , J4 , J5, J6, J7 , M1 , M2 , M3, P1, P2 , P3 , P4 , P5 , P6 , P7, P8, P9.

b) In Field 10b if any of the following qualifiers are filed: E , H , L , B1 , B2 , U1 , U2 ,V1 , V2 , D1 or G1.

c) In Item 18 if PBN/ is filed.

d) In Item 18 if SUR/ is filed.

e) In Item 18 if DLE/ is filed.

f) In Item 18 if TALT/ is filed.

7.5 If the qualifiers in paragraphs 7.3 and 7.4 above co-exist in the same Flight Plan, the format is inconsistent and therefore should be rejected by automation to 'error queue' for closer study. After November 15, 2012 all FPLs will be assumed to be in NEW format.

8. ATS Messages

Item 18 DOF

8.1 The FPL&AM/TF considers that ambiguity exists in relation to Item 18 and DOF which has implications on the composition of ATS messages as published in Amendment 1. The clarification provided for the requirement to include Item Type 18 in CHG, CNL, DLA, DEP and RQS messages states *"Field Type 18 with DOF specified is meant to uniquely identify the flight when the FPL is presented more than 24 hours in advance and there is no need to include all other Item 18 information"*.

8.2 The clarification also offers an interpretation of the Field Type 16 Previous Field/Next Field Table. This clearly states that only the DOF indicator is included in these messages and only if filed with the original message. If DOF is not filed in the original message then Item 18 is omitted. However, this interpretation contradicts the composition and examples for the CHG, CNL, DLA, DEP, RQP and RQS messages detailed in the Amendment which refer to Item 18 *"Other information (using more than one line if necessary)"*.

8.3 Accordingly, the following interpretation is applicable as an Asia/Pacific regional approach:

a) Insert DOF/YYMMDD in Item 18 if that indicator has been previously specified;

b) If the DOF/ indicator has not been previously specified insert zero (0) in Item 18

8.4 Example ATS messages based on this interpretation are shown below:

Modification (CHG) Messages

- (CHG-ABC123-NZAA2300-VTBS-DOF/091120-16/VTBD1151 VTBD)
- (CHG-ABC123-NZAA2300-VTBS-0-16/VTBD1151 VTBD)
- (CHG-ABC123-NZAA2300-VTBS-DOF/091120-13/NZAA0045-18/DOF/091121) *

  * **Note:** if changing DOF insert the complete content of Item 18 in Item 22

Flight Plan Cancellation (CNL) Messages

- (CNL-ABC123-NZAA2300-VTBS-DOF/091120)
- (CNL-ABC123-NZAA2300-VTBS-0)

Delay (DLA) Messages

- (DLA-ABC123-NZAA2345-VTBS-DOF/091120)
- (DLA-ABC123-NZAA2345-VTBS-0)

Departure (DEP) Messages

- (DEP-ABC123/A0254-NZAA2347-VTBS-DOF/091120)
- (DEP-ABC123/A0254-NZAA2347-VTBS-0)

Request Flight Plan (RQP) Messages

- (RQP-ABC123-NZAA2345-VTBS-DOF/091120)
- (RQP-ABC123-NZAA2345-VTBS-0)
- (RQP-ABC123-NZAA-VTBS-DOF/091120)
- (RQP-ABC123-NZAA-VTBS-0)

Request Supplementary Flight Plan (RQS) Messages

- (RQS-ABC123/A0254-NZAA2345-VTBS-DOF/091120)
- (RQS-ABC123/A0254-NZAA2345-VTBS-0)

Arrival (ARR) Messages

- (ARR-ABC123-NZAA-VTBS1315)
- (ARR-ABC123-NZAA0145-VTBS1315) **

  ** **Note:** include EOBT (Field Type 13b) if known

– END –

Appendix A

Adopted by Conclusion 20/7 of APANPIRG/20 (September 2009)

ASIA/PACIFIC REGION

INTERIM STRATEGY FOR THE IMPLEMENTATION OF

NEW ICAO FLIGHT PLAN FORMAT AND SUPPORTING ATS MESSAGES

Recognizing that:

1) Dynamic information management will assemble the best possible integrated picture of the historical, real-time and planned or foreseen future state of the ATM situation and provide the basis for improved decision making by all ATM community members;

2) The *Global Air Traffic Management Operational Concept* (Doc 9854) requires information management arrangements that provide accredited, quality-assured and timely information to be used to support ATM operations;

3) ATM Requirement 87 in the *Manual of Air Traffic Management System Requirements* (Doc 9882) provides that 4-D trajectories be used for traffic synchronization applications to meet ATM system performance targets, explaining that automation in the air and on the ground will be used fully in order to create an efficient and safe flow of traffic for all phases of flight;

4) The amended ICAO Flight Plan and associated ATS Message formats contained in Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444, applicable 15 November 2012) have been formulated to meet the needs of aircraft with advanced capabilities and the evolving requirements of automated air traffic management systems; and

5) The complexities inherent in automated computer systems preclude the adoption of a single regional transition date and transitions to the new flight plan provisions will therefore occur throughout the declared transition period. Accordingly, pursuit/adoption of a single 'global' implementation date is also not viable.

The Asia/Pacific implementation of Amendment 1 to the PANS-ATM shall:

1) Ensure that all States and airspace users implement the full provisions of Amendment 1 from 15 November 2012, not just selected aspects of the Amendment;

2) Acknowledge that States not implementing the full provisions of Amendment 1 from 15 November 2012 are obligated to publish the non compliance in State AIP as a 'significant difference' well in advance of the 15 November 2012 applicability date and will be included on the APANPIRG List of Deficiencies in the ATM/AIS/SAR Fields; and

3) Ensure that, from 15 November 2012, all States and airspace users accept and disseminate 'NEW' flight plan and associated ATS message formats only and capabilities for 'PRESENT' flight plan provisions are discontinued.

*(**Note:** In the context of the implementation, 'PRESENT' refers to the existing flight planning and ATS message formats as defined in the current version of the PANS-ATM and 'NEW' refers to the amended provisions as contained in Amendment 1 to the PANS-ATM.)*

The Asia/Pacific transition to the PANS-ATM Amendment 1 provisions shall:

1) Comply with the regional guidance provided by APANPIRG's Asia/Pacific Flight Plan and ATS Messages Task Force (FPL&AM/TF);

2) Preserve global consistency in implementation by basing implementation activities, to the extent possible, on Guidelines 1 to 6 described in the ICAO guidance material in State Letter AN 13/2.1-09/9, dated 6 February 2009;

3) Ensure that the FPL&AM/TF undertakes coordination to facilitate harmonization with implementations in neighbouring regions;

4) Eliminate or minimize State specific constraints and, if constraints are identified as necessary, implement such constraints on a regional or sub regional basis in preference to an individual State basis;

5) Declare a transition period from 1 July 2011 until 15 November 2012, and encourage States to implement 'NEW' capability between 1 July 2011 and 1 July 2012;

6) Not implement 'NEW' capability by States or users before the commencement of the transition period (i.e. no 'NEW' before 1 July 2011);

7) Encourage States to immediately commence preparations to implement Amendment 1 provisions and report progress to the FPL&AM/TF periodic meetings;

8) Require States to inform the Regional Office of scheduled transition date by 1 July 2010 for relay to the FPL&AM/TF;

9) Consider a regional constraint on requiring acceptance of flight plans more than 24 hours prior to Estimated Off Blocks Time (EOBT) during the transition period, to mitigate Date Of Flight (DOF) complexities;

10) Require that States retain capability to simultaneously support 'PRESENT' and 'NEW' provisions (flight plan and ATS message format) from the activation of their 'NEW' capabilities until the end of the transition period;

11) Encourage users to implement capability to simultaneously support 'PRESENT' and 'NEW' provisions from activation of their 'NEW' capabilities until the end of the transition period;

12) Recognize that until a number of adjacent States are providing 'NEW' capability, advantages do not accrue to users. Accordingly, users may not commence transition until the latter part of the transition period; and

13) Avail of States with expertise in automated ATM ground systems to support the conduct of a Regional Office Seminar during November 2009.

(last amended FPL&AM/TF/1, March 2009)

Appendix B

Amendment proposed by FPL&AM/TF/2 (November 2009)

for consideration by APANPIRG/21 (September 2010)

ASIA/PACIFIC REGION

STRATEGY FOR THE IMPLEMENTATION OF

NEW ICAO FLIGHT PLAN FORMAT AND SUPPORTING ATS MESSAGES

Recognizing that:

1) The *Global Air Traffic Management Operational Concept* (Doc 9854) requires information management arrangements that provide accredited, quality-assured and timely information to be used to support ATM operations;

2) ATM Requirement 87 in the *Manual of Air Traffic Management System Requirements* (Doc 9882) provides that 4-D trajectories be used for traffic synchronization applications to meet ATM system performance targets, explaining that automation in the air and on the ground will be used fully in order to create an efficient and safe flow of traffic for all phases of flight;

3) The amended ICAO Flight Plan and associated ATS Message formats contained in Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444, applicable 15 November 2012) have been formulated to meet the needs of aircraft with advanced capabilities and the evolving requirements of automated air traffic management systems;

4) The implementation of the amended ICAO Flight Plan and ATS Message formats has been adopted by APANPIRG/20 as Regional Performance Objective 5, and

5) The complexities inherent in automated computer systems preclude the adoption of a single regional implementation date and transitions to the new flight plan provisions will therefore occur in accordance with the declared transition period described in this document.

The Asia/Pacific implementation of Amendment 1 to the PANS-ATM shall:

1) Ensure that all States and airspace users implement the provisions of Amendment 1 from 15 November 2012, not just selected aspects of the Amendment;

2) Acknowledge that States not implementing Amendment 1 from 15 November 2012 are obligated by ICAO provisions to publish, preferably by 12 January 2012, the non compliance in State AIP as a ‘significant difference’ and will be included on the APANPIRG List of Deficiencies in the ATM/AIS/SAR Fields; and

3) Ensure that, from 15 November 2012, all States and airspace users accept and disseminate ‘NEW’ flight plan and associated ATS message formats only and capabilities for ‘PRESENT’ flight plan provisions are discontinued.

*(**Note:** In the context of the implementation, ‘PRESENT’ refers to the existing flight planning and ATS message formats as defined in the current version of the PANS-ATM and ‘NEW’ refers to the amended provisions as contained in Amendment 1 to the PANS-ATM.)*

The Asia/Pacific transition to the PANS-ATM Amendment 1 provisions shall:

1) Comply with the regional guidance provided by APANPIRG's Asia/Pacific Flight Plan and ATS Messages Task Force (FPL&AM/TF);

2) Preserve global consistency in implementation by basing implementation activities, to the extent possible, on Guidelines 1 to 6 described in the ICAO guidance material in State Letter AN 13/2.1-09/9, dated 6 February 2009;

3) Ensure that the FPL&AM/TF undertakes coordination to facilitate harmonization with implementations in neighbouring regions;

4) Minimize State specific constraints and, if constraints are identified as necessary, implement such constraints on a regional or sub regional basis in preference to an individual State basis;

5) Declare a transition period from 1 January 2012 until 15 November 2012,comprising;
   - 1 January to 31 March 2012 - ANSPs software delivery and internal testing,
   - 1 April to 30 June 2012 – ANSPs external testing and implementation, and
   - 1 July to 15 November 2012 – airspace users testing and implementation.

6) Not implement 'NEW' capability by States before the commencement of the ANSPs external testing and implementation period (i.e. no ANSP 'NEW' before 1 April 2012) and, insofar as possible, complete ANSP implementation of 'NEW' capability by the end of the ANSPs external testing and implementation period (i.e. complete ANSP 'NEW' before 30 June 2012);

7) Recognizing the risk to automated systems of having all users simultaneously commencing 'NEW' on the common implementation date (15 November 2012), encourage users to take full advantage of the airspace users testing and implementation period to ensure operational readiness of flight planning systems;

8) Encourage ANSPs and airspace users to coordinate appropriate implementation methodologies in order to ensure a staggered migration of airspace users to 'NEW' during the airspace users testing and implementation period (i.e. 1 July – 15 November 2012);

9) Encourage States and users to immediately commence preparations to implement Amendment 1 provisions in accordance with the declared transition period and report progress to the FPL&AM/TF periodic meetings;

10) Require States to inform the Regional Office of scheduled transition date by 1 July 2010 in accordance with APANPIRG Conclusion 20/8, for relay to the FPL&AM/TF;

11) To mitigate Date Of Flight (DOF) complexities, adopt a regional approach that does not require processing of flight plans more than 24 hours prior to Estimated Off Blocks Time (EOBT) during the declared transition period;

12) Require that States retain capability to simultaneously support 'PRESENT' and 'NEW' provisions (flight plan and ATS message format) from the activation of their 'NEW' capabilities until the end of the transition period (i.e. until 15 November 2012), at which point 'PRESENT' capability shall be discontinued;

(last amended FPL&AM/TF/2, November 2009)

ASIA/PACIFIC REGION

STRATEGY FOR THE IMPLEMENTATION OF NEW ICAO FLIGHT PLAN FORMAT AND SUPPORTING ATS MESSAGES

Recognizing that:

1) The *Global Air Traffic Management Operational Concept* (Doc 9854) requires information management arrangements that provide accredited, quality-assured and timely information to be used to support ATM operations;

2) ATM Requirement 87 in the *Manual of Air Traffic Management System Requirements* (Doc 9882) provides that 4-D trajectories be used for traffic synchronization applications to meet ATM system performance targets, explaining that automation in the air and on the ground will be used fully in order to create an efficient and safe flow of traffic for all phases of flight;

3) The amended ICAO Flight Plan and associated ATS Message formats contained in Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444, applicable 15 November 2012) have been formulated to meet the needs of aircraft with advanced capabilities and the evolving requirements of automated air traffic management systems;

4) The implementation of the amended ICAO Flight Plan and ATS Message formats has been adopted by APANPIRG/20 as Regional Performance Objective 5, and

5) The complexities inherent in automated computer systems preclude the adoption of a single regional implementation date and transitions to the new flight plan provisions will therefore occur in accordance with the declared transition period described in this document.

The Asia/Pacific implementation of Amendment 1 to the PANS-ATM shall:

1) Ensure that all States and airspace users implement the provisions of Amendment 1 from 15 November 2012, not just selected aspects of the Amendment;

2) Acknowledge that States not implementing Amendment 1 from 15 November 2012 are obligated by ICAO provisions to publish, preferably by 12 January 2012, the non compliance in State AIP as a 'significant difference' and will be included on the APANPIRG List of Deficiencies in the ATM/AIS/SAR Fields; and

3) Ensure that, from 15 November 2012, all States and airspace users accept and disseminate 'NEW' flight plan and associated ATS message formats only and capabilities for 'PRESENT' flight plan provisions are discontinued.

*(**Note:** In the context of the implementation, 'PRESENT' refers to the existing flight planning and ATS message formats as defined in the current version of the PANS-ATM and 'NEW' refers to the amended provisions as contained in Amendment 1 to the PANS-ATM.)*

The Asia/Pacific transition to the PANS-ATM Amendment 1 provisions shall:

1) Comply with the regional guidance provided by APANPIRG's Asia/Pacific Flight Plan and ATS Messages Task Force (FPL&AM/TF);

2) Preserve global consistency in implementation by basing implementation activities, to the extent possible, on Guidelines 1 to 6 described in the ICAO guidance material in State Letter AN 13/2.1-09/9, dated 6 February 2009;

3) Ensure that the FPL&AM/TF undertakes coordination to facilitate harmonization with implementations in neighbouring regions;

4) Minimize State specific constraints and, if constraints are identified as necessary, implement such constraints on a regional or sub regional basis in preference to an individual State basis;

5) Declare a transition period from 1 January 2012 until 15 November 2012,comprising;

   - 1 January to 31 March 2012 - ANSPs software delivery and internal testing,
   - 1 April to 30 June 2012 – ANSPs external testing and implementation, and
   - 1 July to 15 November 2012 – airspace users testing and implementation.

6) Not implement 'NEW' capability by States before the commencement of the ANSPs external testing and implementation period (i.e. no ANSP 'NEW' before 1 April 2012) and, insofar as possible, complete ANSP implementation of 'NEW' capability by the end of the ANSPs external testing and implementation period (i.e. complete ANSP 'NEW' before 30 June 2012);

7) Recognizing the risk to automated systems of having all users simultaneously commencing 'NEW' on the common implementation date (15 November 2012), encourage users to take full advantage of the airspace users testing and implementation period to ensure operational readiness of flight planning systems;

8) Encourage ANSPs and airspace users to coordinate appropriate implementation methodologies in order to ensure a staggered migration of airspace users to 'NEW' during the airspace users testing and implementation period (i.e. 1 July – 15 November 2012);

9) Encourage States and users to immediately commence preparations to implement Amendment 1 provisions in accordance with the declared transition period and report progress to the FPL&AM TF periodic meetings;

10) Require States to inform the Regional Office of scheduled transition date by 1 July 2010 in accordance with APANPIRG Conclusion 20/8, for relay to the FPL&AM TF;

11) To mitigate Date Of Flight (DOF) complexities, adopt a regional approach that does not require processing of flight plans more than 24 hours prior to Estimated Off Blocks Time (EOBT) during the declared transition period;

12) Require that States retain capability to simultaneously support 'PRESENT' and 'NEW' provisions (flight plan and ATS message format) from the activation of their 'NEW' capabilities until the end of the transition period (i.e. until 15 November 2012), at which point 'PRESENT' capability shall be discontinued;

(last amended FPL&AM TF/2, November 2009)

ATM/AIS/SAR Sub Group of APANPIRG — TASK LIST

The priorities assigned in the list have the following connotation:

A = Tasks of a high priority on which work should be expedited; and
B = Tasks of a medium priority on which work should be undertaken as soon as possible but not to the detriment of Priority "A" tasks.

(last updated ~~26 June, 2009~~ 8 July 2010)

ACTION ITEM & PRIORITY	GLOBAL PLAN INITIATIVE	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
18/1 **Priority A**	GPI-5 Performance based navigation GPI- 8 Collaborative airspace design and management	**ATS Routes** a) Identify ATS route requirements and monitor progress of route implementation in APAC Region b) Coordinate implementation of new ATS routes in accordance with the requirements of both States and airspace users c) Maintain Asia/Pacific ATS Route Catalogue on ICAO Regional Office website	ONGOING	States, Airspace Users, Regional Office **Functional Responsibility:** TRASAS CMRI BBACG FIT-BOB BOB-RHS/TF SEACG FIT-SEA SEA RR/TF ISPACG & FIT IPACG & FIT ASIOACG	OPEN	ATS Routes included as standing agenda item on ATS Coordination Group agendas

ACTION ITEM & PRIORITY	GLOBAL PLAN INITIATIVE	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
18/2 **Priority A**	GPI-5 Performance based navigation GPI-8 Collaborative airspace design and management	**ATS route implementation based on PBN ~~Concepts~~** *South East Asia* Conduct ATS route implementations in collaboration with stakeholders based on the Regional PBN Implementation Plan agreed by APANPIRG, to improve en-route airspace efficiency by means of reduced horizontal separation (lateral and longitudinal) based on PBN provisions.	2010	States of South East Asia, Regional Office **Functional Responsibility:** SEACG, FIT-SEA, SEA RR/TF	OPEN	ATM/AIS/SAR/SG/19 established the SEA Route Review Task Force (SEA RR/TF)
18/3 **Priority A**	GPI-5 Performance based navigation GPI-8 Collaborative airspace design and management	**ATS route implementation based on PBN ~~Concepts~~** *Bay of Bengal* Conduct ATS route implementations in collaboration with stakeholders based on the Regional PBN Implementation Plan agreed by APANPIRG, to improve en-route airspace efficiency by means of reduced horizontal separation (lateral and longitudinal) based on PBN provisions.	2010	States of Bay of Bengal, Regional Office **Functional Responsibility:** BBACG, FIT-BOB, BOB-RHS/TF	OPEN	BBACG/20 adopted 2010 as target for 50 NM longitudinal, established the Bay of Bengal Reduced Horizontal Separation Implementation Task Force (BOB-RHS/TF) Revised target 2011 with the phased implementation

ACTION ITEM & PRIORITY	GLOBAL PLAN INITIATIVE	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
18/4 **Priority A**	GPI-5 Performance based navigation GPI-8 Collaborative airspace design and management	**ATS route implementation based on PBN ~~Concepts~~** *Pacific Area (including North Pacific)* Conduct ATS route implementations in collaboration with stakeholders based on the Regional PBN Implementation Plan agreed by APANPIRG, to improve en-route airspace efficiency by means of reduced horizontal separation (lateral and longitudinal) based on PBN provisions.	2010	States of North Pacific, Central and South Pacific, respectively, Regional Office **Functional Responsibility:** No ICAO working group established, informal groups doing this work, notably ISPACG, IPACG	OPEN	50 NM longitudinal implemented North Pacific in 2008 30/30 NM (RNP4) implemented Honiara, Nauru, Brisbane, Nadia Auckland Oceanic FIRs in January 2005 30/30 NM operational trials commenced Oakland FIR 2007, Fukuoka FIR from August 2008, Anchorage FIR estimate 2011

ACTION ITEM & PRIORITY	GLOBAL PLAN INITIATIVE	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
18/5 **Priority A**	GPI-5 Performance based navigation GPI-8 Collaborative airspace design and management GPI-10 Terminal area design and management, GPI-11 RNP and RNAV Standard Instrument Departures (SIDs) and Standard Terminal Arrivals (STARs) GPI-12 Flight Management System (FMS) – based arrival procedures	**Terminal Area implementation based on PBN ~~Concept~~** Implement ICAO Performance Based Navigation (PBN) provisions for terminal area operations in collaboration with stakeholders based on the Regional PBN Implementation Plan agreed by APANPIRG, to improve terminal area efficiency by use of advanced navigation specifications for SIDs, STARs and instrument approach procedures.	In accordance with Regional & State PBN Plans for 2008-2012 and 2013-2016	States, Users, Regional Office **Functional Responsibility:** PBN/TF	OPEN	

ACTION ITEM & PRIORITY	GLOBAL PLAN INITIATIVE	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
18/5 **Priority A**	GPI-6 Air traffic flow management GPI-8 Collaborative airspace design and development GPI-16 Decision support and alerting system	**<u>Implement Air Traffic Flow Management</u>** States to consider and implement aspects of air traffic flow management (ATFM) including: a) centralized ATFM b) inter-regional cooperative ATFM; c) establishment of ATFM databases; d) application of strategic ATFM planning; e) application of tactical ATFM planning; and f) assessment of economic and environmental impact of the implementation of the ATFM system.	2012	States, Users, Regional Office ATM/AIS/SAR/SG APANPIRG **Functional Responsibility:** ATFM/TF for Bay of Bengal, no other working group established	OPEN	Bay of Bengal ATFM/TF active since 2005 Bay of Bengal implemented BOBCAT 5 July 2007 ATM/AIS/SAR/SG/19 drafted Conclusion to establish regional ATFM steering group
18/7 **Priority A**	GPI-2 Reduced vertical separation minima	**<u>RVSM Implementation</u>** a) Plan for and facilitate implementation of RVSM, as appropriate, in the Asia/Pacific Region	2009 - 2012	Affected States, Regional Office **Functional Responsibility:** RVSM/TF dissolved in December 2008 following China implementation, no ICAO group required for few remaining APAC FIRs	OPEN OPEN	~~China sovereign airspace implementation 21 November 2007. Pyongyang FIR scheduled October 2009.~~ Ulaanbaatar tentatively 2012 in coordination with the Russian Federation.

ACTION ITEM & PRIORITY	GLOBAL PLAN INITIATIVE	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
18/8 **Priority A**	None applicable	**<u>Identify and manage Deficiencies in the ATM, AIS and SAR fields</u>** a) Develop and maintain Deficiencies list, b) Identify unimplemented items in the BANP, c) Assist States to correct deficiencies, d) Promote timely resolution of safety-critical items identified by APANPIRG	ONGOING	States, Users, International Organisations, Regional Office, ATM/AIS/SAR/SG APANPIRG **Functional Responsibility:** No specific working group established, all parties have responsibilities in this area.	OPEN	ALLPIRG/5 (March 2006) raised Conclusion 5/15 in respect of "Last Resort" action to resolve deficiencies
18/10 **Priority A**	None applicable	**<u>ATM Contingency Planning</u>** Prepare ATM Contingency Plans based on model (Indonesia) adopted by APANPIRG/17. Coordinate with neighbouring States to prepare plans	2010	States, Regional Office, **Functional Responsibility:** No working group established, work item included on agenda of ATS Coordination Groups.	OPEN	Send copies of ATM Contingency Plans to Regional Office

ACTION ITEM & PRIORITY	GLOBAL PLAN INITIATIVE	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
~~**18/6**~~ ~~**Priority B**~~	~~GPI-18 Aeronautical information~~	~~**Implement AIS enhancements**~~ ~~a) Develop AIS implementations plans for introduction of AIS quality systems and AIS databases and consider issues arising from the use of public internet for AIS;~~ ~~b) Study means of aeronautical data management by civil aviation authorities and/or ATS providers in other regions including the aeronautical information exchange model (AIXM) and the electronic AIP (eAIP), and consider the feasibility in making use of these methods/models in the Asia/Pacific Region;~~ ~~c) Develop Regional AIS Automation Plan, training material and conduct workshops on the Guidance Manual for AIS in the Asia/Pacific Region~~	~~2012~~	~~States, Users, Regional Office~~ ~~**Functional Responsibility:** AAITF~~	~~OPEN~~ CLOSED (Refer Action Item 20/1)	~~AIS/AIM Implementation Task Force (AAITF) active since March 2006~~
18/9 **Priority B**	None applicable	**SAR Matters** Assist appropriate provision of SAR facilities, services and procedures within the Asia Pacific Region by: a) Periodic review of SAR facilities, services and procedures in the region, b) Encourage States to delegate or negotiate SAR services, c) Asia/Pacific "SAR Capability Matrix" be kept up to date and distributed to States for information and action., d) Asia/Pacific "Register of SAR Agreements" be kept up to date and distributed to States for information and action	ONGOING	States, Regional Office, ATM/AIS/SAR/SG APANPIRG	OPEN	States to update the ATM/AIS/SAR/SG each year to permit the periodic update of the SAR Capability Matrix and Register of SAR Agreements.

ACTION ITEM & PRIORITY	GLOBAL PLAN INITIATIVE	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
~~**18/11**~~ ~~**Priority B**~~	~~As appropriate~~	~~**APANPIRG Key Priorities**~~ ~~Regularly review APANPIRG List of Key Priorities for implementation of CNS/ATM systems for the Asia/Pacific region, identify new items as required, encourage and monitor implementation~~	~~ONGOING~~	~~States, Regional Office, Airspace Users, International Organisations ATM/AIS/SAR/SG~~	~~OPEN~~ CLOSED	~~ATM/AIS/SAR/SG/19 recommended that the key priority items be included in Performance e Framework Forms (PFFs) and the Key Priorities List be discontinued.~~ With the adoption of the Performance Framework Form, APANPIRG/20 agreed that the Key Priority List would be discontinued, with immediate effect.
~~**18/14**~~ ~~**Priority A**~~	~~GPI-5 Performance based navigation~~ ~~GPI-9 Situational awareness~~ ~~GPI-11 RNP and RNAV SIDs and STARs~~ ~~GPI-17 Implementation of data link applications~~	~~**Amendments to ICAO Flight Plan**~~ ~~Review Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444, effective 15 November 2012) to identify implementation complexities and consequent regional implementation plans and strategies arising from the adoption of amended PANS ATM provisions relating to the ICAO Flight Plan and associated ATS Message formats.~~	~~2010~~	~~States, Regional Office, Airspace Users, International Organisations ATM/AIS/SAR/SG~~ ~~**Functional Responsibility:** FPL&AM/TF~~	~~OPEN~~ CLOSED (Refer to Action Item 20/2)	~~FPL&AM TF/1 drafted the *Interim Strategy for the Implementation of New ICAO Flight Plan Format and supporting ATS Messages*~~ ~~ATM/AIS/SAR/SG/19 recommended that APANPIRG adopt the Interim Strategy~~

ACTION ITEM & PRIORITY	GLOBAL PLAN INITIATIVE	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
20/1 **Priority B**	GPI-18 Aeronautical information	**Enhanced Provision of AIS/AIM** a) Implement the enhanced provisions for AIM becoming available through the work of the AIS-AIM Study Group; b) Monitor implementation of the regional performance framework performance objectives contained in the Performance Framework Form (PFF); c) Enable future AIM functions to address the new requirements that will be needed to implement the Global Air Traffic Management Operational Concept in a net centric information environment	2016	States, Users, Regional Office **Functional Responsibility:** AAITF	OPEN	AIS/AIM Implementation Task Force (AAITF) active since March 2006
20/2 **Priority A**	GPI-5 Performance based navigation GPI-9 Situational awareness GPI-11 RNP and RNAV SIDs and STARs GPI-17 Implementation of data link applications	**New ICAO Flight Plan Form** Implement Amendment 1 to the Fifteenth Edition of the *Procedures for Air Navigation Services – Ait Traffic Services* (PANS-ATM, Doc 4444, effective 15 November 2012) relating to the ICAO Flight Plan and associated ATS Message formats.	2012	States, Regional Office, Airspace Users, International Organisations ATM/AIS/SAR/SG **Functional Responsibility:** FPL&AM/TF	OPEN	FPL&AM/TF/1 drafted the *Interim Strategy for the Implementation of New ICAO Flight Plan Format and supporting ATS Messages* APANPIRG/20 (September 2009, Bangkok) adopted the Interim Strategy. FPL&AM/TF/2 drafted the *Asia/Pacific Guidance Material for the Implementation of Amendment 1 to Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444), 15th Edition.*

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Agenda Item 3.3: RASMAG

Agenda Item 3: Regional Air Navigation Planning and Implementation Issues

3.3 Regional Airspace Safety Monitoring Advisory Group (RASMAG)

3.3.1 The meeting reviewed a consolidated report of the 12th and the 13th Meetings of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/12 and 13, December 2009 and August 2010, respectively). Full copies of the meeting reports are available on the website of ICAO Asia and Pacific Office at http://www.bangkok.icao.int/ under the 'Meetings' menu. The meeting expressed its appreciation for the many tasks that had been addressed by RASMAG since reporting to APANPIRG/20 last year.

RASMAG List of Competent Airspace Safety Monitoring Organizations

3.3.2 RASMAG is required by its TOR to recommend and facilitate the implementation of airspace safety monitoring and performance assessment services, and to review and recommend on the competency and compatibility of monitoring organizations. The updated *"RASMAG List of Competent Airspace Safety Monitoring Organizations"* is shown at **Appendix A** to the Report on Agenda Item 3.3.

Asia/Pacific RVSM Safety Assessments

3.3.3 The meeting recalled that the assessment of the safety performance of RVSM airspace was provided by specialist assessment bodies known as Regional Monitoring Agencies (RMAs), which are specifically established to undertake the on-going monitoring of RVSM operations in order to meet ICAO Standards. For Asia/Pacific Region, APANPIRG-endorsed RMA services are provided by:

a) Australian Airspace Monitoring Agency (AAMA), operated by Airservices Australia;

b) China RMA, operated by the Air Traffic Management Bureau (ATMB) of the Civil Aviation Administration of China (CAAC);

c) JCAB RMA, operated by Japan Civil Aviation Bureau (JCAB);

d) Monitoring Agency for the Asia Region (MAAR), operated by Aeronautical Radio of Thailand (AEROTHAI); and

e) Pacific Approvals Registry and Monitoring Organization (PARMO), operated by the United States Federal Aviation Administration (FAA).

3.3.4 To facilitate ongoing vertical safety assessment, the Asia/Pacific regional RVSM airspaces are broadly divided into the following sub-areas:

a) Brisbane, Melbourne, Honiara and Nauru FIRs (AAMA);

b) Port Moresby FIR (AAMA);

c) Indonesian FIRs (AAMA),

d) sovereign airspaces of China (China RMA);

e) Fukuoka FIR (JCAB RMA);

f) Bay of Bengal FIRs (MAAR);

g) Western Pacific/South China Sea FIRs (MAAR);

h) Pacific Area (PARMO); and

i) Northeast Asia Incheon FIR (PARMO).

3.3.5 The meeting reviewed a consolidated report of the RVSM safety performance across the Asia/Pacific region. The meeting recognized that this summary of RVSM safety performance comprised the reporting called for by Asia/Pacific Safety Metric 1 *"Percentage of RMA sub- regions achieving the regional Target Level of Safety (TLS) for RVSM operations, as of April each year"* that had been adopted by APANPIRG/20, and noted that:

a) With the exception of the Kabul and the Ulaanbaatar FIRs, RVSM has been implemented throughout the Asia/Pacific region. Pyongyang implemented RVSM in October 2009 and Ulaanbaatar is scheduled in late 2011;

b) RVSM safety monitoring in Asia/Pacific is undertaken as a regional programme in accordance with Annex 11 requirements;

c) Safety monitoring for RVSM operations in Asia/Pacific is undertaken by five APANPIRG approved RMAs – AAMA, China RMA, JCAB RMA, MAAR and PARMO;

d) In general terms, the regional TLS for RVSM operations is being widely satisfied across the Asia/Pacific region;

e) The regional TLS, however, is not being satisfied in Australian and Indonesian airspace. Active investigation and remediation by Australia is ongoing;

f) Persistent examples of RVSM non-approved flights 'incorrectly' filing flight plans showing RVSM approval in Field 10 have been identified through the work of AAMA, China RMA and PARMO. This leads ATC to incorrectly applying the reduced separation minima;

g) Single biggest issue leading to a Large Height Deviation (LHD) in the Asia/Pacific RVSM operational environment remains that of errors in the ATC-Unit to ATC-Unit coordination interface.

South China Sea Horizontal Safety Assessments

3.3.6 The meeting noted that the assessment of the safety performance of South China Sea reduced horizontal separation minima was undertaken by South-East Asia Safety Monitoring Agency (SEASMA), which was especially established to undertake the on-going monitoring of reduce horizontal separation operations on six major RNAV routes in the South China Sea airspace in order to determine compliance with Asia/Pacific region safety goals for the established lateral and longitudinal separation standards.

3.3.7 Table 1 below is the result of the airspace oversight as of April 2010.

Type of Risk	Risk Estimation	TLS	Remarks
Lateral Risk	0.044×10^{-9}	5×10^{-9}	Below TLS
Longitudinal Risk	1×10^{-9}	5×10^{-9}	Below TLS

Table 1: Lateral and Longitudinal Risk Estimates

Assessment of Non-Approved Operators Using RVSM Airspace

3.3.8 Australia and the United States provided a summary of operator compliance with State approval requirements. United States carried out the assessments using one-month samples of the Pacific and Northeast Asia traffic movement data collected during December 2009. The importance of timely notification by States of operator approval status to RMAs was emphasized by the results.

3.3.9 All civil aircraft operations observed in each sample were compared against the collective approvals database from January 2010. The operator-aircraft combinations identified as asserting approval for operations in RVSM airspace ("/W" or "/Q" in Field 10 of the ICAO flight plan) found in the traffic data, were cross-examined with the collective approvals database. The operator-aircraft combinations identified were still under investigation.

3.3.10 The meeting noted that experience had shown that the primary systematic reason for failure to match operations and approvals was a delay in State notification of the approval status of some operators to the appropriate RMA. This situation should be remedied in the future because of the widespread application of RVSM throughout the region.

3.3.11 Australia stated that in total, the comparison undertaken by AAMA identified 213 airframes over a 10 day period in July 2010, with airframes from Malaysia showing the highest number of 54. The next highest three States were the Philippines, India and the United States, in this order. Details of the State of Registry, aircraft registration and type were provided.

3.3.12 RASMAG/13 noted the concerns expressed by AAMA in relation to the quality of the data contained in the approvals databases provided by other RMAs primarily as a result of non-standard formatting. Australia commented that given that there is now an agreed format for collection of this type of data, and that it is likely that more RMAs will undertake broad based comparative checks of aircraft operating in their assigned airspaces, it was imperative that the database formatting and data quality was maintained to a high standard. AAMA sought the assistance of the global RMAs in achieving this outcome and for the Asia/Pacific RMAs to review and adjust their approval databases at their earliest convenience but at least by end of December 2010.

3.3.13 China RMA submitted to the fifth RMA Coordination Meeting (RMACG/5, May 2010) the assessment of RVSM non-approved aircraft operating in Chinese RVSM airspace during the period of December 2009. The purpose that China RMA reported this to RMACG/5 was that there was a delay in notification of the approval status of some operators and other RMAs may experience similar problems with States reporting approvals. Most of the flights were conducted by aircraft from the Russian Federation. RASMAG/13 was informed that the EUR RMA was currently collaborating with the Russia Federation towards the RVSM implementation on 17 November 2011 in the EURASIA region and the RMA would provide assistance in resolving the issue of reporting approvals.

3.3.14 China RMA commented that there was an obvious decrease in the number of identified State non-approved operations in the domestic Chinese RVSM airspace compared to the result reported to RASMAG/12. China RMA used the additional December 2009 flight plans data to cross check the 'ICAO Flight Plan Field 10' column in the Traffic Sample Data (TSD). This check improved the correctness of ICAO Flight Plan Field 10 information and registration number in the TSD. Another reason was that the RVSM approval information from the Middle East RMA had been updated. In the last analysis, the majority of 'non-approved' operations in the domestic Chinese airspace were conducted by the aircraft from the Middle East region where an up-to-date approval exchange was not available. This situation had improved in 2010 and all the RVSM approval statuses for the aircraft from the Middle East region were identified.

RVSM Manual

3.3.15 It was noted that the Separation and Airspace Safety Panel (SASP) agreed to progress the update to RVSM Manual (Doc 9574) with the goal of completing a final draft at its next working group meeting in May 2010. To that end, the Chairman of RASMAG provided a copy of the draft document for RASMAG's review seeking any feedback to be provided to the Chairman by 30 March 2010.

3.3.16 RASMAG/13 was provided with suggested wording in consideration of RASMAG Task 12/1, which highlighted the benefits of establishing Scrutiny Groups as part of the safety management for RVSM airspace. As a result of discussion, additional wording was developed for the amendment and agreed to by the meeting. RASMAG/13 requested the Chairman to directly coordinate with SASP at its next meeting in November 2010.

Long-Term Height Monitoring Infrastructure

3.3.17 APANPIRG had agreed that RASMAG should be tasked to conduct investigations and attempt to recommend the type and the appropriate locations of monitoring systems to most effectively monitor the Asia/Pacific aircraft population with the least infrastructure investment. RASMAG/12 considered how best to proceed in responding to the APANPIRG task. MAAR commented that there was an urgent need to identify the required monitoring system infrastructure for the Asia/Pacific region and that they were concerned that traditional ground-based systems may not be practical. In the view of MAAR a system based on ADS-B was the most cost efficient and practical given the planned implementation of ADS-B systems in the Region.

3.3.18 RASMAG/12 turned its attention to discussing possible options to develop a proposal to be provided to APANPIRG/21 that would identify possible height monitoring infrastructure required by the Region. Opening the discussion, the Chairman proposed that the traffic flows should provide the basis for the provision of the appropriate infrastructure. It was agreed that the focus should be on those elements of the regional fleet that did not have access to the ground-based height monitoring facilities in Europe and North America. In taking this view, such an analysis, while high-level in nature, would more clearly focus on the required systems to accommodate the regional fleets that currently do not have access to ground-based monitoring.

3.3.19 Through an analysis of the traffic flows and input from the respective RMAs, RASMAG/12 determined that there were five main blocks of airspace within the Asia/Pacific region that contained the major traffic flows of the fleets that remained essentially within one or more of those five areas. In assessing the types of monitoring infrastructure required in each of these areas, RASMAG/12 agreed with the following:

For the Japanese FIR, a ground-based Height Monitoring Unit (HMU) to capture the domestic fleet plus those aircraft operating across the North Pacific or between Japan and Southeast Asia;

For the China FIRs, several ground-based HMU essentially to accommodate the large number of Chinese domestic fleet that operate within those FIRs only, and to be available for other international flights that may operate in that airspace;

For Southeast Asia, given the proposed infrastructure in the other areas, MAAR advised that their assessment is that any required monitoring of the fleet of States in this area can be accommodated by use of available Enhanced GPS Monitoring Units (EGMUs);

For the India/Pakistan area, a ground based HMU to cater primarily for the large domestic fleet that operates in that area: and

For the Australian area including Indonesia, New Zealand and Papua New Guinea, the widespread Australian and Indonesian ADS-B network and the proposed ADS-B mandate for Australian airspace effective 2013 will provide significant monitoring capability without the need for other ground based systems.

Monitoring Progress of China RMA

3.3.20 China reported that China RMA had two sets of EGMUs to conduct the aircraft height keeping performance monitoring. China RMA had submitted preliminary results for the ground-based monitoring station site selection in China to RMACG/5. RASMAG/13 was informed that China RMA was also considering the possibility of buying the COTS ground-based monitoring system. China RMA was promoting the Long-Term Monitoring program and, since the beginning of 2010, China RMA had provided monitoring service to 54 domestic aircraft.

Analysis to Determine the Potential of the First Height Monitoring Unit (HMU) in Japan

3.3.21 Japan had indicated its intention to deploy three HMUs in Japan, with the first one (Okayama HMU: HMU-1) targeted to become operational in the third quarter of 2011. Japan provided an analysis undertaken by JCAB RMA to determine the future potential of HMU-1 as the first ground-based height-keeping performance monitoring system in Japan. RASMAG/13thanked Japan for the information and noted the significant progress made in establishing height monitoring capability.

RVSM Approval Aircraft ADS-B Equipage in Australia

3.3.22 The meeting noted that given the extensive coverage of ADS-B within the RVSM flight levels (FL) in Australia, AAMA had been undertaking an analysis to determine which operators and aircraft type have the potential to be monitored using the Australian ADS-B surveillance system in the short-term. In doing this work, AAMA was cognizant of the fact that after 12 December 2013, all aircraft operating over Australian territory above FL 290 must be ADS-B equipped.

3.3.23 The analysis undertaken by AAMA showed that currently a significant number of RVSM approved aircraft operating within the Australia FIRs were equipped with ADS-B. This fact and the expectation of increased fitment in the next few years due to new aircraft purchases and the Australian FIR mandate for fitment scheduled for December 2013 demonstrated the short-term ability of AAMA to use ADS-B to provide initial and long-term monitoring for a number of Asia/Pacific

based operators and aircraft types that were already equipped with ADS-B. Additionally, AAMA was keen to progress discussions with the Indonesian authorities with a view to obtaining ADS-B data for RVSM monitoring purposes from the extensive ADS-B network available in that State.

3.3.24 Australia reminded RASMAG/13 that at RASMAG/12, an infrastructure plan was developed to assist APANPIRG to make decisions on the best height monitoring systems and their location to acquit the regions responsibilities in relation to the new long-term height monitoring requirements being implemented from November 2010. As proposed by RASMAG, AAMA had taken steps to identify the number of aircraft types by operator that could potentially be monitored using ADS-B in the period from December 2010 to 12 December 2013. RASMAG/13 was informed that as a first step, the analysis identified the operators using the Australian RVSM airspace.

3.3.25 RASMAG/13 thanked Australia for the detailed analysis and encouraged AAMA to continue its excellent work with the United States in establishing the viability of ADS-B as a height monitoring means. United States congratulated AAMA on the effort in providing this analysis. They also explained that NAARMO was keen to use ADS-B to measure changes in ASE.

Review Outcome of Related Asia/Pacific Meetings

3.3.26 RASMAG/13 reviewed the outcome of PBN/TF/6, FIT-BOB/12, FIT-SEA/10, SEACG/17 and ATM/AIS/SAR/SG/20. RASMAG/13 noted that ATM/AIS/SAR/SG/20 felt that a region-wide safety monitoring arrangement for data link operations with oversight by RASMAG would be preferred and has formulated the Draft Conclusion SG 20/13 – CRA Arrangement under RASMAG Responsibility, for consideration by APANPIRG.

3.3.27 RASMAG/13 agreed that communication and surveillance capability had a vital role to play in ensuring the continuing safety of the region's airspace. RASMAG/13, however, was of view that while RASMAG's responsibility is to oversight safety in the region, the arrangement for the establishment and operations of CRAs was the responsibility of FIT and ATM/AIS/SAR/SG.

China RMA Action to Improve Coordination and Assist the Collection of LHD

3.3.28 RASMAG/12 noted that China RMA had taken initiatives to improve the efficiency of its operations and obtain the support of the Chinese domestic operators as well as regulatory organisations within the Chinese aviation system. Australia commented that they were having similar problems as China RMA in not receiving LHD reports from airlines even though the requirement to report is clearly detailed within the Australian Aeronautical Information Publication (AIP). As a result, following discussions with the Australian Transport Safety Bureau (ATSB), pilot reports to the mandatory incident reporting system maintained by that organisation, and which fit the criteria for an LHD are now passed to the AAMA on a monthly basis. The United States stated that they considered the work that China is doing in this regard to assist reporting from operators is an activity of importance however can be difficult as it is realistically an ongoing process due to staff changeovers, new operators entering the airspace and other factors.

Sample Letter Templates for Use by Asia/Pacific RMAs

3.3.29 The letter templates were drafted using the sample letter templates contained in the RMA Manual and actual letters sent by the PARMO, EUROCONTROL, and North Atlantic (NAT) Central Monitoring Agency (CMA) RMAs. After some amendments to wording, the meeting agreed to standardize on all the letters for use by Asia Pacific RMAs. The United States suggested that possibly they could establish an Asia/Pac folder on the KSN site where copies of the templates could be stored. This was readily agreed to by the meeting.

3.3.30 MAAR then raised an issue regarding the fact that previous letters sent by them to States have been ignored while letters from ICAO have generated a response. They suggested that in sending the letter in Appendix A of WP/16, that it would be more effective to have this sent from the ICAO Regional office. The Secretary acknowledged that there may be issues with that process but if the RMA could complete the required areas of the standardized letter, he would arrange for it to be sent by ICAO if possible.

Large Height Deviation (LHD) between Japan and Republic of Korea

3.3.31 Japan reported four LHDs which were had occurred since the implementation of AIDC on 15 June 2009. New Zealand suggested that possibly Japan could supply a further update of the analysis. RASMAG/12 agreed to task the RMAs that could provide data and analysis in relation to the effect of AIDC on Category E LHDs, to do so.

EMA Handbook PBN Approvals Database Format

3.3.32 A format in the EMA Handbook had been developed that specifically includes all current PBN and data link approval types. New Zealand had proposed combining the RVSM, PBN and data link approvals databases, and so, in anticipation, the proposed format also allows for RVSM approvals. While the proposal shows a proposed database record format, the same structure could be used as the form for States to report additions and changes to their approvals.

Unified Approvals Database

3.3.33 New Zealand reported that in discussing the notion of a Regional PBN Approvals database, RASMAG/11 had agreed not to pursue the regional database at the present time but had requested States to consider the proposal and how to best provide data for inclusion when it was eventually established. The number of PBN approvals that an aircraft may hold requires a more complex database than for RVSM approvals. There are a number of navigation specifications that must be allowed for; the approvals are not hierarchical and may be airspace-dependent.

3.3.34 Where an organisation provides both RMA and EMA functions, it would be feasible to combine the RVSM, PBN and data link approvals databases. A combined RVSM, PBN and data link approvals database would allow States to provide approvals data to a single Monitoring Agency; the data will be distributed to other agencies through Monitoring Agency internal data exchange mechanisms. Sending data to a single agency is considered to be a significant benefit in reducing overhead activities and minimizing the risks of errors.

Establishment of PBN Approval Database

3.3.35 RASMAG/13 recalled that at RASMAG/12, New Zealand proposed combining and linking the RVSM and the PBN databases. JCAB RMA had been inspired by the proposal, and combined the PBN database with the RVSM database. JCAB RMA has also combined the RMA F2/F3 forms and EMA A2/A3 forms.

3.3.36 RASMAG/13 noted that RMA, RVSM-related data shall be exchanged with the other RMAs, whereas this is currently not the case with PBN-related data. The database established by JCAB RMA is the combination of the globally shared RVSM data and the locally required PBN data. JCAB RMA foresees lasting improvement of the database format as the development of PBN operations continue.

3.3.37 RASMAG/13 congratulated Japan on their initiative in developing the means to capture PBN approvals information. Singapore also thanked Japan and both agreed to share PBN data that they had captured. The Chairman suggested that possibly other RMAs could review their F2/F3 forms to capture this information which was supported by the meeting. The United States commented that the sharing of PBN data between EMAs is a good outcome which should be encouraged.

PBN Approvals Information on Flight Plans

3.3.38 RASMAG/12 discussed the need to include all PBN approval types in the flight plan to assist in the airspace monitoring duties of the EMA and to make use of the flight plan form Field 18 as the means to include the PBN approval types. RASMAG/12 endorsed the proposal to use Field 18 of the flight plan on a regional basis to identify an aircraft's PBN approvals. The Secretary was tasked with coordinating this proposal to the Flight Plan Task Force as well as the ATM/AIS/SAR Sub-Group.

China as RMA for the Oceanic Airspace of the Sanya FIR

3.3.39 China reported that in 2002 when RVSM was implemented partially in the Sanya FIR, RVSM had not been introduced in domestic Chinese airspace. China RMA received authorization from APANPIRG in 2008 in Conclusion 19/14. Civil Aviation Authority of China (CAAC) realized that it was important to enhance the management of domestic RVSM airspace and ensure a thorough knowledge of the risk for the entire Chinese airspace. The meeting was advised that China RMA was willing to take over the responsibility for the oceanic airspace of Sanya FIR from MAAR.

3.3.40 RASMAG/12 noted the intention of China, and endorsed the proposed action. In Conclusion 19/14**,** APANPIRG had explicitly authorised China as the RMA for China's sovereign airspace. In addition, it was also noted that RASMAG/11 had endorsed China RMA's taking over from MAAR as the RMA for the Pyongyang FIR.

3.3.41 The meeting adopted the following Conclusion:

Conclusion 21/15 − Responsibility Area of China RMA

That, the China RMA be approved as an APANPIRG Asia/Pacific RVSM Regional Monitoring Agency with responsibility for all RVSM airspaces in China FIRs, and the Pyongyang FIR.

India's Progress towards Establishment of Enroute Monitoring Agency (EMA) – BOBASMA

3.3.42 RASMAG/13 was informed that India was progressing in establishment of En-route Monitoring Agency for airspace over the Bay of Bengal, Arabian Sea and Indian Ocean with assistance and guidance of the FAA. It was noted that the Airports Authority of India has formed a Team of experts from Air Traffic Management, Safety, avionics and mathematical/statistical background. The team will visit the FAA Technical Center, Atlantic City, USA in August 2010 to understand the safety monitoring establishment and its operation.

3.3.43 RASMAG/13 thanked India for the information and encouraged them to continue their work to develop capabilities that would enable them to be endorsed as an EMA. The Chairman also reminded India of the need to present their credentials to RASMAG in relation to establishing their capability to undertake the required technical work of an EMA.

RVSM Non-Approved Operators Using RVSM Airspace

3.3.44 Australia and China provided analyses of RVSM non-approved aircraft operations within their respective RVSM airspace. RASMAG/12 was informed that the presence of non-approved aircraft was closely monitored in Australian airspace to ensure the risk was adequately controlled so that aircraft were not separated with less than the required minimum. Australia stated that AAMA commenced a scheduled review of all flight plan data on a monthly basis to identify Australian registered 'rogue' aircraft operating within the Australian FIRs. The overwhelming majority of those aircraft were general aviation operated airframes.

3.3.45 Australia explained that checks in January 2009 while identifying a number of non-approved aircraft, also revealed a number of issues related to the approvals database held by the State authority due in part to delays in having that data base updated following the issuing of approvals to operators. Pro-active discussions between AAMA and the State authority saw these data base issues effectively resolved as evidenced in the significant reduction in the number of non-approved aircraft identified in subsequent months. Australia informed RASMAG/12 that AAMA was now confident that the issue of rogue airframes operating in the RVSM airspace within the Australian FIRs was being effectively controlled through close cooperation with the State authority.

Data Link Performance

3.3.46 New Zealand noted a report to IPACG FIT CRA that an A345 fleet had displayed a downward trend in data link performance in terms of both ADS-C and CPDLC round-trip times. This was thought to be due to increasing use of on-board passenger facilities for the Internet access and in-flight telephone connectivity via satellite. It was understood that a software upgrade to the ground earth station would resolve the problem, and that this upgrade had been approved.

ADS-C/CPCLC Data Link Performance Monitoring

3.3.47 United States presented observed CPDLC/ADS-C performance measures as specified in the Global Operational Data Link Document (GOLD) from operational data collected in the Oakland and New York FIRs. The data highlighted the difference in communication performance observed between two separate regions. The United States noted the Oakland data reflects the improvements to the system from the implementation of the CRA function. United States also provided a summary of observed errors in the estimated time of arrival at the next compulsory waypoint contained in ADS-C position reports received at New York and Oakland oceanic centers. The analysis concentrated on ADS-C reports with the current position time equal to the estimate of time over next compulsory waypoint, e.g. the time interval to next waypoint given as zero. The results showed a pattern associated with the time of day for ADS-C reports originating from a specific aircraft manufacturer. FAA has notified the aircraft manufacturer of the problem, and the aircraft manufacturer had responded and indicated that the problem had been identified and planed a fix for 2012.

3.3.48 United States noted that a lot of monitoring of this type of data already took place in the NAT and through the FITs in the Pacific. As a result, the EMAs would need to become more active in undertaking this type of monitoring particularly where separation standards require specific communications requirements are met. New Zealand commented that this type of analysis was essential in being able to pinpoint issues with operators, aircraft types or even specific airframes, and therefore allowing follow-up to resolution. New Zealand also noted some concerns with regards to future availability and needs for satellite communication systems and the level of protection being provided to band width available to aviation industry. The meeting agreed these issues would need to be monitored by RASMAG.

Fifth Meeting of the Regional Monitoring Agency Coordination Group (RMACG/5)

3.3.49 The meeting noted that RASMAG/13 was provided a brief overview of the outcomes of the fifth RMA Coordination Meeting (RMACG/5, May 2010) held in Atlantic City, USA and the main items of discussion were presented. With regard to the revised Minimum Monitoring Requirement (MMR) agreed at RMACG/5, RASMAG/13 recalled that Conclusion 20/20 would remain in force until the Long-Term Height Monitoring (LTHM) requirements in Annex 6 – *Aircraft Operations* become effective in November 2010. RASMAG/13 was also informed that Annex 11 provisions and those of the RVSM manual require system performance monitoring on a regional basis to provide evidence of stability of ASE. In addition, the revised MMR agreed by RMACG/5 was a means to translate the requirement of Annex 6 into the operational environment. Therefore, RASMAG decided that the revised MMR agreed by RMACG/5 would remain as the basis for the maintenance of LTHM requirements in the region after November 2010 as follows:

Decision RASMAG 13/1 – Use of the Revised MMR in LTHM for the Region

That, in order to ensure the continued safe use of RVSM airspace within Asia/Pacific region, the revised MMR endorsed by RMACG/5 be used as the regional basis for maintenance of LTHM requirements after November 2010.

3.3.50 The Secretariat was tasked to update the LTHM impact statement to incorporate the revised MMR. RMAs were requested to review the monitoring burden based on the revised MMR by 30 August 2010.

Proposed Changes to the Asia/Pacific Regional En-Route Monitoring Agency (EMA) Handbook

3.3.51 RASMAG/13 was informed by Singapore that States were recommended to use the suggested form in the EMA handbook (APPENDIX E) when submitting large lateral deviation (LLD) and/or large longitudinal error (LLE) where, it was stated that deviations due to weather and other contingency events will need to be reported. If ATC approval for a deviation, however, had been granted, such a deviation should not constitute an LLD. The meeting agreed that an LLD did not include ATC approved deviations or other contingency events, and adopted the proposed changes to the EMA Handbook which clarifies that large horizontal-plane deviations identified in the monitoring process would not include ATC-approved deviations or other contingency events unless the deviation magnitude is greater than the approved deviation.

Review by APANPIRG/21

3.3.52 The meeting noted that the persistent examples of RVSM non-approved flights incorrectly filing plans showing RVSM approvals had been identified. The Secretariat advised the meeting that research by RMAs were still on-going on the causes of the problem therefore it was recommended that RMAs continue to identify non-approval airframes and provide that information to the States concerned for action on an individual case basis. Further, the Secretariat informed the meeting that particularly investigation on operator-aircraft combinations was yet to concluded, and a Conclusion or Decision would not be formulated for APANPIRG until appropriate actions are found on a total region basis and identified by RASMAG.

3.3.53 The meeting thanked RASMAG for their continuous work to monitor safety in applying reduced separation standards. The meeting noted that the result of APAC Metric 1 – the percentage of RMA sub-regions achieving the regional TLS for RVSM operations, referenced as of April, was 77.8 %.

APANPIRG Asia/Pacific Airspace Safety Monitoring

RASMAG LIST OF COMPETENT AIRSPACE SAFETY MONITORING ORGANIZATIONS

The Regional Airspace Safety Monitoring Advisory Group of APANPIRG (RASMAG) is required by its terms of reference to recommend and facilitate the implementation of airspace safety monitoring and performance assessment services and to review and recommend on the competency and compatibility of airspace monitoring organizations. In order to assist in addressing these requirements, RASMAG updates and distributes the following list of competent airspace safety monitoring organizations for use by States requiring airspace safety monitoring services. In the context of the list, abbreviations have meanings as follows:

- RMA – Regional Monitoring Agency – safety assessment and monitoring in the vertical plane (i.e. RVSM);
- EMA – En-route Monitoring Agency – safety assessment and monitoring in the horizontal plane (i.e. RVSM, RNAV10, RNP4);
- CRA – Central Reporting Agency – technical performance of data link systems (i.e. ADS/CPDLC); and
- FIT – FANS 1/A Interoperability/Implementation Team – parent body to a CRA.

(Last updated 17 December 2009)

Organisation *(including contact officer)*	State	Competency	Status	Airspace assessed (FIRs)
Australian Airspace Monitoring Agency (AAMA) - Airservices Australia http://www.airservicesaustralia.com/organisations/aama/default.asp Mr. Robert Butcher, Operational Analysis Manager, Safety and Environment Group email: robert.butcher@airservicesaustralia.com or aama@airservicesaustralia.com	Australia	APANPIRG RMA	Current	Brisbane, Honiara, Jakarta, Melbourne, Nauru, Port Moresby and Ujung Pandang FIRs.
		EMA	Current	Brisbane, Melbourne FIRs.

Organisation *(including contact officer)*	State	Competency	Status	Airspace assessed (FIRs)
China RMA - **Air Traffic Management Bureau, (ATMB) of Civil Aviation Administration of China (CAAC)** http://www.chinarma.cn (secure site) Mr. Tang Jinxiang, Engineer of Safety and Monitoring Technical Group, ATMB email: tangjx@adcc.com.cn	China	APANPIRG RMA	Current	Beijing, Guangzhou, Kunming, Lanzhou, Shanghai, Shenyang, Urumqi Wuhan Sanya and Pyongyang FIR.
JCAB RMA - **Japan Civil Aviation Bureau** Mr. Noritoshi Suzuki, Special Assistant to the Director, Flight Procedures and Airspace Program Office, email: suzuki-n248@mlit.go.jp	Japan	APANPIRG RMA	Current	Fukuoka FIR
		EMA	Available fourth quarter – 2009	Fukuoka FIR
Monitoring Agency for the Asia Region (MAAR) – Aeronautical Radio of Thailand LTD http://www.aerothai.co.th/maar Mr. Nuttakajorn Yanpirat, Executive Officer, Systems Engineering,Aeronautical Radio of Thailand Ltd. email: nuttakajorn.ya@aerothai.co.th or maar@aerothail.co.th	Thailand	APANPIRG RMA	Current	Bangkok, Kolkatta, Chennai, Colombo, Delhi, Dhaka, Hanoi, Ho Chi Minh, Hong Kong, Karachi, Kathmandu, Kota Kinabalu, Kuala Lumpur, Lahore, Male, Manila, Mumbai, Phnom Penh, Singapore, Taibei, Ulaan Bataar, Vientiane, Yangon FIRs

Organisation *(including contact officer)*	State	Competency	Status	Airspace assessed (FIRs)
Pacific Approvals Registry and Monitoring Organization (PARMO) – Federal Aviation Administration (US FAA) http://www.faa.gov/air_traffic/separation_standards/parmo/ Mr. Dale Livingston, Manager, Separation Standards Analysis Team, FAA, email: dale.livingston@faa.gov or aparmo@faa.gov	USA	APANPIRG RMA	Current	Anchorage Oceanic, Auckland Oceanic, Incheon, Nadi, Oakland Oceanic, Tahiti FIRs
		EMA	Current	Anchorage Oceanic, Oakland Oceanic
South East Asia Safety Monitoring Agency (SEASMA) - Civil Aviation Authority of Singapore (CAAS) Mr. Kuah Kong Beng, Chief Air Traffic Control Officer, email: KUAH_Kong_Beng@caas.gov.sg	Singapore	EMA for South China Sea	Current	Hong Kong, Ho Chi Minh, Kota Kinabalu, Kuala Lumpur, Manila, Sanya and Singapore FIRs
FIT - SEA (ICAO Regional Office email icao_apac@bangkok.icao.int & **CRA Japan** Mr. Mitsuo Hayasaka, Deputy Director, Air Traffic Control Association Japan, email:hayasaka@atcaj.or.jp	ICAO Regional Office & CRA Japan	FIT & CRA	Current	South China Sea FIRs

Organisation *(including contact officer)*	State	Competency	Status	Airspace assessed (FIRs)
IPACG/FIT Mr. Takahiro Morishima, JCAB Co-Chair email: morishima-t2zg@mlit.go.jp & Mr. Reed Sladen, FAA Co-Chair, email: reed.b.sladen@faa.gov	Japan & USA	FIT & CRA	Current	North & Central Pacific (Oceanic airspace within Fukuoka FIR, and Anchorage & Oakland FIRs)
CRA Japan Mr. Mitsuo Hayasaka, Deputy Director, Air Traffic Control Association Japan, email: hayasaka@atcaj.or.jp	Japan	CRA	Current	Fukuoka FIR for IPACG/FIT Ho Chi Minh, Manila, Singapore FIRs for FIT-SEA
FIT - BOB ICAO Regional Office email icao_apac@bangkok.icao.int & Mr. Bradley Cornell, Boeing Engineering email: Bradley.D.Cornell@Boeing.Com	ICAO Regional Office & Boeing USA	FIT & CRA	Current	Bay of Bengal FIRs, Ujung Pandang and Jakarta FIRs, provides assistance to the members of the Arabian Sea/Indian Ocean ATS Coordination Group (ASIOACG)
ISPACG/FIT Mr. Bradley Cornell, Boeing Engineering email: Bradley.D.Cornell@Boeing.Com	Boeing USA	FIT & CRA	Current	South Pacific FIRs and members of the Informal South Pacific ATS Coordination Group (ISPACG)

Agenda Item 3.4: CNS/MET

Agenda item 3: Regional air navigation planning and implementation issues

3.4 CNS/MET matters

3.4.1 The meeting reviewed the outcomes of the Fourteenth Meeting of Communications, Navigation and Surveillance/Meteorology Sub-Group (CNS/MET SG/14) of Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) held in Jakarta, Indonesia from 19 to 22 July 2010. The meeting was attended by 103 participants from 20 States and 3 International Organization, IATA, IFALPA and SITA. For the first time CNS/MET SG met for four day period in response to the outcome of last APANPIRG meeting and because of prevailing circumstances. It was however agreed that four and a half day are essential for the meetings to be meaningful.

3.4.2 The meeting also reviewed the report of the Ninth Meeting of ADS-B Study and Implementation Task Force (ADS-B SITF/9) held in Jakarta from 18 to 19 August 2010. Briefing on the outcome of the Seventh Meeting of Performance Based Navigation Task Force (PBN TF/7) held from 1 to 3 September 2010 was presented by the Chairman of the PBN TF. Work done by the Sub-Group and the Task Forces was noted with appreciation. Based on the discussions on CNS/MET related issues presented meeting took following actions:

Election of Vice Chair of CNS/MET Sub-group of APANPIRG

3.4.3 It was informed that Dr. Cheng Cho-ming and Mr. Keith Mackersy were elected as co-chairs for the MET Working Group of CNS/MET Sub-group of APANPIRG.

Relevant Action Items of the 46th DGCA Conference

3.4.4 Action Items developed in the 46th DGCA Conference relating to the Work Programme of the CNS/MET Sub-group were highlighted as follows:

- Action Item 46/1 – Seamless Sky - ATM;
- Action Item 46/6 – Implementation of Continuous Descent Operation;
- Action Item 46/7 – Asia-Pacific Flight Procedure Programme;
- Action Item 46/8 – Preparation for WRC2011 (2012); and
- Action Item 46/11 – Technical Cooperation (Training opportunities)

3.4.5 The meeting noted that Items 46/6, 46/7 and 46/8 were already covered by the work programme of the CNS/MET Sub-group and APANPIRG. The meeting encouraged the States to make use of the opportunities provided under ICAO Developing Countries Training Programme for training of their national technical staff as and when they are made available.

3.4.6 With respect to Action Item 46/9 regarding USOAP Compliance Checklists (CC), Australia noted that the CC database used by USOAP had not been updated in time; the checklist still refers to old reference when the SARPs have already been amended. Timely update to the compliance checklist is required. In this regard, the meeting was informed that the on-line database on notification of difference by the States based on information provided by the States would be made available shortly by ICAO.

Review outcome of the ATM/AIS/SAR/SG/20

3.4.7 The meeting noted CNS/MET related outcome of ATM/AIS/SAR/SG/20 meeting held in Singapore from 6 to 10 July, 2010. CNS/MET SG endorsed a draft Conclusion formulated by the ATM/AIS/SAR/SG/20 inviting ICAO to convene a Workshop for planning the future ATM system.

Aeronautical Fixed Service

AMHS Implementation Plan

3.4.8 Hong Kong China, proposed phased approach to ensure an orderly testing and implementation of AMHS in the region. To avoid the complexities and time involved in testing every possible combination of a large number of MTAs in the region, it was proposed that the comprehensive interoperability test procedures included in Annex C and E of the AMHS Manual should be used only for those pairs of MTAs which are directly connected. For indirectly connected MTA pairs, abridged interoperability test procedure included in the Bilateral Test items (except IT601) stipulated in paragraph 4, Annex E of the AMHS Manual should be sufficient. Four phases of testing, with Phase I for AFTN routing at MTA level, Phase II or intermediate phase for MTA direct routing to end BBIS, Phase III or final phase for MTA – to – any – MTA routing within the region and Phase IV for migration to IPS as and when IPS is available were explained in detail. In accordance with the phased testing approach explained above, an AMHS Implementation Planner developed to support the States in planning testing and implementation of AMHS in their Administrations was also presented to the meeting.

Fifth Meeting of ATNICG

3.4.9 The fifth meeting of Aeronautical Telecommunication Network Implementation Coordination Group (ATNICG/5), hosted by Department of Civil Aviation, Malaysia was held from 31 May to 4 June 2010 in Kuala Lumpur, Malaysia.

3.4.10 ATNICG reviewed the Subject/Tasks list assigned for the Group and decided to propose new sub-tasks and remove some of the existing ones on the basis of developments that have taken place. CNS/MET SG Meeting reviewed the updated Subject/Tasks List placed at **Appendix A** to this report and adopted the following Decision:

Decision 21/16 - ATNICG Subject/Tasks List

That, the updated Subject/Tasks List placed at **Appendix A** to the Report on Agenda Item 3.4 be adopted.

Clarifications on ICAO Doc 9896

3.4.11 The meeting noted the outcome of Aeronautical Communication Panel (ACP) Working Group of the Whole meeting held from 18 to 22 January 2010 in Montreal. It was informed that Edition 2 of Doc 9896, guidance document on ATN using IPS had been delivered. Differences between Edition 1 and 2 of Doc 9896 were explained and inclusion of Voice over IP (VoIP) in the later edition was informed. The meeting also noted issues related to the on-line and off-line Directory Services and adopted following Conclusion:

Conclusion 21/17 - ICAO Doc 9896 clarifications

That ICAO be invited to provide clarifications on the following issues related to ATN/AMHS implementation

i) VoIP should be limited to ATS ground service since the ICAO approach is to encourage data communication such as CPDLC for air-ground communication. Furthermore, the VoIP performance is network dependent and thus performance acceptance is varied;

ii) how the States will come to know about updates on the relevant RFCs; and

iii) IPv6 address structure.

ATNICG Working Group Activities

3.4.12 Sixth meeting of ATNICG Working Group (ATNICG WG/6) was held in Hua Hin, Thailand from 22 to 25 September 2009 and the Seventh Meeting of the Working Group (ATNICG WG/7) was held on 29 January 2010 in Bangkok. ATNICG WG/7 was held back to back with AMC Training conducted by EUROCONTROL on 25 and 26 January and the AMHS Implementation Workshop organized on 27 and 28 January 2010. All these programmes (the meetings, the training and the workshop) were hosted by Aeronautical Radio of Thailand (AEROTHAI). The meeting was informed about the commissioning of AMHS link between Hong Kong and Macao in December 2009.

Review ATN/AMHS Implementation Status

3.4.13 Implementation status was presented by Japan, Indonesia, India, China, Singapore, Republic of Korea, Thailand and USA to the ATNICG Meeting. Compatibility issue between Edition 2 AMHS installed in Japan and Edition 3 in Korea was noted by the meeting. Hong Kong China presented the implementation status in the region through an Excel based Regional AMHS Implementation Planner. It was informed that the implementation status will in future be updated through the Implementation Planner and following Decision was adopted:

Decision 21/18 - Regional ATN/AMHS Implementation Planner

That, the Asia/Pacific Regional Implementation Planner Placed at **Appendix B** to the Report on Agenda Item 3.4 be adopted to report ATN/AMHS implementation progress in the region.

Review of implementation plan and status from other ICAO regions

3.4.14 It was informed that MID region had adopted ATN over IPS, which will maintain compatibility with AFTN, CIDIN and ISO/OSI based implementations and also AMHS implementation had been completed or was in very advanced stage of completion in a number of States in the region. MID region currently has four links with Asia and Pacific regions (Bahrain/Singapore, Kuwait/Pakistan, Iran/Pakistan and Oman/India). It was agreed that Singapore, Pakistan and India should take initiative in transiting to inter-regional AMHS connectivity following the prescribed procedure. The meeting adopted the following Conclusion based on recommendation of CNS/MET SG:

Conclusion 21/19 - AMHS connectivity with ICAO MID region

That Singapore, Pakistan and India take initiative in transiting to AMHS connectivity with Bahrain, Kuwait, Iran and Oman respectively at the earliest.

In response to a query raised in the meeting, both India and Singapore confirmed their readiness to conduct tests with their reciprocal ends.

3.4.15 AMHS connectivity between Amman/Jordan and Abu Dhabi/UAE on Virtual Private Network (VPN) and policy adopted in the MID region regarding usage of public internet was also informed to the meeting.

Asia/Pacific Regional ATN/AMHS Implementation Strategy

3.4.16 Singapore presented the ATN/AMHS Implementation Strategy as updated by ATNICG/5 for review. Changes proposed in the format of the Strategy were noted. The meeting agreed with the stress given to replace the X.25 sub-network with IP sub-network connectivity. The revised Strategy recommends deployment of a backbone network of ATN/OSI and a private network of ATN/IPS comprising of dedicated point-to-point circuits with no connectivity provided with public network. Usage of public network however is limited for connectivity between MTAs and their UAs. The meeting, after deliberations decided to adopt following Conclusion:

Conclusion 21/20 - Strategy for Implementation of Aeronautical Telecommunication Network (ATN) in the Asia/Pacific Region

That, the document provided at **Appendix C** to the Report on Agenda Item 3.4 be adopted as Strategy for Implementation of Aeronautical Telecommunication Network (ATN) in the Asia/Pacific Region.

ATS Messaging Management Centers (AMC) Data

3.4.17 The meeting was informed about the observation made in ATNICG/5 that AMC data provided by the States was sometimes not correct though ICAO State Letter on this subject was quite comprehensive. To facilitate recording of correct data, meeting was presented a proposal to circulate a form amongst the States for collecting the correct information. This form includes a filled up sample to provide a better understanding about the requirements of each column. The meeting agreed with the proposal and adopted following Conclusion:

Conclusion 21/21 - AMC Information Form

That, States be invited to provide data for AMC in respect of their Administration in the format provided at **Appendix D** to the report on agenda item 3.4.

Use of Directory Service

3.4.18 Directory Service concepts are specified in ICAO Doc 9705, Edition 3, Sub-Volume VII and Asia/Pacific Directory Service Guidance document. Based on X.500, Directory Service allows users to collect information describing the users, the applications and other resources in a common directory that is accessible to all authorized users and applications within ATN. It also provides 'on-line' administration tool to centrally manage information for the global ATN. For the reasons like synchronizing the data in all the MTAs etc, the service is still not being used on-line. It was informed that ATNICG formulated a Decision to analyze and recommend Directory Service that can be implemented for future use, develop procedures for implementation, identify obstacles on its implementation and develop mitigation proposals for these obstacles.

IP Sub-network Planning

3.4.19 ATNICG reviewed two Addressing Plans, one based on the IPv6 and the other based on IPv4 which has been adopted in the CAR/SAM region. Based on the IPv4 and IPv6 addressing plans proposed, the meeting considered the following:

i) The coordination required to obtain a global IPv6 address prefix for the region, and the cost in acquiring and maintaining such address prefix;

ii) The desirability of an ICAO global IPv6 addressing scheme, which must be coordinated through the Aeronautical Communication Panel;

iii) The urgent need to migrate from AFTN to the AMHS, and the need for non-backbone States to use the Internet Protocol Suite (IPS) to reduce their implementation costs; and

iv) That the proposed IPv4 addressing plan is considered sufficient to meet the requirements of ground-ground communication in the Asia/Pacific region in the short-to-medium term.

3.4.20 Based on the considerations mentioned above, meeting adopted following Conclusion developed by ATNICG and recommended by the CNS/MET SG:

Conclusion 21/22 – Asia/Pacific ATN Interim Addressing Plan

That,

i) The proposed IPv6 and IPv4 addressing schemes be submitted to ICAO and ICAO be requested to consider a global IPv6 addressing scheme for ground-ground communication;

ii) The proposed IPv4 address plan placed at **Appendix E** to this report on agenda item 3.4 be adopted to enable the Asia/Pacific ATN ground IPS network implementation to proceed using IPv4 in the interim with minimum delay; and

iii) The Asia/Pacific region transition to IPv6 once the above issues have been resolved.

Amendment of Regional Documents

3.4.21 The meeting was informed that Asia/Pacific ATN IDRP Routing Policy Version 3.1 provides for a common addressing prefix for Asia/Pacific and NAM regions to achieve the ultimate goal of shortest path and hence ATNICG has proposed that the two regions should have common 5-byte NSAP prefix and this requires that Asia/Pacific ATN NSAP addressing plan should be changed to include Hexadecimal Code ‘91’ in the ADM field. The recommended change in the document was adopted by APANPIRG.

3.4.22 ATNICG WG/6 was informed that the current test cases provided in Annex C to Asia/Pacific AMHS Manual are somewhat limited in the scope of verifying routing capabilities of ATN routers operating in multiple domains and hence amendment proposed by ATNICG to include additional test cases and endorsed by CNS/MET SG was adopted by the meeting.

3.4.23 Updated version of guidance document on Management, Operation and Technical Controls on Security recommended by CNS/MET SG was adopted.

3.4.24 The meeting also agreed to the ATNICG recommendation to revise the test procedures to limit the testing between indirectly connected MTA pairs to abridged procedures provided in paragraph 4, Annex E of the AMHS Manual to save time and efforts required for conducting the comprehensive testing procedure provided in Annex C and Annex E.

3.4.25 Step-by-step approach for transiting from AFTN Routing to MTA-to-any-MTA developed by ATNICG on the basis of the experience gained by many States and was recommended for adoption by APANPIRG.

3.4.26 In view of the foregoing , the meeting adopted the following Conclusion:

Conclusion 21/23 – Amendment/update of Regional ATN/AMHS Guidance Documents

That, the following amended Regional Guidance Documents for ATN/AMHS implementation be adopted and distributed to the States:

a) the amended Asia/Pacific ATN Network Service Access Point (NSAP) Addressing Plan for Asia/Pacific Region as provided in the **Appendix F** to the Report on Agenda Item 3.4;

b) the Test Procedure for ATN Router Connection Test, Annex C to Asia/Pacific AMHS Manual as provided in the **Appendix G** to the Report on Agenda Item 3.4;

c) "Asia/Pacific ATN Security Guidance Document" to replace the existing Asia/Pacific ATN Security Guidance Document, Draft First Edition as provided in **Appendix H** to the Report on Agenda Item 3.4; and

d) the phased testing procedure to transit from AFTN routing to MTA-to-any-MTA routing to be incorporated in the AMHS Manual as provided in **Appendix I** to the Report on Agenda Item 3.4.

3.4.27 It was informed that ATNICG had considered an Interface Control Document for the IPS routers and agreed to have a common standard to facilitate uniform and harmonized implementation of ATN over IPS. ATNICG felt that there may be a requirement to amend the FASID tables to accommodate the unique requirement of IPS and proposed that an additional sub task be introduced in the Subject/Tasks list for ATNICG.

3.4.28 The meeting was reminded about the requirement of amending the guidance documents on the basis of Proposed Defect Reports (PDRs) raised in the Aeronautical Communication Panel (ACP) meetings. It was expressed that those States, which were not attending the ACP meetings regularly, were not having an opportunity to raise the PDRs. The meeting was also informed that PDR has since been renamed as Amendment Proposals. The meeting therefore adopted following Conclusion for providing an opportunity of raising PDR to such States, which were not attending ACP meetings:

Conclusion 21/24 - Points for Proposed Defect Report (PDR) (Amendment Proposal) raised in the region

That, States be invited to present their ATN/AMHS implementation related Points for Proposed Defect Report (PDR) (Amendment Proposal) to the ICAO APAC Office. These points will be presented to the ATNICG/ATNICG Working Group (whichever is scheduled earlier) by the Secretariat for endorsement, so that these points, along with the ATNICG/ATNICG WG recommendations can be forwarded to ACP WG – M Secretariat through ICAO APAC Office.

3.4.29 Japan presented its proposal to the ATNICG Meeting for AFTN Routing Change between Japan and Russia in view of the developments that have taken place lately. It was agreed that ICAO Regional office should coordinate with Europe Region for updating the AFTN routing directory. Accordingly the meeting adopted the following Conclusion formulated by ATNICG:

Conclusion 21/25 – Japan/Russia AFTN Routing Change

That, ICAO be requested to coordinate with Europe Region for updating its AFTN routing directory and consequential change to the APAC AFTN routing directory.

3.4.30 It was informed that the next Working Group (ATNICG WG/8) meeting has been planned to be held from 28 September to 1 October 2010. In the ATNICG/5 meeting, New Zealand offered to host the Working Group meeting in Christchurch. Republic of Korea offered to host the Sixth Meeting of ATNICG in Seoul tentatively scheduled from 23 to 27 May 2011.

3.4.31 The meeting appreciated the contributions made by Department of Civil Aviation, Malaysia by hosting the Fifth Meeting of ATNICG and thanked New Zealand and Republic of Korea for their offers to host the next Working Group and ATNICG meetings respectively.

Pan-regional ICD for AIDC

3.4.32 The meeting noted that NAT SPG has agreed to the development of Pan-regional ICAO guidance material for oceanic AIDC ICD based on the current AIDC ICD (version 3) adopted by APANPIRG and the latest AIDC ICD used in the NAT Region. The NAT SPG further agreed that the task of harmonising the NAT and APAC AIDC ICDs should be advanced in accordance with the following principles:

a) The United States should continue their effort by drafting a consolidated ICD with a thorough bi-directional tracking of content;

b) Since the ICD would apply to oceanic regions only title of the future document should be “Pan-regional ICD for Oceanic AIDC”;

c) The content of the initial consolidated ICD should be confined to the existing substance of the NAT and APAC ICDs. Otherwise review would become unnecessarily complicated;

d) The above should be accomplished as quickly as practicable, and the NAT and APAC ICDs should be frozen in the interim; and

e) Once the NAT and APAC PIRGs have endorsed the resulting ICD, a new round of drafting and review could begin to incorporate any desired new substance, as part of the ongoing inter-regional maintenance of the document.

3.4.33 The NAT SPG also agreed that this work would be progressed in the framework of the NAT IMG and that a group of experts would be identified to review the draft consolidated NAT/APAC AIDC ICD. The Rapporteur of the NAT CNSG would coordinate this activity with the APAC Region. The work would be conducted via electronic means of communication as far as possible. A progress report would be provided to the next meeting of the NAT IMG where a decision would be taken regarding further steps.

3.4.34 Within the Asia Pacific Region, the APAC AIDC ICD applies to ATS units and ATM systems serving oceanic, continental and regional airspace. Therefore the assumption that the ICD would only apply to oceanic regions is at complete variance with the implementation and use of the APAC AIDC ICD. Accordingly, the meeting adopted following Conclusion:

Conclusion 21/26 – Pan-Regional ICD for AIDC

That, ICAO Regional Office inform the NATSPG that the proposed title "Pan-regional ICD for Oceanic AIDC" is unacceptable as the ICD for AIDC is applicable for use by all ATS and ATM facilities in both oceanic, and continental areas within the Asia Pacific Region; and that the document should be titled as "Pan-Regional ICD for AIDC.

ATS Inter-facility Data Communication (AIDC) Implementation Seminar

3.4.35 Secretariat re-emphasized the need to have error free coordination across FIR boundaries to ensure safety of operations and informed the meeting about the planned ATS Inter-facility Data Communication (AIDC) Implementation Seminar to be held on 12 and 13 October 2010 in Bangkok. This Seminar is being organized under the provision of ICAO Special Implementation Project. Invitation for the Seminar was issued through a State Letter dated 15 July 2010. The meeting encouraged the States to participate in the Seminar to facilitate early implementation of AIDC in the region.

Network Incompatibility Issues

3.4.36 Regarding issues related to network incompatibilities, USA proposed a possible solution based on using Applications to overcome the network incompatibility issues. Usage of Extensible Markup Language (XML) for transmission of OPMET data, usage of public internet for accessing ATS Messaging Management Centers (AMC),the World Area Forecast System (WAFS) Internet File Server, Virtual Private Network (VPN) over public internet etc. are some of the diverse systems which are proposed to be used in the future.

3.4.37 Asia/Pac Region is phasing out X.25 sub-network and transiting towards IP sub-network to support AMHS. It is recommended that the region should move forward to using XML formatted data over AMHS to support OPMET data and other similar requirements. Trial of XML over AMHS has been planned between Hong Kong China, USA and Singapore. It was also recommended that States should use public internet using IP Security (such as VPN) on a case to case basis to improve network performance. It was informed that table driven protocol like XML can be used for many aeronautical applications. The meeting was of the view that since the proposal included issues related to transmission of OPMET messages, ATNICG should coordination with MET working group to harmonize implementation with the requirements.

Aeronautical Mobile Service (AMS)

Satellite Operational Continuity

3.4.38 The meeting noted that the end to end serviceability performance of SATCOM data-link has improved to some extent since late 2009. The meeting noted that service provider/stakeholders have been putting efforts into incentivising the Release 15 upgrades to all four GESs – which are now nearing completion. It was also informed that additional 60 aircraft from 4 airlines have started using MTSAT through SITA AIRCOM service.

3.4.39 It was noted that although improvement for end to end communication performance is still required, the data-link requirement for RNP 4 based separation in the South Pacific could be marginally achieved. The meeting further noted that the chain of SATCOM data-link service involves several segments from different service providers and stakeholders including end users. Therefore improvements of the SATCOM data-link service require coordinated and collaborated efforts among all the stockholders and strategic planners. The meeting considered it as a global issue which needs to be addressed at global level.

3.4.40 The meeting noted the recommendation by ICAO that the Air Navigation Service Providers and the Airline Operators should consider to use two or more redundant autonomous SATCOM systems through service providers to achieve improved performance. The meeting expressed concerns about the availability of data link services after the life of some of the current INMARSAT and MTSAT satellites expire in 2016. Therefore strategic system planning for future system and requirements for the correspondent and/or updated avionics are required.

3.4.41 In this connection, the meeting further discussed possible dates for SOCM/2 Meeting. It was noted that SOCM/2 meeting may be postponed due to the reason that FANS SATCOM Improvement Team Meeting (FSIT) had not been reconvened as planned. However, if the FSIT meeting is not conducted in a reasonable period of time, the meeting agreed that the SOCM/2 meeting should be conducted in 2011. The meeting discussed objectives of the meeting and identified following items that may be included in the agenda for the next (SOCM/2) meeting.

- Review the status of Satellite data-link communication;
- Implementation of improvement plan by stakeholders to develop a common outage/maintenance reporting template and process by CSPs which is useful for States/ANSPs/CRAs;
- Develop common format for service level agreement between CSPs and State/ANSPs/ Operators based on requirements in the GOLD;
- Satellite Communication Voice for routine ATS; and
- Mid and long term strategy for Satellite communication i.e. beyond 2016 including requirements for modification to SATCOM satellite data unit (SDU) to enhance capability to access multi satellite service provider and whole I3 and I4 network.

3.4.42 In this connection, attention of the meeting was also drawn to the *'Guidance Material for the Asia/Pacific Region for ADS/CPDLC/AIDC Ground Systems Procurement and Implementation'* provided on the ICAO Asia/Pacific Regional website through the link APAC e-documents for guidance in the matters of procurement and implementation of data-link systems.

Review outcome of NAT SPG/46 Meeting

3.4.43 The meeting was informed about the revised version of amendment proposal for the NAT SUPPs (Doc7030) on SATCOM Voice (Conclusion 46/4) adopted by the NAT SPG/46 held from 23 to 25 June 2010. After considering the NAT SPG Conclusions and relevant information presented by Australia, the meeting supported the continued development of ICAO global AMS(R)S Voice avionics standards and procedures. The meeting endorsed the Terms of Reference for the future work of the inter-regional Satellite Voice Communication (SATCOM) Task Force as approved by NAT SPG/46 and adopted the following Conclusion:

Conclusion 21/27 – Inter-regional ad hoc SATCOM Task Force

That,

a) the Terms of Reference of the inter-regional ad hoc Satellite Voice Communication (SATCOM) Task Force adopted by NAT System Planning Group as provided at **Appendix J** to the Report on Agenda Item 3.4 be endorsed; and

b) the outcome of the task force should be coordinated with the CNS/MET Sub-group of APANPIRG.

Update on use of Satellite Voice Communication (SCV) for ATC purpose

3.4.44 The meeting noted with cconcern following limitations raised by the States and industry with using SCV for ATS:

- The Annex 10 requirements for Aeronautical Mobile Satellite (Route) Service (AMS(R)S) voice avionics and the supporting ground system requirements and performance standards are not sufficiently robust to support the desired use as a substitute to HF for long range communication;

- Many ANSPs do not have the supporting infrastructure nor ATC procedures to use SCV as an alternative to HF;

- Pilot and ATC procedures are not fully developed;

- SCV, unlike HF, would not be globally available;

- The lack of guidance on the separation standards for which SCV is intended to be used; and

- Using SCV would increase workload of air traffic controller.

3.4.45 While supporting the continued development of relevant ICAO standards and procedures for using SCV for ATS, the meeting recommended to retain SCV use to emergency and non-routine purposes as stated in APANPIRG Conclusion 14/17 adopted in 2003.

Policy on harmonizing data communication

3.4.46 USA informed the meeting about FAA's policy on harmonizing its data communication programs within the National Airspace System (NAS) and the international airspace it serves. After introduction of history of datalink communication related activities and background information on the development of standards for CPDCL and ADS-C applications, it was stated that the FAA will promote the use of RTCA, EUROCAE, and ICAO documents to internationally standardize the operational and technical definition for next generation data communication services that meet the operational needs in the domestic and international airspace. The FAA envisions that operators will only need one upgrade cycle to equip their aircraft to benefit from the next generation data communication capabilities planned for 2015-2025 in international and domestic airspace. RTCA SC-214 and EUROCAE WG-78 are working jointly to develop standards for next generation data communication services..

ADS/CPDLC operational trial in the Ujung Pandang FIR

3.4.47 Indonesia informed the CNS/MET SG meeting that taking into account the progress of CNS/ATM implementation in the Region, Indonesia has conducted the ADS/CPDLC operational trial on the oceanic ATS routes A461, B583, B584, B472, B473, B462, R340/R590 in the Ujung Pandang FIR for all aircraft equipped with FANS-1/A. Trials were conducted for 3 months starting from 3 July 2008. This ADS-C/CPDLC trial will finish in September 2010. The result of the trial conducted till then was considered optimistic which met the operational requirement. Indonesia has proposed transition from the trial to operational implementation.

DATA-LINK Performance Monitoring Results by New Zealand

3.4.48 The meeting noted some encouraging results of data-link performance monitoring within the Auckland Oceanic FIR presented by New Zealand. The meeting also noted that the Central Reporting Agencies (CRA) of the Informal South Pacific ATS Coordinating Group i. e. the ISPACG CRA, has for some time been publishing a collection of data-link monitoring data on its website at: http://www.ispacg-cra.com/performance.asp.

3.4.49 The statistical data collected recently indicates that while the safety targets for network availability are being achieved at present, it is clear that considerable improvement is necessary for the efficiency target to be met. The efficiency target supports operational efficiency and orderly flow of air traffic. It was demonstrated that the nominal times for CPDLC and ADS-C continuity are being achieved.

Regional HF Management Guidance Material

3.4.50 The HF management guidance material developed by the South Pacific HF Working Group covering SP6 area was reviewed by the CNS/MET SG/14 meeting. The guidance material integrated regulatory materials relating to South Pacific States, FASID, radio regulations and current NOTAM's etc. The purpose of the document is to provide a guidance methodology for the utilization of the Families of Frequencies employed by the Aeronautical Communication Stations in the South Pacific, to support a better management plan of the available families of frequencies and human resources, in order to increase the efficiency and capacity of the Communications Network. The document focuses on the propagation and technical characteristics of the HF network while detailing specific information on ground facilities within the south pacific SP6 region. In view of the foregoing, the meeting adopted the following Conclusion:

Conclusion 21/28 – Regional HF Management Guidance Material

That, the HF Management Guidance Material for the South Pacific as provided in **Appendix K** to the Report on Agenda Item 3.4 be adopted as Part One of Asia/Pacific Regional Guidance Material for HF Management.

3.4.51 The meeting also encouraged States in North Pacific Sub-region, Bay of Bengal and Indian Ocean sub-regions to coordinate with each other in developing a similar document for use by the Operators and Air Navigation Service Providers. These documents will become part of the Regional HF management guidance material for adoption by APANPIRG through CNS/MET Sub-group.

Navigation

Review reports of the Performance Based Navigation (PBN) Task Force

3.4.52 It was informed that the Seventh Meeting of PBN Task Force had to be delayed because of unavoidable circumstances and was held just before APANPIRG/21. Due to the rescheduling of the seventh meeting, the ATM/AIS/SAR SG and the CNS/MET SG were not able to review report of the PBN TF/7 meeting. The CNS/MET SG/14 Meeting reviewed the report of the Sixth meeting of the PBN TF which took place in Hong Kong, China from 3 to 5 February 2010. PBN TF/6 was preceded by an Implementation Seminar also held in Hong Kong.

3.4.53 The meeting was informed that PBN TF had recommended integration of the Implementation Tasks List and action items into the PBN Task Force Tasks List. The meeting reviewed the integrated Tasks List proposed by the PBN TF and agreed to adopt following Decision:

Decision 21/29 – PBN Task Force Tasks List

That, the PBN Task Force Tasks List provided at **Appendix L** to the Report on Agenda Item 3.4 be adopted.

Global PBN Implementation – Update

3.4.54 The meeting was informed about the significant global PBN initiatives and completion of the initial draft of PBN Operational Approval Manual and Continuous Descent Operations (CDO) Manual. The meeting also noted directions adopted by the PBN Study Group in September 2009 to harmonize the global PBN implementation efforts.

APAC Region PBN Implementation

3.4.55 States, which had not developed their State PBN Plan, were once again reminded about the requirement and an action item was adopted by PBN/TF encouraging the States to consider implementation of CDO. State were also encouraged to attend PBN related training and other programmes. The meeting was briefed about various issues related to PBN implementation in the region and about various action items adopted by the Task Force.

PBN Implementation Plan

3.4.56 The meeting was briefed about the limitations of earlier generation FMS and it was recommended that this issue should be taken up with Instrument Flight Procedure Panel (IFPP). Accordingly, the following Conclusion developed by PBN TF/6 meeting and further updated by PBNTF/7 was adopted by the meeting:

Draft Conclusion 21/30 – Limitation of Older Generation FMS

That, ICAO (IFPP, PBNSG) be invited to note once again the importance of the limitation of older generation FMS in storing multiple procedures for the same type of navigation system for a runway. This limitation occurs when pilots attempt to select a specific approach that is not stored in the FMS navigation database. ICAO is requested to consider establishing additional guidance, supplementing existing PANS provisions and to explore solution(s).

State/Industry Contribution

3.4.57 The meeting was informed about the status of PBN implementation in various States, as presented to the PBN Task Force meeting. States, while informing the PBN TF about the status of implementation in their administration also described various benefits these implementations have provided. Based on the review of the status of implementation in various States, PBN TF revised APAC Regional PBN Implementation Plan. The meeting reviewed the revised plan updated by the PBN TF and adopted following Conclusion:

Conclusion 21/31 – Revised APAC Regional PBN Implementation Plan

That, the revised APAC Regional PBN Implementation Plan Version 2.0 provided in **Appendix M** to the Report on Agenda Item 3.4 be adopted.

State PBN Implementation Plan

3.4.58 PBN Task Force urged the States to plan their PBN implementation efforts to ensure harmonized transition and implementation. The meeting also discussed non-submission of State implementation plans by some States and adopted following Conclusion:

Conclusion 21/32 – Develop State PBN Implementation Plan

That, the States, which have not developed their State PBN Implementation Plans so far, be urged to develop the plan in accordance with the Asia/Pacific Regional PBN Implementation Plan at the earliest and advise the Regional Office of the impediments they are facing in the implementation of PBN.

3.4.59 The CNS/MET SG was also informed about the discussions that took place in PBN TF regarding the display limitations related to the RNP operations to levels below 0.3. Based on the experience gained by some of the States, PBN TF recommended an alternate means of compliance. The meeting after reviewing the recommendation adopted following Conclusion:

Conclusion 21/33 – Aircraft Equipage Requirements

That, ICAO provides guidance on aircraft that do not have a lateral and vertical readout on the navigation display, but do display the lateral and vertical profile on the navigation equipment, which could be considered as an alternate means of compliance, if supplemented by appropriate flight crew training for RNP value of 0.3 RNP or greater.

PBN Implementation Progress Report

3.4.60 Regarding Draft Conclusion 14/19 on PBN Performance Metrics, it was informed that PBN TF was of the view that PBN Progress Report Template should include the impact on safety, gains in efficiency, environmental savings and infrastructure cost reduction to synchronize them with the performance based measurements concept. The meeting noted the intent of the Draft Conclusion but did not consider it necessary to change measurement parameters at this stage noting that ICAO has a programme to develop a set of global performance Metrics to harmonize the performance measurement.

PBN Flight Plan Issues

3.4.61 The meeting was briefed about the PBN issues related to the Flight Plan Amendment, which becomes applicable in November 2012. PBN TF had developed action items to address these issues.

3.4.62 States and International Organizations appreciated the work done by the Task Force and agreed that the Tasks assigned to the Task Force will grow in future. The CNS/MET meeting also expressed that though GNSS has been there since past sixteen to seventeen years, yet there is some resistance in its adoption by some States. It was agreed that concerted efforts are needed to develop a global acceptance of GNSS to support PBN implementation.

PBN Task Force Work Programme

3.4.63 The CNS/MET SG recommended that the continuing contribution of the PBNTF can facilitate the implementation of PBN in the Asia/Pacific Region. It was considered that the existing terms of reference should be reviewed to allow the PBN TF to focus on implementation and to move on from the planning phase to implementation phase of PBN. The meeting noted PBN TF proposal that the TF should pass routine and repetitious tasks to other bodies more appropriate to undertake these activities; such as education and training which can be transferred to aviation academies. The meeting noted CNS/MET recommendation that the life of PBNTF should be extended by 3 to 5 years. After discussion, meeting agreed to the continuation of the Task Force with TOR to be reviewed in the next meeting of PBN TF. The Task Force was also asked to identify the PBN implementation gaps in the States. Accordingly, following decision was adopted:

Decision 21/34 - PBN Task Force continuation

That, the PBN Task Force be continued.

3.4.64 In order to raise the awareness about slow progress of PBN Implementation, the meeting identified the need to bring it to the attention of the next DGCA Conference to be held in October 2010 in Macao, China. Consequently, the following conclusion was adopted.

Conclusion 21/35 – Slow Progress of PBN Implementation

That, ICAO highlights the slow progress and impediments in PBN implementation at the upcoming 47th DGCA Conference for its support to expedite implementation.

PBN State Plan Harmonization

3.4.65 IATA, on behalf of Australia, Hong Kong China, New Zealand and Thailand presented a report in the CNS/MET SG/14 on the PBN State Plan harmonization in the region. Highlighting the slow progress of PBN implementation in the region, it was informed that approximately half of the Asia Pacific States had not submitted their PBN Implementation Plan by the end of 2009 (as required by ICAO Assembly Resolution). Out of the plans submitted, only one third demonstrated a path towards timely and successful implementation. The paper also predicted that APAC Region will not be able to meet the implementation targets and stands at the risk of not meeting ICAO Resolution A36-23 requirements. In conclusion, the plans received were categorized in to three categories based on their quality:

i) Robust – when 8 to 10 basic plan elements (BPE) are satisfied;
ii) Marginal – when 5 to 7 BPE are satisfied; and
iii) Incomplete – when 4 or less BPE are satisfied

3.4.66 Out of the 21 plans assessed, 7 were rated as robust, 5 were rated as marginal and 9 were rated incomplete. It was informed that individual plan assessment letters will be issued through ICAO to each of the 21 States, providing them confidential feedback and suggesting improvements.

3.4.67 It was also expected that this assessment feedback will not be taken as criticism by the States. In response to a query, the meeting was informed that the assessment criteria was developed from PBN Manual and the secretariat was requested to forward this review mechanism to ICAO Headquarters for its global usage.

Regional Support Strategy for PBN Implementation

3.4.68 IATA proposed a regional strategy to support the States in an effort to accelerate PBN implementation within the region. While the Regional PBN Implementation Plan has been delivered, the States' progress on National PBN Implementation Plan was quoted to be slow. Strategy proposed to support the States in their PBN related initiatives included:

- Establish a regional working level team (with proposed name *PBN Regional Development and Implementation* (REDI)) to identify implementation needs and to organize appropriate resources;

- Formulate cooperative arrangements with volunteering States that are advanced in PBN to leverage knowledge and experience;

- Development of additional support mechanism that will create skills and capabilities;

- Further promote PBN to decision makers within States to create the political will to invest and devote necessary resources for PBN implementation.

3.4.69 The meeting generally agreed with the requirements and objectives of the team, some Task Force members however were of the opinion that tasks of the proposed team can be shared by some of the Task Force members to save requirement of additional resources.

3.4.70 The meeting was of the view that the work of the proposed REDI team may overlap with the work of GO team at the global level. After a brief discussion, it was agreed that the management structure and relation of REDI team with GO-team will be reviewed.

Outcome of PBNTF/7 Meeting

3.4.71 The chairman of the PBN TF presented a brief summary on the outcome of PBN/TF/7 meeting which was held from 1st - 3rd September 2010. The report will be presented to the next meeting of CNS/MET/SG and to ATM/AIS/SAR/SG for review. The executive summary of the meeting outcome is as follows:

- Noted that substantial progress has been made in the planning and implementation of PBN in the APAC Region since January 2008;

- Noted that an Operational Approval Handbook has been developed which provides additional guidance on PBN Operational Approval requirements. PBN Model Regulations have also been developed by the COSCAPs. The States were encouraged to take advantage of the PBN courses planned by COSCAPs;

- Updated a draft Conclusion of CNS/MET SG/14 on the limitation of older generation FMS based on deliberations;

- Developed Draft Conclusions to endorse the minimum technical and operational requirements for a regional RAIM prediction System. States were encouraged to take part in the regional RAIM Prediction System;

- The meeting noted that seventeen States have taken part in the APAC Flight Procedure Programme (FPP), nine of which are *Active Participating* States/*Administrations*. The first PANS OPS Initial course was successfully conducted in June 2010 and a PBN Procedure Design Course was conducted from 1-17 September 2010. The meeting formulated a Draft Conclusion to encourage other States to join the FPP; and

- The meeting also developed several action items for the Task Force members and updated the Task List.

Implementation of GNSS

3.4.72 While discussing updating of the GNSS Manual Rev 1 (2005), the meeting noted slow progress of aviation in implementing GNSS applications in some new ATM initiatives such as PBN, RNP approaches, etc where GNSS is the core technology. While the meeting recognized much progress had been achieved in the PBN initiative such as use of GNSS in the oceanic phase but it felt more could be achieved in the terminal and approach phases. Also the meeting noted that there is a lack of formal adoption of GNSS in most States. The meeting brainstormed ways for greater

implementation of GNSS in the aviation field, including overcoming of existing hurdles and agreed that this slow implementation of GNSS applications in some aviation fields should be brought to the attention of the coming DGCA Conference in Macao, China as well as the 37th Session of the ICAO Assembly.

3.4.73 From feedback received and based on the queries received from the States, it is felt that States may not be aware of the GNSS Manual. The meeting suggested a need to raise awareness of the existence of Rev. 1 GNSS Manual amongst the aviation community. This concern about slow progress may be brought to the attention of each DG at the upcoming DGCA Conference. The meeting was informed that Rev. 2 of the GNSS Manual, expected to be out by end 2010, would provide guidance on how to deal with the identified hurdles and would become a more useful reference document in guiding the States in GNSS implementation.

3.4.74 In view of the foregoing, the meeting adopted following Conclusion for the promotion of greater implementation of GNSS applications in the aviation field.

Conclusion 21/36 – Progress of GNSS Implementation & Awareness of GNSS Manual

That, ICAO

a) highlight the slow progress of GNSS implementation in the aviation field at forums such as the coming 47th DGCA Conference in October in Macao, China; and

b) raise the awareness of existence of the GNSS Manual among the aviation community

Ionospheric Data Collection

3.4.75 It was recalled that APANPIRG/20 meeting agreed to promote a cooperative effort in developing a standard ionospheric model for the region to facilitate implementation of GNSS. As a first step, it was decided that Focal Contact Points in the States should be identified, who will coordinate in the matters of ionospheric data collection. The second step was to be discussed in this meeting. The progress that has taken place in the identification of Focal Contact Points was reported and meeting was invited to discuss the second step in the direction of developing the model.

3.4.76 At CNS/MET SG/14 meeting, Japan presented a paper on activities related to monitoring and possible mitigations of ionosphere characteristics in the low latitudes. The paper noted that the Electronic Navigation Research Institute (ENRI) has successfully developed a prototype GBAS that provides Cat I performance in the Japanese ionospheric environment. The paper promoted cooperation in the collection and sharing of ionospheric data particularly in the period leading to and during the next solar maximum which is expected to occur in 2013. Japan also suggested that a workshop be conducted by voluntary group to enhance the understanding of ionosphere issues.

3.4.77 Australia presented the findings of a historic review of ionospheric characteristics observed in the Australian mid latitude. The review found from the observed data that ionospheric excursions were well contained within the threat space developed for the contiguous United States. The methodology used in the Australian study is proposed as an evaluation tool for other States.

3.4.78 Hong Kong China informed the meeting about the installation of GNSS monitoring system and its proposal to commence ionospheric data collection by late 2010. Other States are invited to exchange data and jointly develop the regional ionosphere model with Hong Kong China.

3.4.79 The meeting agreed with the benefits of a coordinated ionospheric review and measurement campaign. Japan was invited to provide technical leadership with the ICAO providing support for development of a measurement campaign coordinated through the points of contacts nominated by States. The coordination is initially to be undertaken through correspondence with the option of a meeting to further progress the program.

Navigation Strategy

3.4.80 The Navigation Strategy for the Asia/Pacific Region was reviewed and was found to be appropriate and hence no revision was made.

Sixteenth International Flight Inspection Symposium (IFIS)

3.4.81 The meeting was informed that the 16th International Flight Inspection Symposium, organized by the Flight Inspection Center of CAAC and the International Committee for Airspace Standards and Calibration (ICASC) was held in Beijing, China from 21 to 25 June 2010. The Symposium was attended by 202 participants from the global flight inspection/validation organisations, industry partners and 36 States/ Administrations including 10 Administrations in APAC Region. This was the first time that such Symposium was held in the APAC Region. The objective of the Symposium was to exchange technical information and experiences gained in flight inspection and validation and promote development of new technology.

Assembly Resolution on PBN

3.4.82 Australia informed the meeting about changes to Assembly Resolution A36-23 scheduled to be proposed by ICAO Council through Assembly Working Paper A37-WP/13. It was informed that the Assembly Working Paper A37-WP13 proposes an updated Resolution which recognizes that not all aircraft are capable of APV operations and requires that LNAV only minima be included along with APV in the Resolution. It was mentioned that the Council paper retains other requirement which would not be met due to infrastructure inadequacy and also the updated Resolution does not consider any alternative procedure as an intermediate step where APV cannot be achieved. An alternate text was proposed for the draft updated Resolution.

India PBN Road Map

3.4.83 While presenting updates on the national PBN Implementation status, roadmaps and benefits achieved from PBN Implementation, India informed the meeting that based on their implementation experience; they do not consider PBN Implementation a difficult task. It was informed that India started with implementation of arrival and departure procedures based on RNAV 1. In its Short Term Plan, India is proposing to implement SIDs and STARs at all the international airports and implementation of RNP approaches by 2012. Other plans include implementation of RNAV 5 between city pairs and RNP 4 for long range routes. Coordination requirements with adjacent FIRs were stressed upon for implementation of long range routes. Fuel savings, reduction in CO_2 emission, reduced RT communication resulting in reduction of Controller workload, better situation awareness, capacity enhancement, enhancement of safety were mentioned as some of the benefits from PBN implementation. Support provided by India to Flight Procedure Programme was also mentioned in the presentation.

Update on GAGAN

3.4.84 India also provided an update on implementation of GAGAN (GPS aided GEO Augmented Navigation). GAGAN Technical demonstration phase and site acceptance test for the monitoring and reference stations have been successfully completed. Necessary Ionospheric and Tropospheric (IONO-TROPO) models for GAGAN are under development. System certification process also has been concurrently taken up with the support of FAA. The system is expected to be operational in the year 2013. The GAGAN shall have capability to provide the augmentation service

within GEO footprint, (which covers a large portion of the Asia-Pacific region), to support RNP0.1 and APV1/APV 1.5 service as specified in the ICAO specifications. GAGAN system shall be interoperable with other systems such as WAAS, EGNOS and MSAS.

U.S. GPS Performance Commitment

3.4.85 United States Government is committed to meeting or exceeding minimum levels of service specified in U.S. Law (10 U.S.C 2281(b)) of 30 September 2008, which meets or surpasses all the performance commitments of the previous version and ICAO Annex 10, Volume I Standards and Recommended Practices. Information Paper informed that UGS maintains GPS constellation at more than 24 satellites level (against the minimum requirement of 21) and currently 33 operational satellites are available. US Space Based Position, Navigation and Timing (PNT) Policy commits to cooperate with other Global Navigation Satellite System and Space Based Augmentation Systems (SBAS) providers to ensure compatibility and interoperability.
GPS Standard Positioning Service (SPS) Performance Standards dated 2008 include:

a) 95% probability of 24 operational satellites ;

b) At least 21 out of 24 orbit slots occupied either by a healthy satellite in the baseline slot or by a pair of healthy satellites in the expanded slots with a probability of no less than 98%; and

c) At least 20 slots will be occupied by healthy satellites with probability of 99.999% (new commitment)

3.4.86 Un-availability of GNSS service due to insufficient satellite geometry is predictable and hence the requirement of ICAO PBN Manual about verifying GNSS service for dispatch can be met to facilitate operational planning. Paper provides information about the developments in the airborne avionics that have taken place recently and the upgraded performance provided by the augmentation systems. Institutional arrangements and leadership role of US in the provision of GNSS and developmental plans for future were also explained in the paper.

Surveillance

3.4.87 Under this agenda item, the meeting reviewed outcome of the Regulator's Workshop on ADS-B Avionics Requirement and the Ninth meeting of the ADS-B Study and Implementation Task Force held from 16 to 19 August 2010 in Jakarta, Indonesia. The meeting also reviewed the outcome of the Fifth Meeting of the South East Asia Sub-Regional ADS-B implementation Working Group held from 21 to 22 January 2010 in Jakarta, Indonesia.

Regulator's Workshop on ADS-B Avionics Equipage Requirements

3.4.88 The Regulator's Workshop on ADS-B Avionics Equipage Requirements, in conjunction with the ADS-B SITF/9 meeting was organized in accordance with APANPIRG Conclusion 20/51. Twenty four presentations covering following topics on the ADS-B equipage requirements were presented and discussed by the Workshop:

- ADS-B Concept Introduction
- Operational use of ADS-B in the Asia and Pacific Region
- Standards and equipment
- Review existing equipage mandates
- Existing and Future Equipment Certification
- Need to harmonize and compliance timing
- Avionics products
- View of air space users and ANSPs
- Harmonization and guidance material

3.4.89 The outcome of deliberations at the Workshop was considered by the Task Force meeting. Based on the feedback survey conducted during the events, it was concluded that the ADS-B Workshop was very well received by the participants.

Need for Flight Inspection/Validation of ADS-B Ground Stations

3.4.90 In respect of APANPIRG decision 20/47, the meeting noted that one of the topics being studied by Aeronautical Surveillance Panel was the development of guidance on flight testing of ADS-B and Multilateration systems. While recognizing that the flight inspection for ADS-B ground stations may be required to validate the theoretical coverage against predictions, the meeting was of the view that it could be achieved by alternate means also. It was agreed that further monitoring of outcome of ASP study in this regard is required. The Task Force agreed that a formalized flight validation/testing program of ADS-B ground station should not be considered as a mandatory requirement. While the meeting noted that States may at their own discretion conduct such a program, this was beyond the minimum requirements. In view of the foregoing, it was concluded that there is no need for the Task Force to develop such guidance material.

Update of ICAO Panels on ADS-B Related issues

3.4.91 The meeting noted ADS-B related developments made by the ICAO panels and their work programme including Aeronautical Surveillance Panel (ASP), Aeronautical Communication Panel (ACP), Separation and Airspace Safety Panel (SASP), Operational Data Link Panel (OPLINKP) and the newly established Airborne Surveillance Task Force (ASTAF).

Review the Terms of Reference and Subject/Tasks List

3.4.92 The meeting reviewed the TOR adopted by APANPIRG/18 and updated the list of Subject and Tasks of the Task Force. The TOR was considered appropriate and the meeting did not propose any changes to the TOR. In respect of the Tasks List, the meeting adopted following Decision:

Decision 21/37 - Subject/Tasks List of ADS-B Study and Implementation Task Force

That, the Subject/Tasks List for ADS-B Study and Implementation Task Force provided in **Appendix N** to the Report on Agenda Item 3.4 be adopted.

Processing and Display of ADS-B Tracks

3.4.93 The meeting adopted the Guidance Material on Processing and Display of ADS-B tracks at Air Traffic Controller's Positions provided by Australia. The meeting adopted following Conclusion formulated by the ADS-B Study and Implementation Task Force on the subject:

Conclusion 21/38 – Guidance Material on Processing and Display of ADS-B Tracks on Air Traffic Controller Positions

That, the Processing and Display of ADS-B Tracks on Air Traffic Controller positions provided in **Appendix O** to the Report on Agenda Item 3.4 be adopted.

Template for promulgation of ADS-B Avionics Equipage Requirements

3.4.94 Following four source documents were identified by the Task Force that may be considered in the development of templates for a regulatory mandate.

- **CASA Australia Civil Aviation Order.** The ADS-B mandate that has actually been issued in final regulatory application is the relevant Civil Aviation Order of the Civil Aviation Safety Authority Australia. The Australian rule has been based on operations in an NRA environment but may also be satisfactory for a RAD environment. The updated Australian CAO is provided at following webpage: http://www.casa.gov.au/wcmswr/_assets/main/download/orders/cao20/2018.pdf

- **EASA AMC 20-24.** ***EASA AMC 20-24 'Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090 MHZ Extended Squitter'*** was issued on 02/05/2008 as an Acceptable Means of Compliance for the airworthiness and operational approval of aircraft installations.

- **Eurocontrol ENPRM/10-003A.** In April 2010, Eurocontrol issued its ***ENPRM/10-003 Surveillance Performance and Interoperability (SPI) Requirements*** under its Single European Sky Mandate on Surveillance. The ENPRM proposes a 2015 mandate for application in a RAD environment. The material is available at following webpage: http://www.eurocontrol.int/enprm/public/standard_page/enprm1003.html

– ***FAA Final Rule for ADS-B Out equipage mandate***

3.4.95 The meeting noted that the promulgation of airspace requirements for ADS-B implementation by States needs to occur as early in the process as possible. This includes potential upgrades/retrofits and IATA had indicated that a general minimum time frame of 4-5 years should be considered.

3.4.96 The meeting noted the recommendation developed by the Task Force for consideration by those States intending to implement ADS-B based surveillance service. i.e. when promulgating requirements for mandating ADS-B airspace, States should include the following information in the documentation:

a) Specify the airspace or routes that will require ADS-B equipage;

b) Define the ADS-B performance standard(s) required recognising both EASA AMC 20-24 and CASA CAO 20.18 Appendix XI;

c) The dates for initial implementation and if any upgrades required. These dates and timeline should identify when the ground capability becomes available and when full compliance with the requirements becomes effective.

d) Provide appropriate justification for the mandate including safety analyses and business case.

3.4.97 In view of the foregoing, the meeting considered a template for use by APAC States to issue a regulatory mandate for aircraft ADS-B equipment carriage in defined airspace and adopted following Conclusion:

Conclusion 21/39 – Template for promulgation of ADS-B Avionics Equipage Requirements

That, based on APANPIRG Conclusion 20/54, States intending to implement ADS-B based surveillance service for a defined airspace and having not published regulations be urged to promulgate mandating rule for ADS-B Avionics Equipage Requirements as soon as possible using the following template:

On and after dd/mm/yyyy, if an aircraft operates on airways (insert routes)……..…at or above FLXXX…..…..(or in defined airspace boundaries ……..…….. at or above FLXXX):

a) the aircraft must carry serviceable ADS-B transmitting equipment that has been certificated as meeting EASA AMC 20-24, or meets the equipment configuration standards in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia; and

b) the aircraft operator must have the relevant operational approval from the State of Registry.

Airworthiness and Operational Approval for ADS-B Avionics Equipage

3.4.98 The meeting agreed that while operational approval was necessary, it should follow the established procedures for other operational approvals such as RVSM and PBN. This will ensure that an undue burden is not placed on either regulators or operators and will maintain a simple consistency through the regulatory approval process.

3.4.99 There is a regime in place for both PBN and RVSM where States must manage the approvals. RVSM approvals are also registered with a Regional Monitoring Agency (RMA) while a global database of PBN approvals is being established jointly by ICAO and IATA. There was a recommendation that a similar regional monitoring agency process be established for ADS-B OUT and eventually ADS-IN approval.

3.4.100 The meeting reviewed the approval process that the State of Registry is responsible for the operational approval of their aircraft in accordance with Annex 6 Chapter 4. With respect to ADS-B equipage and operation authorizations, the meeting discussed several aspects that need to be considered by the Regulators for assessing an aircraft and the operator for ADS-B operation. The meeting therefore adopted following Conclusion:

Conclusion 21/40 – Guidelines for Airworthiness and Operational Approval for ADS-B Avionics Equipage

That, States be advised to use the guidelines provided in **Appendix P** to the Report on Agenda Item 3.4 for Airworthiness and Operational Approval for ADS-B Out Avionics Equipage.

Updates on ADS-B Upper Airspace Project

3.4.101 Australia informed the meeting that the ADS-B Upper Airspace Project (UAP) was operationally commissioned on 19 December 2009 and air traffic controllers are now authorized to provide 5 NM separation services using ADS-B based surveillance service for air traffic at and above FL290. The coverage is currently available across the whole continent from 29 ADS-B ground station sites and one Wide Area Multilateration system comprising 14 sites. The meeting was informed that operational feedback since commissioning has been extremely positive and more than 73 per cent of all scheduled international flights in Australia are flying ADS-B approved aircraft.

3.4.102 The last ADS-B ground station of UAP Phase 1 at Broken Hill was commissioned in February 2010. Additional 18 stations are planned to be installed as part of UAP Phase 2 to provide ADS-B coverage within existing SSR coverage to provide a backup and improved tracking performance which will extend ADS-B coverage to all en-route sectors.

ADS-B development in China

3.4.103 China provided updates on its ADS-B development and deployment plan. ADS-B technology is considered as an important surveillance technology over western airspace and a significant supplementary measure for the radar surveillance in eastern part of China. ADS-B application in oceanic areas and airport surface will also be promoted and 1090ES has been chosen as the primary data link. In April 2010, CAAC issued the Chinese Technical Standards Orders of "Extended Squitter Automatic Dependent Surveillance-Broadcast (ADS-B) and Traffic Information Service-Broadcast (TIS-B) Equipment Operating on the Radio Frequency of 1090 MHz" for manufactures applying for Chinese Technical Standard Order Authorization for 1090ES ADS-B and TIS-B equipment. In May 2010, CAAC issued the Advisory Circular of "Airworthiness and Operational Approval of Automatic Dependent Surveillance-Broadcast Application in Non-Radar Areas via 1090 MHz Extended Squitter" for the manufactures, modification units and operators who want to get airworthiness approval for ADS-B airborne equipment.

3.4.104 In March 2009, CAAC set up an ADS-B station to serve ATS Routes L642 and M771 in the South China Sea area. In addition to the Chengdu - Jiu Zhai ATS route, CAAC is now working on a project of communication and surveillance with 5 ADS-B ground stations covering Chengdu-Lhasa ATS route to be completed by the end of 2010. CAAC also has a plan to install ADS-B stations along Lhasa-Ali route and B215 route from Yinchuan to Urumqi. Further, CAAC has scheduled to build ADS-B stations nationwide according to "the twelfth five-year plan". In the same period, the relevant automatic air traffic management systems will be upgraded to be able to receive, process and display ADS-B data.

Hong Kong China reconfirmed its plan to:

- mandate ADS-B carriage, by end 2013 for aircraft flying on ATS routes L642/M771;
- mandate ADS-B carriage, by end 2014, for aircraft flying within Hong Kong FIR; and
- mandate ADS-B carriage, after 2015 to be confirmed, for low flying aircraft including general aviation aircraft and helicopters.

ADS-B Implementation Process in Fiji

3.4.105 In June 2008, the Civil Aviation Authority of the Fiji Islands issued its Airworthiness notice detailing ADS B Equipment standards and as of the 01st May 2010, Fiji has mandated ADS B equipage for all Fiji registered aircraft operating in controlled airspace, with the exception of domestic aircraft due to be withdrawn by Jan 2011, international aircraft due to be withdrawn by Jan 2014 and any other aircraft exempted by the Authority.

3.4.106 The ATM System has been replaced with the AURORA System. At the Nadi International Airport, there are 5 ADS-B Ground Stations, 1 of which includes an interrogator. These will be setup in appropriate configuration to enable MLAT operation at Nadi International Airport. The ADS-B and MLAT ground station installations are expected to be completed before end of 2010 with Site Acceptance Testing completed by mid of first quarter 2011. The Fiji ADS-B and MLAT system is expected to be used initially as a surveillance tool from second quarter of 2011.

Indonesia

3.4.107 Indonesia provided updates on ADS-B implementation. 27 ADS-B Ground stations with dual system had been installed at Makassar, Sorong, Natuna, Kupang, Merauke, Banda Aceh, Matak, Cilacap, Soekarno Hatta Airport-Jakarta, Tarakan, Pangkalan Bun, Palu, Kintamani - Bali, Waingapu, Alor, Galela, Ambon, Saumlaki, Medan, Pakanbaru, Palembang, Pontianak, Timika, Biak, Kendari, Manado, and Surabaya amongst which 18 Stations in the Eastern part of Indonesia are connected to Makkasar Air Traffic Service (MAATS) ATM system and 9 ADS-B Ground Station in the Western part of Indonesia are linked to the Remote Control Monitor System (RCMS) in JAATS-Jakarta. The Test-Bed system at DGCA Headquarters is able to monitor and control the ADS-B Data from these 27 ADS-B Ground Stations.

3.4.108 MAATS-Makassar has been upgraded from Eurocat-X version 2.4 to version 3.15 integrating ADS-B capabilities and was commissioned in December 2009. DGCA will establish Implementation Team for ADS-B implementation. Required regulations such as Operational Concept, Safety Assessment, ADS-B Procedure will be developed and introduced into CASR. For Near Term, DGCA has a plan to use ADS-B for Situational Awareness in MAATS Center. Cross FIR boundary operational data sharing has been identified as the initial application of ADS-B Services. Based on experience gained in using ADS-B for situational awareness, Indonesia will provide separation services using ADS-B.

Malaysia

3.4.109 Updates from Malaysia were as follows:

- DCA Malaysia had a discussion with DGCA Indonesia at Special Coordination Meeting which was held in June 2009 regarding ADS-B data sharing from Banda Acheh for ATC surveillance in Bay of Bengal. The discussion is still on-going;
- Malaysia had started upgrading the ATM System which will be able to integrate all the surveillance data inclusive of ADS-B. The project is scheduled to be completed in April 2011;
- Malaysian airspace is covered by radar except for a small portion in the Bay of Bengal which at the moment is covered by ADS-C. Nevertheless DCA Malaysia has submitted in 10th Malaysia Plan to install ADS-B station and also upgrade and refurbish the present radars;
- DCA Malaysia expects the timeline for ADS-B mandatory equipage in Kuala Lumpur and Kota Kinabalu FIRs to be before 2020.

3.4.110 Malaysia was encouraged to advance its plan for providing ADS-B based surveillance service for its air space in BoB area.

New Caledonia

3.4.111 France provided an update on the ADS-B implementation status in New Caledonia. Implementation of three ADS-B ground stations was completed in the first half of 2010 to provide situation awareness service for international traffic at La Tontouta airport, the domestic traffic at Magenta airport and Air Traffic Service within Nadi FIR. The ADS-B controller display positions are also available since 30 July 2010. Most of the commercial flights are now displayed on the screen for air traffic controllers whose work has become easier as now they have a better representation of the air traffic situation with more accurate information. However, some air traffic (military, general aviation etc) is not displayed and air traffic controllers still use procedure control to separate aircraft.

3.4.112 Aircraft operators flying to/from airports in New Caledonia and through sector of New Caledonia airspace are invited to equip their fleet. New Caledonia is also proposing cooperation for ADS-B data sharing with neighboring air navigation service providers such as instantaneous recordings for SAR purposes.

R&D activities on ADS-B, GBAS system technologies in the Republic of Korea (ROK)

3.4.113 The meeting noted the R&D activities related to ADS-B and Ground Based Augmentation System (GBAS) technologies undertaken in the Republic of Korea.

3.4.114 Based on the CNS/ATM R&D road map for 2005~2020 in the Republic of Korea(ROK), the Korean government will undertake 19 research programs on next generation aviation safety facilities step by step. Among them GBAS and ADS-B technologies are being developed during 2010~2014 in the ROK which are in accordance with the ICAO standards, particularly focusing on the certification and operation technologies. These systems will be implemented in Korean territory after the successful development of GBAS and ADS-B test-bed system. Schedule of ADS-B R & D are as follows:

a) Phase 1 (2010-2011): Development of ADS-B system, Implementation of Test and Evaluation environments;

b) Phase 2 (2012-2013): Performance Improvement of air and ground surveillance; and;

c) Phase 3 (after 2014): Acquiring key technologies, deployment in the domestic area and regulation for installation of ADS-B airborne system;

Singapore

3.4.115 Singapore informed the meeting that the Civil Aviation Authority of Singapore (CAAS) installed an ADS-B station and an ADS-B data processor in Singapore on 7 December 2009. The facility will:

a) complement the existing surveillance coverage by the Long Range Radar;

b) allow Singapore to perform operational trial using ADS-B data; and

c) complement the coverage of Indonesia and Vietnam through data sharing.

3.4.116 The ground station supplied by Comsoft GmbH supports ASTERIX Cat 21 versions 0.23, 0.26 and 1.3 with coverage of about 290 NM based on targets of opportunity. The ADS-B data processor can also process versions 0.23, 0.26 and 1.3 of ASTERIX Cat 21. The processing system is able to fuse ADS-B data from various sources and customized filtered dataset for each user.

3.4.117 It was also informed that the ADS-B data is currently used mainly for technical evaluation and familiarization. CAAS is considering to purchase a stand-alone controller position to conduct operational trials, before the commissioning of the new ATM automation system in early 2012. Singapore is ready to share ADS-B data with other States.

ADS-B in USA

3.4.118 .An essential component of the FAA's Next Generation Air Transportation System (NextGen), is the ADS-B Program. This program will increase safety, capacity and efficiency of air travel and will provide critical flight information simultaneously to pilots and air traffic controllers. In response to a query, it was clarified that USA issued the final rule in end of May for DO260B mandate from 2020. It was further explained that the mandate does not include ADS-B IN nor does it include TIS-B and FIS-B. Further information regarding ADS-B project is available on the following FAA's webpage: www.adsb.gov

3.4.119 The current status of ADS-B deployment for FAA into National Airspace System of USA was noted. It introduced the system coverage by 794 radio sites. The meeting noted the implementation status and high level programme schedule in the presentation. About 800 ground stations will be commissioned by end of 2013. It was concluded that ADS-B technology is proven. It was informed that ITT Team has successfully designed, developed, and integrated an exceptional ADS-B ground infrastructure solution.

3.4.120 FAA, also provided information on the implementation status of essential services to the properly equipped aircraft with Traffic Information Service – Broadcast (TIS-B) and Flight Information Service – Broadcast (FIS-B). US ADS-B rule requires aircraft to be equipped by 2020 to transmit "ADS-B Out" to fly in certain airspace, equipage to receive "ADS-B In" to receive free traffic and weather service is voluntary as of now. The interoperability requirement between different ANSPs was stressed. It was also suggested that States should consider ADS-B in 3 mile terminal operation and airport surface instead of 5 mile separation for use in non-radar airspace, to save expenditure towards retrofits at a later date. It was advised that the States should consider total benefits that can be accrued from ADS-B before publishing any regulations or requirements. FAA claimed that its Final Rule and standards, notably DO 260B provides the maximum benefits possible for all these applications.

ADS-B Seminar for Civil Aviation Authority of the Philippines (CAAP)

3.4.121 CANSO informed the meeting that an ADS-B seminar for the CAAP was conducted by the CANSO in Manila on 11 August 2010. The Seminar discussed the benefits of the Philippines participating in the South China Sea project and recommended that apart from the ADS-B site at Puerto Princesa, the CAAP consider adding another ADS-B station, taking into account the need to provide coverage on the 2 trunk routes (N884 and M767). A possible site identified was Quezon Palawan. The seminar recommended that the CAAP consider location of additional ADS-B sites based on possible cost allocation to other user States.

3.4.122 The meeting discussed the need to optimize overall benefits of ADS-B implementation for flights in South China Sea airspace and supported the recommendation for the Philippines to install an ADS-B station on a site in the South like Quezon Palawan to cover the above two trunk routes. In this connection, the meeting also supported the recommendation that Brunei consider installing an ADS-B ground station in Brunei.

GPS Time Tagging Issue

3.4.123 The meeting noted the GPS Time Tagging issues as presented by Australia. GPS time currently differs from Coordinated Universal Time (UTC) by 15 seconds due to UTC "leap seconds". Some GPS receivers erroneously output GPS time (as if it were UTC) until a new offset is received in a GPS navigation message. It can be 14 minutes before such a message is received. If these GPS receivers are used for ADS-B time tagging, before the offset arrives false position reports can be shown to ATC. A number of protections can limit the impact of this issue.

Regional Surveillance Strategy for APAC Region

3.4.124 The meeting reviewed regional surveillance strategy for Asia and Pacific Regions adopted by APANPIRG/19 in 2008. The meeting updated the strategy taking into account comments from fourteenth meeting of CNS/MET Sub-group of APANPIRG held in July 2010 which suggested inclusion of information regarding newly developed standard DO260B (Version 2 ES being developed by ICAO to be applicable in November 2013) and insert additional word "cooperation" at last bullet paragraph as follows: Ensure civil-military c*ooperation* and interoperability.

3.4.125 The noted revised regional surveillance strategy for Asia and Pacific Regions and adopted the following Conclusion:

Conclusion 21/41 – Revised Regional Surveillance Strategy for Asia and Pacific Regions

That, the revised Regional surveillance strategy for Asia and Pacific Regions provided in **Appendix Q** to the Report be adopted.

Updates on ADS-B Data Sharing in South China Sea area

3.4.126 It was informed that Indonesia, Singapore and Vietnam have been jointly working on the installation of ADS-B ground stations and VHF radios. Discussions were also held between the parties concerned on the ADS-B data and VHF radio facilities sharing.

3.4.127 ADS-B operations will be implemented in the area in 2 phases. In Phase I, ADS-B operations will apply to ATS routes L642 and M771 while other ATS routes could be covered in Phase II. ADS-B operations will be exclusive and applicable between FL310 and FL410. Aircraft intending to operate in ADS-B airspace will need to be ADS-B equipped and certified accordingly.

3.4.128 During CNS/ATM SG meeting, CANSO congratulated Indonesia, Viet Nam and Singapore for the project and for coming up with the project timeline and milestone so that all parties could work towards timely completion of the project. It was further stated that this was an excellent example of regional collaboration involving multiple ANSPs which would pave the way for the wider implementation of ADS-B in the ASIA/PAC Region.

3.4.129 IATA supported efforts made by the three States to enable ADS-B data and DCPC capability sharing. IATA totally endorsed the proposed steps and emphasized the very important role of the project with clear timelines. Importance of regulator's ADS-B equipment seminar to be held in August was emphasized. It was suggested that States should finalize their equipment requirement to allow the air space users to have 4-5 years time for equipping their aircraft. Member Airlines are expecting to receive early benefits as best equipage should be able to receive best service.

Bay of Bengal/South Asia Sub-regional Projects

3.4.130 Regarding planning and implementation of ADS-B in Bay of Bengal area, the meeting agreed to the proposal of the Task Force that a more pragmatic solution in the near term is to invite India and Myanmar to the next meeting of the SEA ADS-B Working Group, which had already been discussed and agreed by the working group. It was also suggested that both Pakistan and Nepal should also be invited.

Australia-Indonesia Data Sharing Project

3.4.131 Australia and Indonesia provided an update on their data sharing project between the Brisbane and Pandang FIRs. Airservices Australia has approved Phase 1A. Indonesia's DGCA has also approved Phase 1A and an ADS-B Filter has been installed in MAATS, Makassar. The ADS-B Filter has been tested and integrated into the ATC System in MAATS (Eurocat X). The tests were conducted between two States and the result of the test was successful. The need to re establish satellite channel previously used between Bali and Brisbane had been identified.

3.4.132 The project is expected to extend to Phase 1B and possibly Phase 2. The Phase 1A shall be operational before requesting approval to commence phase 1B which would comprise following additional sites: Broome, Doongan in Australia and Kintamani, Kupang in Indonesia. The Phase 2 would transform to full radar like separation when both parties have in place suitable infrastructure such as duplicated data communication links and DCPC capability. The meeting appreciated the progress made by the two States and supported the continued execution of the project.

Misleading ADS-B Transmissions

3.4.133 The meeting noted that a number of ADS-B avionics products transmit ADS-B data which could be considered misleading. Examples of these are:

- A product which transmits messages formats similar to, but not the same as DO260, DO260A or DO260B. When interpreted as DO260 messages, these can be misinterpreted as a good integrity messages with an incorrect position.

- A product which transmits DO260 NUC based solely on the accuracy value HFOM instead of the integrity value HPL. This can be interpreted as a DO260 message with good integrity when in fact integrity is poor.

- Other transponder and GPS products that fail to meet the published requirements of the Australian regulations

3.4.134 In environments where all airspace participants are required to have compliant equipment, the risk of using such misleading data is low. However, in an airspace which does not mandate ADS-B equippage, ADS-B transmissions may still be used, and the risk of use of such misleading data is higher in the following airspaces:

- where ATC separation services are delivered in voluntary equipage airspace;

- where ADS-B is used for ATC situational awareness only and ADS-B equipage is not mandatory; and

- where ADS-B IN may be used

3.4.135 The exception related to transmission of NIC or NUCp=0 is made because NIC or NUCp = 0 indicates that the data has no integrity and the Australian ATC system will discard such messages. Many aircraft with compliant ATC transponders, without GPS systems, transmit inertial positional data in ADS-B messages with NUC or NIC=0. It is also expected that ADS-B IN systems will discard NUC/ NIC=0 data.

3.4.136 In view of the foregoing, the meeting recommended all Asia/Pac States intending to implement ADS-B based surveillance service to consider publishing additional provisions in their mandating rule and adopted following Conclusion:

Conclusion 21/42 – Rule on Misleading ADS-B Transmissions

That, States where ADS-B may be used, even voluntarily, promulgate rule for ADS-B Avionics Equipage Requirements consider publishing additional provisions for misleading ADS-B transmission as follows:

After <insert earliest date that ADS-B may be used for any relevant operational purpose> if an aircraft carries ADS-B transmitting equipment which does not comply with

a) EASA AMC 20-24, or
b) the equipment configuration standards in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia.

the aircraft must not fly unless the equipment is:
(a) deactivated; or
(b) set to transmit only a value of zero for the NUCp or NIC.

Note:
1. It is considered equivalent to deactivation if NUCp or NIC is set to continually transmit only a value of zero.

2. Regulators should take appropriate action to ensure that such regulations are complied with.

3. ATC systems should discard ADS-B data when NUC or NIC=0

Use of the Aviation Frequency Spectrum and the International Telecommunication union (ITU) World Radiocommunication Conference (WRC) (WP/17)

3.4.137 The meeting confirmed that the strategy established for promoting the ICAO Position for International Telecommunication Union (ITU) World Radiocommunication Conferences (WRCs) has served well. However, to balance the increased attention, pressure and resources given to the ITU WRC process by other (non-aviation) services, the meeting agreed that aviation must similarly enhance its profile in this process. The requirement for an associated long-term CNS strategy within the aviation community was also highlighted. Such a strategy should gradually introduce more spectrum-efficient systems within the aviation frequency bands. This strategy will need to be requirements driven rather than technology driven and it will, from time to time, need to be backed up by a proactive phase out of older technology

Regional Preparations for ITU WRC 2012

3.4.138 Stressing on the significance of protecting the spectrum to meet the current requirement and acquisition of new spectrum for new applications, Chairman invited the States to participate actively in all the activities related with the WRC meeting and support ICAO position on WRC Agenda Item of critical importance to aviation. Next WRC is scheduled to be held from 23 January to 17 February 2012. The Secretariat provided information on the regional activities aimed at ensuring inclusion of ICAO position on WRC–2012 Agenda Items of critical interest to civil aviation in the regional/national position.

First Meeting of the Regional Preparatory Group (RPG) for WRC- 2012

3.4.139 States have identified focal contact points in their administration who will project ICAO position in the national/regional level forums in order to ensure that this position is included in the national/regional position. To provide a forum for these contact focal points to be thoroughly familiar with ICAO position and to assist them to effectively participate in the national/regional level forums, the first meeting of the Regional Preparatory Group (RPG/1) was organized on 8 and 9 December 2009 in Bangkok. Meeting addressed following agenda items:

i) Introduction to ITU and WRC Processes;

ii) Aviation Issues at WRC – 2012; and

iii) Role of aviation sector in the preparation for WRC – 2012.

3.4.140 After a brief discussion, the meeting adopted a Conclusion which was formulated by the RPG/1 meeting and endorsed by the CNS/MET SG/14 as follows:

Conclusion 21/43 – Preparation for WRC – 2012

That,

a) States be urged to have the designated contact person closely involved in the preparatory work for WRC – 2012 at the national level in close coordination with the contact points designated by respective telecommunication regulators;

b) Make necessary arrangements for the designated contact persons to attend the APT APG meetings and WRC – 2012 Conference to protect aviation interests; and

c) Reference to APANPIRG Conclusions 19/41, 20/58 and DGCA Conference Action Item 46/8 may be used to support these efforts.

3.4.141 The RPG/1 meeting was informed that the States can get the latest information regarding ICAO position from ICAO Aeronautical Communication Panel (ACP) website http://www.icao.int/anb/panels/acp/index.cfm. Some participants were of the view that better visibility should be provided to ICAO Position on WRC-2012 Agenda Items of interest to civil aviation. To this effect, the meeting adopted following Conclusion formulated by RPG/1 and recommended by CNS/MET SG/14.

Conclusion 21/44 – Visibility of ICAO Position on WRC – 2012 Agenda Items

That, ICAO be urged to improve visibility to ICAO Position on WRC-2012 Agenda Items of critical interest to civil aviation on the ICAO website.

Third Meeting of APT Conference Preparatory Group (APG/3) for WRC-2012

3.4.142 The APG2012-3 was held in Bangkok from 8 to 12 March 2010. The meeting was attended by 306 participants representing 27 States, industrial bodies and international organizations. ICAO participated in the meeting as observer and presented two Information Papers reflecting ICAO Position on WRC2012 agenda items of critical interest to Civil Aviation and ICAO contribution to the ITU-R Working Party activities. The secretariat presented to the CNS/MET SG meeting, in detail the outcome of APG2012-3 on Agenda Items of critical interest to civil aviation. The meeting stressed on the importance of ensuring retention of the existing spectrum and acquisition of additional spectrum for new applications and urged the States to ensure that their delegations to the national/regional

forums effectively project ICAO position and to the extent possible ensure its inclusion in the national/regional position. It was commented that if aviation looses spectrum it will lose capacity also.

3.4.143 Meeting was specifically informed about Agenda Item 1.7 of WRC-2012 on long term spectrum availability and access to meet the requirements of aeronautical mobile-satellite (R) service which was specifically highlighted during the meeting and States were urged to support Method B specified in the proposal. Different positions taken by national administrations were discussed in the meeting.

Review Regional Implementation of World Area Forecast System (WAFS)

3.4.144 The general concept of satellite broadcast versus the Internet for accessing World Area Forecast System products brought a discussion that warranted further consideration through an ad-hoc group (ISCS Provider State, Australia, Hong Kong China, New Caledonia, New Zealand, Singapore and IATA) formed by the CNS/MET SG/14 meeting. This resulted from a discussion on the concept of WAFS as it has evolved since the inception of WAFCs development in 1982. Concerns with the cessation of ISCS-G2 in June 2012 and an investigation of the need for SADIS satellite broadcast beyond 2015 by the SADISOPSG have raised the need for this matter to be considered at the next Conjoint ICAO MET/AIM Divisional Meeting / WMO CAeM-XV session tentatively scheduled to be held in 2014. The CNS/MET SG/14 meeting acknowledged that global policies were outside the terms of reference for the meeting. The meeting noted that Amendment 75 to Annex 3 applicable 18 November 2010 enables the use of the Internet for obtaining non-time critical MET data such as WAFS forecasts and has been endorsed through Decisions in APANPIRG/20 and WAFS Operations Group (WAFSOPSG)/5.

In light of the fact that data currently being provided by ISCS satellite service will only be available via the World Area Forecast System File Service (WIFS) after June 30, 2012, the meeting adopted the following Conclusion:

Conclusion 21/45 – Transition to WAFS Internet File Service (WIFS) from ISCS-G2

That,

a) The ISCS Provider State will work with States, in cooperation with the ICAO Secretariat and Asia and Pacific Regional Office, to assist States with the implementation of WIFS by March 2012;

b) States to update Points of Contact in **Appendix R** to the report on agenda item 3.4 and submit the WIFS registration form; and

c) ICAO Asia and Pacific Regional Office to request States to advise on the status of their implementation of WIFS by March 2011.

Note 1: The data currently being provided by ISCS satellite service will only be available via the WAFS Internet File Service (WIFS) after June 30 2012.

Note 2: WIFS commenced operation in May 2010.

3.4.145 Improvements in harmonization for the forecasts of maximum Clear Air Turbulence (CAT) potential and mean in-cloud turbulence potential were due to model changes by WAFS, but unknown to analyst that model changes were made. The WAFS Providers noted that WAFS changes are placed on the bulletin notice board available on the WAFSOPSG website. However, further clarity on model changes and implementation dates were determined by the meeting as necessary to

inform the users of these trial product changes. In addition, this is necessary information for proper analysis and subsequent reporting of results.

3.4.146 Furthermore, the meeting agreed that improvements to the WAFS implementation warranted consideration by the WAFSOPSG to inform users of updates to the contents of the WAFS forecasts and provide further guidance regarding the specific actions taken by the MET service providers and all relevant end users of WAFS upon receiving the administrative message. In particular, MET Services may find difficulty in determining whether or not a flight is in pre-flight stage or in-flight with regard to the following guidance provided on SIGWX corrective messages in response to APANPIRG Conclusion 19/44 and WAFSOPSG/5:

> *The content of such administrative messages shall be brought to the attention of users of the WAFS SIGWX forecast at the pre-flight planning stage. Where relevant to a particular flight, such correction information may be forwarded to aircraft in flight, but is not mandatory.*

In light of the above, the meeting adopted the following Conclusion:

Conclusion 21/46 – Improvements to WAFS Implementation

That, the WAFSOPSG is invited to discuss and consider the following improvement measures in WAFS implementation:

a) the WAFC Provider States inform users in advance about forthcoming changes to the contents of the WAFS forecasts; and

b) further guidance be provided regarding the specific actions to be taken by the MET service providers and all relevant end users of WAFS upon receiving the administrative message.

Note: Guidance should also include any requirement for a user State to generate its own administrative message for a product affected by a received administrative message.

3.4.147 Other issues that will be addressed by the WAFSOPSG through direct membership as opposed to a PIRG conclusion include: splitting the forecast data files provided in such a way as to increase the efficiency of obtaining gridded forecasts (currently provided by SADIS FTP and WIFS) putting priority on those required by Annex 3 for in-flight documentation (although IATA expressed concerns as they ingest data in automated systems as they become available) and to continue efforts in harmonizing the gridded forecasts of CB (horizontal and top) and icing between the two WAFCs. It was noted that the harmonization of the gridded forecast for turbulence had improved.

3.4.148 Updates based on WAFCs developments were reflected in the ASIA/PAC WAFS Implementation Plan and Procedures (Appendix V to the CNS/MET SG/14 report) and the Work Programme and composition of the WAFS/I TF (Appendix W to the CNS/MET SG/14 report) through the adoption of **Decision 14/28**.

Regional Implementation of International Airways Volcano Watch (IAVW)

3.4.149 In light of providing operators and flight crews graphical advisories of tropical cyclone and volcanic ash for the whole route of a flight (Amendment 75 to Annex 3) in the most expeditious manner (automatic processes), a link between text and graphical advisories is necessary. Including the file name of the graphical advisories under “Remarks” of the corresponding textual advisories is expected to fulfill this need. Given the aforementioned, the meeting adopted the following Conclusion:

Conclusion 21/47 – Improvements to VA and TC advisories

That, t he IAVWOPSG consider including the file name of the graphical advisories, if issued, under "Remarks" of the corresponding textual advisories.

3.4.150 The CNS/MET SG/14 meeting noted that 15% of the ACC AFTN addresses were still needed in the ASIA/PAC Region to support the IAVWOPSG Secretariat in developing a global list of ACC AFTN addresses to Volcanic Ash Advisory Centre (VAAC) London for the distribution of radioactive cloud information beginning 18 November 2010 (Amendment 75 to Annex 3). (reference Appendix X to the CNS/MET SG/14 Report).

3.4.151 Outcomes of the EUR/NAT VATF/2 were noted by the meeting in particular the recommended regional use of the NAT and EUR volcanic ash contingency plans (EUR Doc 019 and NAT Doc 006, Part II). This plan uses various volcanic ash concentrations thresholds as they relate to contamination levels of low, moderate and high that are used by the State to determine danger areas and by operators in assessing risk. In this context, sub-regional volcanic ash contingency plans in the ASIA/PAC Region and a call for States to establish/maintain appropriate contact points in the interim period (preferably by Jan 2011) until these contingency plans in the ASIA/PAC Region become available was requested to the CNS/MET SG/14 meeting by the ATM/AIS/SAR/SG/20 draft Decision SG 20/12. **Part a)** of this draft Decision was superseded by the **Decision 14/30** which calls for the Meteorological Advisories and Warnings Implementation Task Force (METWARN/I TF which used to be VA/TC I TF) to develop the framework of contingency plans for weather phenomena that include volcanic ash, tropical cyclone, Tsunami and radioactive cloud by making reference to the EUR/NAT contingency plans and the findings of the IVATF and the World Meteorological Organization scientific steering committee. This Decision was based on the recommendation of an ad-hoc group consisting of VAAC Wellington, Darwin and Tokyo, IATA and Hong Kong China formed by the CNS/MET SG/14 meeting. The name of the TF to manage the contingency plans was changed from the TC/VA I TF to the METWARN/I TF through **Decision 14/30** due to the alignment with the global group on Meteorological Advisories and Warnings. Lastly, ATM input on the contingency plans will be managed through the MET/ATM TF and linked to the METWARN/I TF by way of the Terms of Reference and Work Plan and Composition of the METWARN/I TF as provided in Appendix Y to the CNS/MET SG/14 Report.

Regional Implementation of International Tropical Cyclone Watch (ITCW)

3.4.152 The CNS/MET SG/14 meeting noted that Amendment 75 to Annex 3 includes the introduction of tropical cyclone advisories in graphical form, which includes the horizontal extent of gale force winds and frequent CB. Suggested dissemination of the graphic advisories is Portable Network Graphic (PNG) via the Internet.

3.4.153 The CNS/MET SG/14 meeting also noted that MWOs in the MID Region that receive TC advisories from Tropical Cyclone Advisory Centre (TCAC) New Delhi will be included in the tropical cyclone SIGMET (WC SIGMET) test on 10 November 2010 at 0200 UTC for MWOs in ASIA/PAC Region and 0800 UTC for MWOs in MID Region and the appropriate documentation updated accordingly.

3.4.154 The meeting was briefed on the latest developments of a pilot project on Aviation-weather Disaster Risk Reduction (ADRR) for aviation users in the Asia and South-West Pacific Regions, under the lead of Hong Kong China, which includes forecasts and warnings of tropical cyclones to 48 hours ahead (versus 24 hours as required by Annex 3) and numerical weather prediction products on tropical cyclones from a suite of sources. The ADRR will be operational by the end of 2010 and expand to cover the Bay of Bengal and Arabian Sea.

Implementation of SIGMET and warnings

3.4.155 The CNS/MET SG/14 meeting reviewed the results of the tropical cyclone (WC), volcanic ash (WV) and other weather phenomenon (WS) SIGMET tests conducted on 10, 17, and 24 November 2009, and noted the increased participation of States and MWOs, which included 8 first time participants in the State and MWO categories for the WS SIGMET test. This years SIGMET tests will also be conducted on 10, 17, and 24 November 2010 and the WAFCs will be invited to validate the receipt of SIGMET (help identify reception issues before the regional SIGMET trail described in the next paragraph).

3.4.156 The meeting was informed of the developments with regard to the feasibility study on the regional issuance of SIGMET advisories to assist the issuance of SIGMET by MWOs using regional centres under the direction of the Meteorological Warnings Study Group (METWSG). To assist the assessment of the SIGMET advisory trial, a SIGMET monitoring scheme to provide statistics on the impact of advisory information was deemed necessary by the ad hoc group formed by the METWSG. To facilitate in monitoring SIGMET issued by MWOs, the Hong Kong Observatory is expanding the current web-based SIGMET monitoring system (http://www.sigmetmon.weather.gov.hk) beyond the ASIA/PAC Region to all the other Regions, which will accommodate the monitoring of other selected regional centres that issue advisories (e.g. AFI) by around the second quarter of 2011. To facilitate monitoring of SIGMET, the meeting noted that the global database for SIGMET (SADIS User Guide Annex 3) did not contain all the Meteorological Watch Offices (MWOs) and associated Flight Information Regions (FIRs) because it represents real time reception. A global database of MWOs and FIRs would be useful in validating requirements. After further consideration by ICAO of draft Conclusion 14/31 of the CNS/MET SG/14 meeting which calls for an update of the SADIS and ISCS User Guide to include the MWO requirements from each region, ICAO determined that the most logical way to achieve a global MWO database is to use the same global database platform that already exists for OPMET requirements (FASID Tables MET 1A and 2A). Once this database is mature, the WAFCs' documentation may use this information for SIGMET requirements. This global database for MWO requirements should be completed in time for the regional SIGMET advisory trial to facilitate the validation of the trial. Given the above, the meeting adopted the following Conclusion:

Conclusion 21/48 — Update of SADIS and ISCS User Guide

That, the SADISOPSG and WAFSOPSG consider the need to update the SADIS and ISCS User Guides by aligning with regional Meteorological Watch Offices requirements (Regional FASID Tables)

Note: To achieve this, the following steps should be taken in time for the regional SIGMET advisory trial (1 April 2011)

a) Regional amendment proposals on FASID Table MET 1B

b) Develop global database based on Regional requirements in a)

c) Consider global database on SIGMET requirements for use in SADIS and ISCS User Guides

3.4.157 Further developments related to SIGMET noted at the CNS/MET SG/14 meeting included the development of a new turbulence index by Japan which improves the accuracy of SIGMET on turbulence. Moreover, the meeting noted the update to the Regional SIGMET Guide that includes Amendment 75 to Annex 3 changes for States' implementation preparation. The meeting was also informed of the transfer of MWO duties from Kunming to Chengdu for the Kunming FIR and Lanzhou to Xi'an for the Lanzhou FIR (effective 1 September 2010) which will be included in the next Regional SIGMET Guide amendment. The change of ICAO indicator for the Oakland Oceanic FIR (KZAK) will also be reflected in that amendment. Concern on the inclusion of the forecast time

in the second line of SIGMET message associated with Amendment 75 to Annex 3 was not clear as determined by the CNS/MET SG/14 meeting. Since that meeting, clarity was provided by ICAO in that the intent of FCST AT is the time of commencement of the event, which will be included in the next amendment to the SIGMET Guide. The use of a unique SIGMET designator (Z99) for testing will be considered in another amendment after further testing and discussion at the OPMET/M TF/9 meeting in March 2011 (a note indicating this information will be included in the next amendment to the SIGMET Guide).

Implementation of the issuance of observation, TAF and OPMET exchanges

3.4.158 Terms of References (TORs) of the OPMET Management Task Force (OPMET/M TF) provided in Appendix Z to the CNS/MET SG/14 Report were aligned as to minimize overlap (e.g. SIGMET test) with the METWARN/I TF and provide a link between the two task forces on interdependent tasks (**Decision 14/32** refers). Further alignment with METWARN/I TF in terms of membership was agreed upon by the CNS/MET SG/14 meeting to reduce the membership of OPMET/M TF to Regional OPMET Data Banks (RODBs), IATA, EUR BMG, MID OPMET bulletin board, and WAFCs.

3.4.159 IATA monitored the OPMET (METAR/TAF) reception for a 9 week period beginning 4 January 2010 against expected reception indicated in FASID Tables MET 1A and 2A (February 2010) (which also corresponds to SADIS User Guide Annex 1) for AOP and non-AOP aerodromes. The statistics provided at the OPMET/M TF/8 and CNS/MET SG/14 meetings were encouraging and a summary provided in tabular form here within.

OPMET Reception									
System	AOP aerodromes			Non-AOP aerodromes			Non-AOP aerodromes not listed in Tables		
	SA (%)	TAF	FC (#)	SA (%)	TAF	FC (#)	SA (#)	TAF (#)	FC (#)
ISCS	85.4	86.3	14	58.7	60.1	1	76	33	1
SADIS	87.3	89.3 (86-2009)	14	69.2 (66.1-2009)	74.1 (67.7-2009)	2	64	24	20 (18 only FC)
Goal	95	95	0	90	90	0			

3.4.160 As a result of recent changes to the ROBEX Handbook which includes many more non-AOP aerodromes since the monitoring by IATA earlier in the year, the meeting agreed that another round of monitoring occur and results be sent to the Regional Office for distribution to States where appropriate. The effort is to attain 95% reception of TAF and METAR at SADIS/ISCS for AOP aerodromes and 90% reception of TAF and METAR at SADIS/ISCS for non-AOP aerodromes and reduce the irregularities in time from METAR observation/TAF creation to reception/start period of validity. It was noted that a validity check be conducted with one of the States that revealed OPMET time and regularity issues when in fact they were certain the OPMET were timely and regular. Lastly, the lower OPMET reception noted on the ISCS versus the SADIS promotes further harmonization of the two systems (which is covered by SADISOPSG/15 Conclusion 15/9). In light of the above, the meeting adopted the following Conclusion:

Conclusion 21/49 — Implementation of OPMET reception

That,

a) IATA be invited to conduct another period of OPMET monitoring for reception of METAR and TAF at SADIS and ISCS and provide the Regional Office with a list of AOP and non-AOP aerodromes by State whose OPMET data are not available at SADIS and/or ISCS as well as a list of AOP aerodromes by State that distribute FC TAF;

b) the Regional Office urge States containing AOP aerodromes whose OPMET is not received at SADIS and/or ISCS to comply to the Regional Air Navigation Plan (RANP);

c) the Regional Office encourage States containing non-AOP aerodromes whose OPMET is not received at SADIS/ISCS to provide OPMET data as already agreed upon;

d) the Regional Office inform States that FC TAF is no longer disseminated internationally in accordance with the RANP;

e) the slower transmission times and missing OPMET data associated with ISCS in relation to SADIS be investigated by RODBs Tokyo and Singapore;

f) the Regional Office inform States of OPMET observation, filing and transmission times as described in the ROBEX Handbook section 7.5; and

g) the Regional Office inform States of OPMET availability and regularity as defined in the Regional Air Navigation Plan and ROBEX Handbook

Note: this Conclusion is intended to assist in achieving the OPMET data availability goals (95% AOP aerodromes and 90% non-AOP aerodromes) described in APANPIRG/20 Conclusions 20/63 and 20/64)

3.4.161 OPMET implementation of 30-hour TAF at AOP aerodromes in the ASIA/PAC Region is 75% as of July 2010, well more than double from a year ago.

3.4.162 A status of Extended Mark-up Language (XML) developments as they relate to ICAO and WMO was provided to the meeting and in particular noted the milestones such as the pilot project conducted by WMO in 2009 and enabling bilateral exchange of OPMET via XML in 2013 (Amendment 76 to Annex 3). Furthermore, possible endorsement of the future use of Weather Information Exchange Model (WXXM) by the planned conjoint ICAO/WMO MET/AIM Divisional Meeting in 2014 and the possible implementation of WXXM in 2016 was noted by the meeting.

3.4.163 The meeting also noted the update to the ROBEX Handbook in June 2010 and that more clarity with Amendment 75 to Annex 3 changes as they relate to collection and distribution of air-reports was deemed necessary (provided in August 2010 amendment to the ROBEX Handbook). Lastly, the meeting noted updates to the Asia/Pacific OPMET data banks ICD to reflect the current RODB operations of non scheduled exchange of OPMET data in the Region.

3.4.164 The meeting agreed that for efficiency of maintaining FASID tables related to HF Radiotelephony VOLMET broadcasts for which most elements are MET, the transfer of FASID Table ATS 2 from ATS to MET be considered by ICAO, which involves all regions (Conclusion 21/10 refers)

Regional MET support to ATM

3.4.165 The meeting reviewed highlights of the MET/ATM TF/1 meeting that included a review of the previous survey on ATM requirements for MET; developments on coordination and services of MET for ATM; new Terminal Weather forecast (now referenced as MET Services for the Terminal Area – MSTA).

3.4.166 The meeting noted that the updated TORs (Appendix A1 to the CNS/MET SG/14 Report) based on MET/ATM TF/1 meeting proposed changes that take into account ingestion of MET information in decision support tools, sub-regional exchange of MET information to support ATM, monitoring of global policies on source and delivery of MET data for ATM and adding a link to the METWARN/I TF in developing contingency plan on weather phenomenon that includes volcanic ash, tropical cyclone, Tsunami and radioactive cloud (**Decision 14/35** refers).

3.4.167 The meeting briefly discussed the status of the upcoming MET/ATM Seminar and TF/2 meeting in Fukuoka, Japan during the fourth week of January 2011 and requested the MET/ATM TF/2 meeting be held in coordination with WMO so that the WMO expert team and task team on Meteorological Service for the Terminal Area (MSTA) be held back to back with the Seminar. Consequently, the meeting adopted the following Conclusion:

Conclusion 21/50 – MET/ATM Seminar

That, ICAO in coordination with WMO conduct a MET/ATM Seminar in early 2011.

Note: This Conclusion reinstates APANPIRG Conclusion 19/53.

3.4.168 The CNS/MET SG/14 meeting noted the results of the Air Traffic Flow Management (ATFM) survey that includes a MET component that was conducted in 2010 in accordance to APANPIRG/20 Conclusion 20/13. In particular, data from the flow control unit was available in more States than anticipated and useful to determining MET needs for ATM. IATA noted that strategic decisions with regard to operations is conducted in part using the available capacity versus the demand. The meeting agreed that further analysis is necessary by the MET/ATM TF and that the ATM use of the survey should be followed as well.

3.4.169 Many States presented current works with regard to MET services for ATM (Hong Kong China, India, Japan, and United States). Specifically, the NextGen concept for meteorological services in support to air traffic management for performance-based navigation; ad-hoc group of AMOFSG to formulate an initial set of requirements, elements and metrics for MET in support to global ATM and PBN; wind shear and turbulence provided by Doppler radar in India,; aviation thunderstorm nowcasting system developed by Hong Kong China; and significant convection forecast and the weather briefing for ATC in support of ATFM by Hong Kong China.

Other MET issues

3.4.170 The meeting noted MET requirement changes associated with Amendment 75 to Annex 3 adopted by the ICAO Council on 22 February 2010, which are provided in the attachment to IP/13 of the CNS/MET SG/14 meeting.

3.4.171 The use “moderate to severe” air-reports of turbulence and icing produces a dilemma for MWOs in that “moderate to severe” is not a category in Annex 3 or PANS-ATM. This concern was raised with reference to the inclusion of the moderate category (in addition to severe) in issuing AIREPs on icing and turbulence beginning in November 2010 (Amendment 75 to Annex 3). The meeting noted that some States in the Region use severe which may warrant a SIGMET. It was further noted that IATA accepted the possibility of over warning provided it does not occur often (CNS/MET SG/14 meeting). ICAO noted that States may choose how to use non-compliant data and that filing a difference with the Annex is not necessary provided that the resulting message is compliant. Given

the frequency of occurrence of these non-compliant reports were determined to be low (less than every month as reported at one location), APANPIRG/21 encouraged the use of severe by States (and their respective MWOs) upon receipt of a 'moderate to severe' AIREP. Therefore, guidance material will be included in the next amendment to the SIGMET Guide (September 2010) that allows the State to determine how to treat non-compliant AIREPs and that a difference with Annex 3 does not need to be filed provided the State converts non-compliant messages to compliant ones. A long term solution may be considered in the appropriate global forum (i.e. METWSG/3 meeting in November 2010).

3.4.172 The meeting noted that requirements for Quality Management System (QMS) for all MET elements in Annex 3 associated with Amendment 75 will become a requirement (standard) in 2012, as opposed to 18 November 2010 for other changes associated with Amendment 75. The meeting noted that the establishment of QMS in conformity with ISO-9000 series will remain a recommendation (2.2.3 of Annex 3). States (RoK and Australia) shared information on QMS for their MET services and in particular with OPMET data and climatology. The meeting learned of the meteorological satellite launch by the RoK and its attributes that can serve the region in improving products for aviation.

Regional Performance Framework Objective

3.4.173 The meeting reviewed and discussed the regional Performance Objectives and associated Asia/Pacific performance Metrics.

3.4.174 It was recalled that CNS/MET SG/13 discussed the proposed metrics, in particular APAC Efficiency-4 and considered it necessary to further develop the harmonized methodology for measurement, once the Metrics are adopted by APANPIRG, to avoid delay. The meeting noted that ATM/AIS/SAR SG/20 had developed a draft Conclusion inviting ICAO to develop a common set of performance metrics for all the ICAO regions so as to facilitate comparative analysis and establish the globally harmonised guidance on methodology of how to collect the data in order to achieve commonality.

3.4.175 The meeting also noted that NAT SPG/46 had considered the need to have a clearly defined common approach to performance monitoring and measurement and the need to agree on a uniform set of metrics. The NAT SPG acknowledged the need to identify a suitable set of metrics – Key Performance Indicators (KPI) related to key performance areas (KPA) of: access, capacity, cost effectiveness, efficiency, environment, flexibility, predictability and safety. NAT implementation management group (NAT IMG) has been tasked to identify such metrics i.e. KPIs. These metrics would then be incorporated into a performance monitoring process.

3.4.176 The meeting recalled that APANPIRG/20 also adopted Conclusion 20/3 to encourage States to use the similar template/format and the regional objectives as the basis for their national objectives to align with Regional & National performance Objectives. The meeting noted that States are expected to collect and provide data to support the existing four APAC regional metrics and report to APANPIRG/21.

Performance Framework Forms in the CNS and MET fields

3.4.177 The meeting reviewed and updated the regional Performance Framework Forms (PFFs) for the CNS and MET fields that were adopted by APANPIRG/20 through Conclusion 20/2 in support to the ICAO planning objective to achieve a performance based global air traffic management (ATM) system through the implementation of air navigation systems and procedures in a progressive, cost-effective and cooperative manner. The MET WG updated the performance frame work forms to include monitoring of the IVATF developments in order to develop a framework for an ASIA/PAC contingency plan for weather phenomena that include volcanic ash events, tropical cyclone, Tsunami and radioactive cloud. In addition, the renaming of the task force VA/TC I TF to METWARN/I TF with broader responsibilities was accounted for. Added tasks of the MET/ATM task force were included. Lastly, the implementation of WIFS by 2012 associated with the cessation of ISCS-G2 in

June 2012 was reflected in the forms. Given these changes, the meeting adopted the following decision based on CNS/MET SG recommendation.

Decision 21/51 - Performance Framework Forms (PFFs)

That, updated performance Framework Forms (PFFs) of CNS and MET fields as contained in **Appendix S** to the report on agenda item 3.4 be adopted.

Review of CNS/ATM Implementation and Planning Matrix

3.4.178 The meeting reviewed the CNS/ATM Implementation and Planning Matrix updated by CNS/MET SG/14 and ADS-B SITF/9 meeting. The matrix reflects implementation status of major CNS/ATM elements in the region which includes ATN, AIDC, CPDLC, GNSS, ADS-C and ADS-B. The updated Matrix is provided in **Appendix T** to this Report on Agenda Item 3.4.

Fellowship Programme – Republic of Korea

3.4.179 The meeting noted information regarding fellowship training programme provided by the Republic of Korea (ROK) to the developing countries in accordance with MOU signed with ICAO since 2001. The ROK has provided assistance to train 360 fellows from 84 countries in the field of air navigation and ROK will continuously make every possible effort to contribute towards balanced development of international civil aviation.

3.4.180 While the meeting appreciated the training programme provided by the Republic of Korea and important role of training, there was a request for a need to issue the letter of invitation to States and their nominated and selected trainees at least 2 months in advance to allow them to make necessary arrangement for travel in time.

Future Programme

TOR and Subject/Tasks List of CNS/MET Sub-group

3.4.181 The meeting reviewed the Terms of Reference of the Sub Group. The meeting did not identify the need to amend the Terms of Reference. The meeting also reviewed the Subject/Tasks List and included several new items including further development of regional HF radio communication guidance material and conducting analysis of ionospheric data collected for the development of model for GNSS, promote implementation of AIDC and improve AMS(R)S communication in the remote and oceanic area in the Tasks List. The MET field tasks were updated to align with the change of task force structure in that the VA/TC I TF broadened duties to include meteorological advisories and warnings and now referenced as METWARN/I TF. The status of on-going tasks was also updated where necessary. Accordingly the meeting adopted the following Decision:

Decision 21/52 - Updated Subject/Tasks List of the CNS/MET Sub-group

That, the updated Subject/Tasks List of the CNS/MET Sub-group provided in **Appendix U** to the report on agenda item 3.4 be adopted.

Any other Business

3.4.182 Under this agenda item, CNS/ATM SG meeting was provided updates on the development of NextGen by the USA. Current demands on the United States of America's national air transportation system are exceeding its ability to provide sufficient system capacity domestically and abroad. Operating and maintenance costs of the air traffic system are outpacing revenues, and the air carrier industry is experiencing a period of dramatic change. Security requirements established in the aftermath of the 11 September 2001 jetliner attacks have significantly impacted costs and the

ability to efficiently move people and cargo. In addition, growth in air transportation is provoking community concerns over aircraft noise, pollution, and congestion.

3.4.183 It was considered that merely adapting air transportation's current paradigm will not be sufficient to meet its challenges. Instead, transformation of today's system is required to ensure a healthy, environmentally friendly, globally interoperable air transportation system for 2025. In 2003, the U.S. Congress established the Joint Planning and Development Office (JPDO) to define a national strategy for developing the Next Generation Air Transportation System (NextGen). The NextGen vision for 2025 enables the safe, efficient and reliable movement of large number of people and goods throughout the air transportation system in a way that is consistent with national security objectives. NextGen's vision is founded upon an underlying set of principles and is enabled by a series of key capabilities that will free the U.S of many current system constraints, support a wider range of operations, and deliver an overall system capacity up to three times greater than that of current operating levels.

3.4.184 The meeting noted the initiative taken by India in implementing automation to improve the overall capability in Aeronautical Information Service through establishing an Integrated AIS/AIM System to manage aeronautical data chain processes involved in designing to publication stages of Aeronautical Information Publication products including Aeronautical Maps/Charts and Circulars.

Note of appreciation

3.4.185 The meeting expressed appreciation and gratitude to DGCA, Indonesia for hosting the CNS/MET Sub-group ADS-B SITF/9 meetings and ADS-B Workshop. The meeting appreciated the support provided by Hong Kong, China in hosting the PBNTF/6 meeting.

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No.	PERFORMANCE OBJECTIVE	ICAO Srategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/5 Update
1	ATN Implementation Coordination	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Review of implementation problems and develop co-ordinated solutions (2) Coordinate/compile the regional implementation schedule (3) Monitor Implementation	Expedite implementation activities, ensure system compatibility through out the region	(1) Co-ordination Report (2) Waterfall schedule (3) Monitor AMHS Implementation Planner	(1)Ongoing/Semi-annually until (2010)- (2) Schedule 09/2009 (3) On going	Kapoor (India)	All members	(1)Updated the information in the ATN Router and AMHS planning tables and the implementation status.(2) Completed, maintain the AMHS Implementation Planner
2	ATN Operational Procedures	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Development of Interim Database for Directory Services	Make available real time and quality assurance addresses for ATN message delivery	(1) Interim Database	(1) (2007)	Robert Hallman (USA)	Thailand, Hong Kong China, Japan	The database was demonstrated. Aerothai will maintain the database on behalf of the regional ICAO Office. Aerothai will serve as POC for AMC coordination between Asia/Pac States and Eurocontrol. ATN Operational Procedures is completed and forward for adoption.
				(2) Develop the operational database management procedures		(2) Operational Procedures	(2) (2007)			Completed.
3	ATN Certification & Validation Process	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Develop conformance procedures and checklist for AMHS and ATN routers	Expedite implementation activities, ensure global system compatibility	(1) Checklist	(1) (2007)	Sin Hie Sng (Singapore)	China, Hong Kong China, Indonesia,ROK,USA,	Completed

No.	PERFORMANCE OBJECTIVE	ICAO Srategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/5 Update
				(2) Develop validation process document		(2) Conformance Document	(2) 2007			Completed and forward to CNS/MET SG and APANPIRG/20 for review and adoption
						(3) Update to Conformance Document	(3) Ongoing until 2010			Completed ~~Document need to be kept up-to-date to reflect defect report from States~~
4	(1) ATN Documentation (2) Review all documents adopted by ATNICG and ATNTTF	D. Efficiency	GPI-17, GPI-19, GPI-22	(1) Study DIR objects/attributes proposed in ACP and follow development within other groups (2) Update document tree/establish tracking table for suspended dates (3) Standardized Report form and Guidance Material	Expedite implementation activities, ensure global system compatibility	(1) Directory Report (2) Tracking table/Updated documentation tree (3) AMC report (4)Report Form and Report Guidance	(1) Annually until (2010) (3) Periodically (4) 2010	Chonlawit B. (Thailand)	USA	Update the database. AMC mandated by ICAO. Training completed. Directory Service will be implemented in coordination with ACP and phases will be developed.
				(2) Development AIDC documentation (including ICD) and follow development within other groups		(2) AFTN AIDC/ATN Gateway Specification ATN AIDC ICD	(2) 2008 (ACP-dependent)	(Thailand)	Thailand	Task Closed in view of the removal of provision from Doc 9880
				(3) Update of AMHS ICD to comply with SARPs 3rd Edition		(1) Report differences between existing ICD and requirements for Edition 3 of Doc 9705 (3) Updated AMHS ICD	(1) Sept 2010(3) (2007)	US	Japan	

No.	PERFORMANCE OBJECTIVE	ICAO Srategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/5 Update
				Managing PDR	Update ICAO Documents (9880/9896)	**PDR filing and tracking**	**On-going**	**US**	**All the Member States**	**Additional Task proposed in ATNICG/5**
5	**ATN Performance**	**D. Efficiency**	**GPI-17, GPI-19, GPI-22**	**(1) Develop/establish/adapt/monitor/identify/analyse performance indicators**	**Assure QOS, service continuity, timely delivery of services**	**(1) AMHS performance report**	**(1) Annually until (2010)**	**Japan**	**Republic of Korea, India**	**Final Draft of the Document complete. Will be presented.**
6	**ATN Service Enhancements**	**D. Efficiency**	**GPI-17, GPI-19, GPI-22**	**(1) Review the impact of the implementation of Directory Services in the Region**	**Enhancing the service**	**(1) Report on directory**	**(1) Annually until (2010)**	**Fiji**	**USA, Thailand, New Zealand, Japan, Australia**	**Complete. AMC has been adopted by ICAO. Aerothai has been designed as POC for Asia/Pac region**
				(2) Directory Service - Implementation Strategy	**Enhancing the operation**	**Requirement Analysis Report & Implementation Strategy**	**1)2011 2) 2012**	**Thailand**		Additional Task Proposed in ATNICG/5
				ATN/IPS Implementation Plan	**Inter-regional and intra regional network compatibility**	**1) ATN/IPS router ICD 2) IPS addressing plan 3) ATN/OSI - ATN/IPS Transition Plan 4) ATN/IPS routing policy 5) Update FASIS Tables to accommodate IPS**	**-2011 2)2011 3) 2011 4) 2012 5) 2011 6) 2010**	**USA**	**Australia, China, India, Fiji, HongKong, China, Japan, and USA**	**Proposed an additional task**

No.	PERFORMANCE OBJECTIVE	ICAO Srategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/5 Update
				Providing support for emerging requirements of OPMET, AIS/AIM, AIDC etc.	**Enhancing the service**	**Task Report on XML based messages over AMHS platform**	**2011**	**USA**	**Hong Kong China,**	**Additional Task proposed in ATNICG/5**
				(5) Study for transition of AFTN-based AIDC as an alternative to ATN based AIDC to ATN environment	**Improving the service and lowering the operating cost**	**(5) Report on the impact of transition of AFTN-AIDC to ATN-AIDC AFTN AIDC/ATN Gateway Specification**	**(5) (2008)**	**Thailand**	**India, Indonesia, New Zealand, USA,**	**A Draft specification of AFTN AIDC/ATN Gateway was presented. Completed. Task closed in view of removal of provision from Doc ~~9880~~**
		D. Efficiency	**GPI-17, GPI-19, GPI-22**	**Analyze Common Address Prefix Proposal**	**Improving the service and routing efficiency**	**Report on common prefix based analysis conduced**	**End of 2008**	**Mark Brown (Japan)**	**Australia, Fiji, HongKong China, New Zealand and USA**	**Completed. Action Items developed at ATNICG/2 for follow-up at WG meetings.**
7	**Security**	**B. Security**	**GPI-17, GPI-19, GPI-22**	**(1) Develop ATN System Security policy**	**Safe and Secure Inter and Intra Regional Communication and service infrastructure**	**(1) Policy Document**	**(1) Annually until (2010)**	**Vidyut Patel (USA)**	**Australia, Hong Kong China**	**Adopted by APANPIRG/19**
				(2) Develop ATN System Security Guidance		**(2) Guidance Document**	**(2) (2011)**			**On-Going review and update**

No.	PERFORMANCE OBJECTIVE	ICAO Srategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/5 Update
				(3) Develop ATN System Security Solution for Initial and Enhanced Services		**(3) Security, Technical, Management and Operational Control**	**(3) (2008)**			**Completed ~~On-Going review and update~~**
				(4) Co-ordinate and monitor ACP working group and other regions including Directory Service, PDRs		**(4) Report**	**(4) Semi-Annually until (2010)**		**Thailand**	**On-Going review and update**
				5) Develop IPS Security Policy and update the relevant guidance documents **(5) Develop ATN System Security Check List based on Security Control and Regional Incident Response Plan and Contingency Plan**		**Policy and updated guidance documents** **(5) Check List, Regional Incident Response Plan and Contingency Plan**	**2011** **(5) (2009)**			Proposed additional task to facilitate ATN/IPS **Forward to CNS.MET SG and APANPIRG for review and adoption**

No.	PERFORMANCE OBJECTIVE	ICAO Srategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/5 Update
8	ATN Service Enhancements (supporting amended ICAO Flight Plan and ATS Message Formats)	D - Efficiency	GPI - 17, GPI - 19, GPI - 22	1) Review the impact of the impleemntation of Amendment 1 to 15th Edition of Doc. 4444 effective 15 Nov. 2012 (PANS ATM Chapter 4 and Appendix 3 relating to the ICAO Flight Plan and associated ATS Message formats to the AFS	Enhancing the service	1) Report on capability of existing and planned AFS systems to the revised ICAO Flight Plan and ATS Message Format	1) Annually until 2011	USA	Fiji India Hong Kong New Zealand Singapore USA	Pending result from ICAO Flight Plan and ATS Message TF
				2) Indentify the new requirements for AMHS/AFTN to support new message format	Enhancing the operation	2) Report on impact of New ATS message format in AMHS	2) 2010	Thailand	Fiji India Hong Kong New Zealand Singapore USA	On-going task-Report at ATNICG/4
				3) Identify the link control procedure using the AMHS to support the revised ATS message format to the ATC automation system	Enhancing the service	3) Report whether special link control procedure is required	3) 2010	Thailand	Fiji India Hong Kong New Zealand Singapore USA	On-going task

The ATN PERFORMANCE OBJECTIVE

The APAC ATN ground-to-ground infrastructure will be fully operational 53 percent at 23 locations by December 2007.

(GPI-22) COMMUNICATION NETWORK INFRASTRUCTURE

Related ATM objectives: AMSS; HF data; VHF data; SSR Mode S; ATN

Scope: To evolve the aeronautical mobile and fixed communication infrastructure, supporting both voice and data communications, accommodating new functions as well as providing the adequate capacity and quality of service to support ATM requirements.

(GPI-19) METEOROLOGICAL SYSTEMS

Objective: To improve the availability of meteorological information in support of a seamless global ATM system.

No.	PERFORMANCE OBJECTIVE	ICAO Srategic Objective	Associated GPI	Tasks/Strategy	Benefits	Deliverables	Target Date	Leader	Supporting Members	ATNICG/5 Update
(GPI-17) IMPLEMENTATION OF DATA LINK APPLICATIONS **Scope:** Increase the use of data link applications **Related ATM objectives:** Application of data link; Functional integration of ground systems; with airborne systems; ATS inter-facility data communication (AIDC)										

AMHS Implementation Planner

Interconnection, Connected to router of: *Administration (Location of Router)*	Stage	BBIS										
		Australia (Brisbane)	Australia (Melbourne)	China (Beijing)	Hong Kong, China (Hong Kong)	India (Mumbai)	Fiji (Nadi)	Japan (Fukuoka)	Singapore (Singapore)	Thailand (Bangkok)	USA (Salt Lake City)	USA (Atlanta)
Australia (Brisbane)	A						Q2/10					
	B											
	C											
	D						Q3/10	2010				
Australia (Melbourne)	A								Q4/06			
	B								TBD			
	C								TBD			
	D								TBD		2010	
China (Beijing)	A				Q2/10							
	B				Q2/10							
	C				Q3/10							
	D				Q3/10	2009 / 2010		2010		2009		
Hong Kong, China (Hong Kong)	A			Q2/10				TBD		TBD		
	B			Q2/10				TBD		TBD		
	C			Q3/10				TBD		TBD		
	D			Q3/10				TBD		TBD		
India (Mumbai)	A								Q3/09			
	B								Q4/09			
	C								Q4/09			
	D			2009 / 2010					Q4/10	2009 / 2010		
Fiji (Nadi)	A	Q2/10									Q2/10	
	B										Q3/10	
	C										Q3/10	
	D	Q3/10									Q3/10	
Japan (Fukuoka)	A				TBD				TBD			
	B				TBD				TBD			
	C				TBD				TBD			
	D	2010		2010	TBD				TBD		2006/ Implemented	
Singapore (Sinagpore)	A		Q4/06			Q3/09		TBD		Q4/06		
	B		TBD			Q4/09		TBD		Q4/10		
	C		TBD			Q4/09		TBD		Q4/10		
	D		TBD			Q4/10		TBD		TBD		
Thailand (Bangkok)	A				TBD				Q4/06			
	B				TBD				Q4/10			
	C				TBD				Q4/10			
	D			2009	TBD	2009 / 2010			TBD			
USA (Salt Lake City)	A						Q2/10					
	B						Q3/10					
	C						Q3/10					
	D		2010				Q3/10	2006/ Implemented				
USA (Atlanta)	A											
	B											
	C											
	D											

AMHS Implementation Planner

Interconnection, Connected to router of: *Administration (Location of Router)*	Stage	BBIS										
		Australia (Brisbane)	Australia (Melbourne)	China (Beijing)	Hong Kong, China (Hong Kong)	India (Mumbai)	Fiji (Nadi)	Japan (Fukuoka)	Singapore (Singapore)	Thailand (Bangkok)	USA (Salt Lake City)	USA (Atlanta)
Bahrain	A								2011			
	B								2011 (IPS-based connection)			
	C								2011			
	D								TBD			
Europe	A											
	B											
	C											
	D							TBD				
Italy	A											
	B											
	C											
	D									TBD		
Kuwait	A											
	B											
	C											
	D			TBD								
Russian Federation	A											
	B											
	C											
	D			TBD				TBD				
South Africa	A	TBD										
	B											
	C											
	D											
United Kingdom	A								Q4/10			
	B								Q4/10 (IPS-based connection)			
	C								Q4/10			
	D								TBD			
Indonesia (Jakarta)	A								Q1/08			
	B								Q1/09			
	C								Q2/10			
	D								TBD			
New Zealand (Christshurch)	A	Q4/12									Q4/12	
	B	Q4/12 (IPS-based connection)									Q4/12 (IPS-based connection)	
	C	Q1/13									Q1/13	
	D	Q1/13									Q1/13	
Timor States (Dili)	A											
	B											
	C											
	D											
Nauru (Nauru)	A											
	B											
	C											
	D											
Papau New Guinea (Port Moresby)	A											
	B											
	C											
	D											

AMHS Implementation Planner

Interconnection, Connected to router of: *Administration (Location of Router)*	Stage	BBIS										
		Australia (Brisbane)	Australia (Melbourne)	China (Beijing)	Hong Kong, China (Hong Kong)	India (Mumbai)	Fiji (Nadi)	Japan (Fukuoka)	Singapore (Singapore)	Thailand (Bangkok)	USA (Salt Lake City)	USA (Atlanta)
Solomon Islands (Honiara)	A											
	B											
	C											
	D											
Vanuatu (Port Vila)	A											
	B											
	C											
	D											
DPRKorea (Pyongyang)	A											
	B											
	C											
	D											
Macau, China (Macau)	A			Q1/09	Q2/09							
	B			Q1 - Q2/09	Q3/09							
	C			Q1 - Q2/09	Q3/09							
	D			TBD	Q4/09							
Mongolia (Ulaanbaatar)	A											
	B											
	C											
	D											
Myanmar (Yangoon)	A											
	B											
	C											
	D											
Nepal (Kathmandu)	A			Q4/10		Q4/10						
	B			Q4/10 (IP-based connection)		Q4/10 (IP-based connection)						
	C			Q1/11		Q1/11						
	D			Q1/11		Q1/11						
Pakistan (Karachi)	A					2009						
	B					Q1/10						
	C					Q1/10						
	D					Q2/10						
Republic of Korea (Seoul)	A											
	B											
	C											
	D											
Vietnam (Ho Chi Minh / Hanoi)	A				TBD				TBD			
	B				TBD				TBD			
	C				TBD				TBD			
	D				TBD				TBD			
Philippines (Manila)	A				TBD				2011			
	B				TBD				2011			
	C				TBD				2011			
	D				TBD				2011			

AMHS Implementation Planner

Interconnection, Connected to router of: *Administration (Location of Router)*	Stage	BBIS										
		Australia (Brisbane)	Australia (Melbourne)	China (Beijing)	Hong Kong, China (Hong Kong)	India (Mumbai)	Fiji (Nadi)	Japan (Fukuoka)	Singapore (Singapore)	Thailand (Bangkok)	USA (Salt Lake City)	USA (Atlanta)
Taibei	A				TBD							
	B				2009							
	C				2009							
	D				2012 - 13							
Bangladesh (Dhaka)	A											
	B											
	C											
	D											
Bhutan (Paro)	A											
	B											
	C											
	D											
Kenya	A											
	B											
	C											
	D											
Oman	A											
	B											
	C											
	D											
Sri Lanka (Colombo)	A								TBD			
	B								TBD			
	C								TBD			
	D								TBD			
Kiribati (Tarawa)	A											
	B											
	C											
	D											
New Caledonia (Noumea)	A											
	B											
	C											
	D											
Tuvalu (Funafuti)	A											
	B											
	C											
	D											
Wallis Island (Wallis)	A											
	B											
	C											
	D											

AMHS Implementation Planner

Interconnection, Connected to router of: *Administration (Location of Router)*	Stage	BBIS										
		Australia (Brisbane)	Australia (Melbourne)	China (Beijing)	Hong Kong, China (Hong Kong)	India (Mumbai)	Fiji (Nadi)	Japan (Fukuoka)	Singapore (Singapore)	Thailand (Bangkok)	USA (Salt Lake City)	USA (Atlanta)
Brunei Darussalam (Brunei)	A								TBD			
	B								TBD			
	C								TBD			
	D								TBD			
Malaysia (Kuala Lumpur)	A								Q1/2007	Q2/2010		
	B								Q1/2007	Q2/2010		
	C								Q4/2011	Q4/2011		
	D								Q4/2011	Q4/2011		
Cambodia (Phnom Penh)	A											
	B											
	C											
	D											
Lao PDR (Vientiane)	A											
	B											
	C											
	D											
American Samoa (Pago Pago)	A											
	B											
	C											
	D											
Marshall Islands	A											
	B											
	C											
	D											
Micronesia, Federated State of Chuuk	A											
	B											
	C											
	D											
Micronesia, Federated State of Kosrae	A											
	B											
	C											
	D											
Micronesia, Federated State of Ponapei	A											
	B											
	C											
	D											
Micronesia, State of Yap	A											
	B											
	C											
	D											
Palau	A											
	B											
	C											
	D											

Note:

A	Physical connections
B	Router Connection Tests
C	MTA Interoperability Tests
D	AMHS Commission
Q1/09	e.g. 1st Quarter in 2009

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

Considering that:

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 for the ATN based on the OSI protocols (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;

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 (UA); and

5) the backbone States in the Asia/Pacific region have already implemented, or are in the process of procuring and implementing, AMHS based ATN/OSI.

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

a) strategically deploy a backbone network of ATN/OSI routers and AMHS Message Transfer System (MTS) to provide a reliable infrastructure to initially support ground-to-ground applications and the planned ATN/OSI air-ground applications.

b) 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;

c) permit non-backbone States, and States in other regions with connections to the Asia/Pacific region, to connect their Message Transfer Agents (MTA) to backbone States using either the OSI-based ATN Internet Communications Services (ICS) or the ATN IPS on a bilateral basis;

d) permit States with limited 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;

e) complete migration from AFTN to AMHS within the time frame specified in the FASID ; and

f) 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:

g) 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;

h) Backbone States shall implement AMHS MTAs that support both the ATN ICS and ATN/IPS network services as specified in ICAO Doc 9880 section 3.2.2.2. Non-backbone States may implement MTAs that support either or both network services.

i) Backbone States shall implement ATN/OSI routers with X.25 sub-network capability and later migrate to IP sub-network capability for interconnection with other Backbone States and Non-backbone States.

j) 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 and to ensure system inter-operability; and

k) 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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Network Inventory - Persons & Contact / COM Centre (In column A and E : You can pick up from drop-down list)

Country	First Name	Surename	Local Title	Personal Roles	Phone Number	FAX Number	E-mail Address	COM Centre Postal Address	AFTN Address (Option)

AFTN Capacities **(In each column, you can pick up from drop-down list)**

Ax - VCG mapping capability	Ad - Ax mapping capability	Ax - VCG mapping actual used	Ad - Ax mapping actual used

VCG = Virtual Circuit Groups

AMHS Capabilities **(In column C, H and I : You can pick up from drop-down list)**

MTA Name	Maximum Content Length	Extended Encoded Information Types	Messages Lifetime (Minutes)				ATS Message Server	AFTN/AMHS Gateway	Currently Authorized Message Length	Maximum Number of Address	Converted General-Text Body Parts	Operation Status
			Urgent	Non Urgent	Normal	Report						
		ISO 8859-1										

Remarks :

IA5 and General-Text Body Part (ISO 646) are mandatory requirements for an ATS Message Server compliant with the "EUR Profile for ATS Message Handling Service".

Maximum Content Length : A minimum value of 2000000 is necessary for an ATS Message Server to be compliant with the "EUR Profile for ATS Message Handling Service"

Messages Lifetime (Minutes) : Three fields for each message priority level, and one field for reports. The maximum value is 5760 (corresponds to four days).

Currently Authorized Message Length : A minimum value of 65536 is necessary for an ATS Message Server to be compliant with the "EUR Profile for ATS Message Handling Service".

Operation Status : 'OP' for operational, 'NON-OP' for not operational, and 'UNKNOWN'

Connections **(In column D and H : You can pick up from drop-down list)**

Existing Connections

Remote COM	Protocol	Network Address	Link Type	Capacity	Supplier	Active	Circuit Type	Remark

Planned Connections

Remote COM	Protocol	Network Address	Link Type	Capacity	Supplier	Active	Circuit Type	Remark

AMHS MTA Table

Contracting State	MTA ID	User Agent ID	Addressing Scheme (CAAS/XF)	Country-name	Administration-domain-name	Private-domain-name	Organization name	Organization unit-name-1	User Agent (Direct User only)	Description of user	MTA Name	NSAP address	T-sel Value	P-sel Value	S-sel Value	Capability
				(C)	**(A)**	**(P)**	**(O)**	**(OU1)**	**(CN)**							

THE PROPOSED IPv4 ADDRESS PLAN

1 Introduction

The IPv4 address scheme is proposed by the Caribbean and South American Regional for its ATN/IPS Network. The Caribbean and South American region also proposed in their plan for a global IPv4 addressing assignment which includes Asia/Pacific region. The Asia/Pacific Region is requested to review this proposed IP addressing assignment for consideration and adoption.

1.1 Objective

This document is meant to describe the addressing plan for IPv4 addresses throughout the Asia/Pacific Region. This document defines the recommended address format for IPv4 addresses. The IPv4 network is to be used within region.

1.2 References

[1]	ICAO Doc 9705-AN/956	Manual of Technical Provisions for the ATN
[2]	ICAO Doc 9896	Manual for the ATN using IPS Standards and Protocols
[3]	ICAO Doc 7910	ICAO Location Indicators
[4]	RFC 1518	An Architecture for IP Address Allocation with CIDR
[5]	RFC 1918	Address Allocation for Private Internets
[6]	RFC 2050	BGP-4 Internet Registry IP Allocation Guidelines
[7]	RFC 3330	Special-Use IPv4 Addresses
[8]	RFC 4271	BGP-4 Specification

1.3 Terms Used

Administrative Domain	–	An administrative entity in the ATN/IPS. An Administrative Domain can be an individual State, a group of States, an Aeronautical Industry Organization (e.g., an Air-Ground Service Provider), or an Air Navigation Service Provider (ANSP) that manages ATN/IPS network resources and services. From a routing perspective, an Administrative Domain includes one or more Autonomous Systems.
Autonomous System	–	A connected group of one or more IP prefixes, run by one or more network operators, which has a single, clearly defined routing policy.

Intra-domain (interior gateway) routing protocol	–	Protocols for exchanging routing information between routers within an AS.
Inter-domain (exterior gateway) routing protocol	–	Protocols for exchanging routing information between Autonomous Systems. They may in some cases be used between routers within an AS, but they primarily deal with exchanging information between Autonomous Systems.
Local Internet Registry	–	A Local Internet Registry (LIR) is an IR that primarily assigns address space to users of the network services it provides. LIRs are generally ISPs, whose customers are primarily end users and possibly other ISPs. [LACNIC]

1.4 Acronyms

AMHS	–	ATN Message Handling System
ARP	–	Address Resolution Protocol
ATN	–	Aeronautical Telecommunications Network
BGP	–	Border Gateway Protocol
DNS	–	Domain Name Service
IANA	–	Internet Assigned Numbers Authority
ICS	–	ATN Internet Communication Service
IP	–	Internet Protocol
IPv4	–	Internet Protocol Version 4
IPv6	–	Internet Protocol Version 6
IPS	–	Internet Protocol suite
LACNIC	–	Latin American and Caribbean Internet Address Registry
LIR	–	Local Internet Registry
OSPF	–	Open Shortest Path First
RIR	–	Regional Internet Registry

1.5 Overview of Addressing Issues

The following subsections present issues that affect the completion of the addressing plan for operating the IPS-based AMHS network.

1.5.1 Public or Private Address

An important decision for the region is whether to use private or public addresses. Private addresses can be used if coordinated by all participating States and Organization; however, it is possible that existing networks already use addresses in the private block ranges. Public addresses must be obtained from a Regional Internet Registry (RIR). The Internet Assigned Numbers Authority (IANA) has delegated responsibility for administration of Internet numbering to the Latin American and Caribbean Internet Address Registry (LACNIC).

1.5.2 Address of Systems in External Regions

Systems in external regions could be assigned an address from the APAC address space rather than use an address in their regional address block. Note however that this must be coordinated with private addresses so as to avoid collisions.

2 IPv4 Addressing Overview and Fundamentals

In the Internet Protocol a distinction is made between names, addresses, and routes. A name indicates what we seek. An address indicates where it is. A route indicates how to get there. The Internet protocol deals primarily with addresses. Its main task is to forward data to a particular destination address. It is the task of higher-level protocols to make the mapping from names to addresses, for example using a domain name service (DNS). The Internet protocol forwards packet data units (PDU) to a destination address using routing tables maintained by a routing protocol. The routing tables contain the address of the next hop along the route to the destination. There are in general two classes of routing protocols: inter-domain or exterior routing protocols such as the Border Gateway Protocol (BGP) and intra-domain or interior routing protocols such as the Open Shortest Path First (OSPF) protocol. In order to forward PDUs to the next hop address, there must be a mapping from this address to the link level address, for example, an Ethernet address. This mapping is maintained by an address discovery protocol such as the Address Resolution Protocol (ARP).

An IPv4 address consists of four bytes (32 bits). These bytes are also known as octets. For readability purposes, humans typically work with IP addresses in a notation called dotted decimal. This notation places periods between each of the four numbers (octets) that comprise an IP address. For example, an IP address that a computer sees as

00001010 00000000 00000000 00000001

is written in dotted decimal as

10.0.0.1

Because each byte contains 8 bits, each octet in an IP address ranges in value from a minimum of 0 to a maximum of 255. Therefore, the full range of IP addresses is from 0.0.0.0 through 255.255.255.255. That represents a total of 4,294,967,296 possible IP addresses.

A network may be set up with IP addresses to form a private or public network. On a private network a single organization controls address assignment for all nodes. On a public network there must be some conventions to assure that organizations do not use overlapping addresses. In the Internet this function is performed by the Internet Assigned Numbers Authority (IANA), which delegates authority to Regional Internet Registries (RIR). For the CAR/SAM Region the RIR is the Latin American and Caribbean Internet Address Registry (LACNIC).

IPv4 Addresses are a fixed length of four octets (32 bits). An address begins with a Network ID, followed by a Host ID as depicted in Figure 2-1.

Figure 2-1. IPv4 Address Format

The original IP addressing scheme divided the Network ID from the Host ID is in a several octet boundaries. In this scheme the main classes of addresses were differentiated based on how many octets were used for the Network ID. This method is called classful addressing. Classful addressing was by convention further modified so that the Host ID could be split into subnet ID and sub host ID. This is typically accomplished using a subnet mask and is called classful addressing with subnetting. This eventually evolved into classless addressing where the division between the Network ID and Host ID can occur at an arbitrary point, not just on octet boundaries. With classless addressing the dividing point is indicated by a slash (/) followed the number of bits used for the Network ID. This value is called the prefix length of the address and the address value up to that point is called the network prefix.

Private Addressing is defined in RFC 1918. IANA has reserved the following three blocks of the IP address space for private Internets:

10.0.0.0 - 10.255.255.255 (10/8 prefix)
172.16.0.0 - 172.31.255.255 (172.16/12 prefix)
192.168.0.0 - 192.168.255.255 (192.168/16 prefix)

Because of the number of bits available to users, these blocks are referred to as a "24-bit block", a "20-bit block", and a "16-bit" block. An enterprise that decides to use IP addresses out of the private address space defined by RFC 1918, can do so without any

coordination with IANA or an Internet registry. Addresses within this private address space will only be unique within an enterprise or a group of enterprises (e.g., an ICAO region), which chose to cooperate over this space so they may communicate with each other in their own private Internet.

3 IPv4 Addressing

3.1 Overview CAR/SAM

3.1.1 During the fourth meeting of ATN/TF4 (Santo Domingo, Dominican Republic, 27 to 28 June 2008) the group analyzed different alternatives for the implementation of the TCP/IP in the CAR/SAM Regions identifying the available options that would facilitate this implementation in the AMHS Service and future applications. This was reviewed in accordance with Document 9880 Part IIB of the ICAO. In this respect the Meeting decided two viable options for the implantation the TCP/IP:

a) AMHS using the RFC1006 on Guiders TCP/IP (IPv4) to allow AMHS to directly interface with IPv4 Guiders for the intra-regional connections.

b) Configurating AMHS, as specified in a) with capacity for IPv4 conversion to IPv6 through the implementation of a function of IP router as gateway for the interregional connections.

3.1.2 The Sixth Meeting of Committee ATM/CNS (ATM/CNS/6) (Santo Domingo, Dominican Republic, 30 June to the 04 July 2008) analyzed this Plan of IP Addressing for CAR/SAM Regions and considered that such a plan would be sent to the ICAO for revision.

3.1.3 During the ACP/WG/I/8 (Montreal, Canada, 25 to 29 August 2008) it was concluded that it is possible to consider a regional scheme of IPv4 addressing. Taking into consideration that the private sector would be using the propose addressing scheme in other applications, the Meeting considered nonviable to apply the IP addressing scheme at a global level.

3.1.4 The Third Meeting of the Group of Regional Implementation SAM/IG/3 (Lima, Peru, 20 to 24 April 2009) considered that, taking into account specified in Table CNS 1Bb from the FASID, the AMHS system to be installed in the SAM Region will use IP protocol and will initially use the IPv4 version. The block of used IPv4 addresses will follow the format established during the ATM/CNS/SG/6 Meeting.

3.2 IP Addressing Plan

When we began to work on the plan of IP addressing, we once again reviewed the scheme that was originally proposed, analyzed the amount of States/Territories by

Region, the amount of addressing that each State/Territory could use and the amount of addressing reserved for the interconnection between States/Territories. The result of this study concluded that:

3.2.1 1 bit would be reduced to State/Territory level. This means the transfer of 256 States to 128 States by region. In the EUR/NAT Region, which is most numerous, has 53 States/Territories, means that there are many vacant numbers.

3.2.2 1 bit at Host's level would be added. This would allow the transfer from 4096 to 8190 hosts per State/Territory. This was considered due to the amount of future applications that would be implemented, mainly in the more developed States, and could cause the amount of directions not to be sufficient. The structure is shown below:

IPv4 Address																															
10									Region				State / Territory								Host's											
0	0	0	0	1	0	1	0	.	0	0	0	0	0	0	0	0	.	0	0	0	0	0	0	0	0	.	0	0	0	0	0	0	0	1
1st. Byte								.	2nd. Byte								.	3rd. Byte								.	4th. Byte							

3.2.3 It should be noted the networks assigned to each State are private networks (RFC 1918). The first Bytes that integrate the assigned address will always maintain a decimal value of 10. Whereas the other three Bytes are used to distribute, in hierarchic form, the blocks of directions corresponding to each State.

3.2.4 The first four bits of the second Byte (4 bits) will be used to identify the regions in around which the States/Territories of the world are grouped:

- 0000 => SAM: South American Office.
- 0001 =>. NACC: North American, American Power station and Caribbean Office.
- 0010 => APAC: Asia and Pacific Office.
- 0011 => MID: Middle East Office.
- 0100 => WACAF: Western and Central African Office.
- 0101 => ESAF: Eastern and Southern African Office.
- 0110 => EUR/NAT: European and North Atlantic Office.

3.2.5 On the other hand, the last four bits of the second Byte, and the first three bits of the third Byte (7 bits) will be used to identify the States/Territories of each region.

3.2.6 Whereas the last five bits of the third Byte and the eight bits that compose the fourth Byte (13 bits) will be used by each one of the States/Territories to assign addressing to their terminals/servers

3.2.7 The proposed IPv4 address allocation scheme will be able to cover:

- 16 Regions.

- 128 States/Territories by each Region.
- 8190 Host' s for each State/Territory

3.2.8 The proposed IPv4 addressing plan would allow each State/Territory tobe able to make use of the block of directions assigned as needed.

a) Each State has been assigned 8190 usable Network addresses, which seem to be sufficient to cover existing needs.

b) In the development of the mentioned scheme, a flexible margin has been designated so that it will allow the future growth or change in the network in the future. For example, if a region were subdivided in two or more regions, or the emerging of a new State/Territory.

c) Argentina has already implemented its ATN network with a scheme of addresses different from the proposed one, prior to the publication of this document, has placed a border devise with the intention that this devise will make the address translation between the outer directions .

3.3 Network Assignment by Region (ASIA/PACIFIC)

Region	Issue	State/ Territory	Network	Direction Used	Decimal Notation	Binary Notation			
							Region	State/Territory	Host's
APAC	1	Australia	10 . 32 .0.0 / 19	First	10 . 32. 0 . 1	00001010.	0010	0000 . 000	00000 . 00000001
				Last	10 . 32. 31 . 254	00001010.	0010	0000 . 000	11111 . 11111110
	2	Bangladesh	10. 32. 64 .0 / 19	First	10 . 32. 32 . 1	00001010.	0010	0000 . 001	00000 . 00000001
				Last	10 . 32. 63 . 254	00001010.	0010	0000 . 001	11111 . 11111110
	3	Bhutan	10. 32. 64.0 / 19	First	10 . 32. 64 . 1	00001010.	0010	0000 . 010	00000 . 00000001
				Last	10 . 32. 95 . 254	00001010.	0010	0000 . 010	11111 . 11111110
	4	Brunei Danussaian	10. 32. 96.0 / 19	First	10 . 32. 96 . 1	00001010.	0010	0000 . 011	00000 . 00000001
				Last	10 . 32. 127 . 254	00001010.	0010	0000 . 011	11111 . 11111110
	5	Cambodia	10. 32. 128. 0 / 19	First	10 . 32. 128 . 1	00001010.	0010	0000 . 100	00000 . 00000001
				Last	10 . 32. 159 . 254	00001010.	0010	0000 . 100	11111 . 11111110
	6	China	10. 32. 160. 0 / 19	First	10 . 32. 160 . 1	00001010.	0010	0000 . 101	00000 . 00000001
				Last	10 . 32. 191 . 254	00001010.	0010	0000 . 101	11111 . 11111110
	7	Cook Islands	10. 32 . 192. 0 / 19	First	10 . 32 . 192 . 1	00001010.	0010	0000 . 110	00000 . 00000001
				Last	10 . 32 . 223 . 254	00001010.	0010	0000 . 110	11111 . 11111110
	8	Cook Islands	10. 32 . 224. 0 / 19	First	10 . 32 . 224 . 1	00001010.	0010	0000 . 111	00000 . 00000001
				Last	10 . 32 . 255 . 254	00001010.	0010	0000 . 111	11111 . 11111110
	9	Democratic people's Republic of Korea	10. 33 . 0 . 0 / 19	First	10 . 33 . 0 . 1	00001010.	0010	0001 . 000	00000 . 00000001
				Last	10 . 33 . 31 . 254	00001010.	0010	0001 . 000	11111 . 11111110
	10	Fiji	10. 33 . 32 . 0 / 19	First	10 . 33 . 32 . 1	00001010.	0010	0001 . 001	00000 . 00000001

				Last	10 . 33 . 63 . 254	00001010.	0010	0001 . 001	11111 . 11111110
	11	India	10. 17 . 64 . 0 / 19	First	10 . 33 . 64 . 1	00001010.	0010	0001 . 010	00000 . 00000001
				Last	10 . 33 . 95 . 254	00001010.	0010	0001 . 010	11111 . 11111110
APAC	12	Indonesia	10. 33 . 96 . 0 / 19	First	10 . 33 . 96 . 1	00001010.	0010	0001 . 011	00000 . 00000001
				Last	10 . 33 . 96 . 254	00001010.	0010	0001 . 011	11111 . 11111110
	13	Japan	10. 33 . 128 . 0 / 19	First	10 . 33 . 128 . 1	00001010.	0010	0001 . 100	00000 . 00000001
				Last	10 . 33 . 159 . 254	00001010.	0010	0001 . 100	11111 . 11111110
	14	Kiribati	10. 33 . 160 . 0 / 19	First	10 . 33 . 160 . 1	00001010.	0010	0001 . 101	00000 . 00000001
				Last	10 . 33 . 191 . 254	00001010.	0010	0001 . 101	11111 . 11111110
	15	Lao People's Democratic Republic	10. 33 . 192 . 0 / 19	First	10 . 33 . 192 . 1	00001010.	0010	0001 . 110	00000 . 00000001
				Last	10 . 33 . 223 . 254	00001010.	0010	0001 . 110	11111 . 11111110
	16	Malaysia	10. 33 . 224 . 0 / 19	First	10 . 33 . 224 . 1	00001010.	0010	0001 . 111	00000 . 00000001
				Last	10 . 33 . 255 . 254	00001010.	0010	0001 . 111	11111 . 11111110
	17	Maldives	10. 34 . 0 . 0 / 19	First	10 . 34 . 00 . 1	00001010.	0010	0010 . 000	00000 . 00000001
				Last	10 . 34 . 31 . 254	00001010.	0010	0010 . 000	11111 . 11111110
	18	Marshall Islands	10. 34 . 32 . 0 / 19	First	10 . 34 . 32 . 1	00001010.	0010	0010 . 001	00000 . 00000001
				Last	10 . 34 . 63 . 254	00001010.	0010	0010 . 001	11111 . 11111110
	19	Micronesia	10. 34 . 64 . 0 / 19	First	10 . 34 . 64 . 1	00001010.	0010	0010 . 010	00000 . 00000001
				Last	10 . 34 . 95 . 254	00001010.	0010	0010 . 010	11111 . 11111110
	20	Mongolia	10. 34 . 96 . 0 / 19	First	10 . 34 . 96 . 1	00001010.	0010	0010 . 011	00000 . 00000001

				Last	10 . 34 . 127 . 254	00001010.	0010	0010 . 011	11111 . 11111110
	21	Myanmar	10. 34 . 128 . 0 / 19	First	10 . 34 . 128 . 1	00001010.	0010	0010 . 100	00000 . 00000001
				Last	10 . 34 . 159 . 254	00001010.	0010	0010 . 100	11111 . 11111110
	22	Nauru	10. 34 . 160 . 0 / 19	First	10 . 34 . 160 . 1	00001010.	0010	0010 . 101	00000 . 00000001
				Last	10 . 34 . 191 . 254	00001010.	0010	0010 . 101	11111 . 11111110
	23	Nepal	10. 34 . 192 . 0 / 19	First	10 . 34 . 192 . 1	00001010.	0010	0001 . 110	00000 . 00000001
				Last	10 . 34 . 223 . 254	00001010.	0010	0001 . 110	11111 . 11111110
	24	New Zealand	10. 34 . 224 . 0 / 19	First	10 . 34 . 224 . 1	00001010.	0010	0001 . 111	00000 . 00000001
				Last	10 . 34 . 255 . 254	00001010.	0010	0001 . 111	11111 . 11111110
	25	Palau	10. 35 . 0 . 0 / 19	First	10 . 35 . 0 . 1	00001010.	0010	0010 . 000	00000 . 00000001
				Last	10 . 35 . 31 . 254	00001010.	0010	0010 . 000	11111 . 11111110
	26	Papua New Guinea	10. 35 . 32 . 0 / 19	First	10 . 35 . 32 . 1	00001010.	0010	0010 . 001	00000 . 00000001
				Last	10 . 35 . 63 . 254	00001010.	0010	0010 . 001	11111 . 11111110
	27	Philippines	10. 35 . 64 . 0 / 19	First	10 . 35 . 64 . 1	00001010.	0010	0010 . 010	00000 . 00000001
				Last	10 . 35 . 95 . 254	00001010.	0010	0010 . 010	11111 . 11111110
	28	Republic of Korea	10. 35 . 96 . 0 / 19	First	10 . 35 . 96 . 1	00001010.	0010	0010 . 011	00000 . 00000001
				Last	10 . 35 . 127 . 254	00001010.	0010	0010 . 011	11111 . 11111110
	29	Samoa	10. 35 . 128 . 0 / 19	First	10 . 35 . 128 . 1	00001010.	0010	0010 . 100	00000 . 00000001
				Last	10 . 35 . 159 . 254	00001010.	0010	0010 . 100	11111 . 11111110
	30	Singapore	10. 19 . 160 . 0 / 19	First	10 . 35 . 160 . 1	00001010.	0010	0010 . 101	00000 . 00000001
				Last	10 . 35 . 191 . 254	00001010.	0010	0010 . 101	11111 . 11111110
	31	Solomon Islands	10. 35 . 192 . 0 / 19	First	10 . 35 . 192 . 1	00001010.	0010	0010 . 110	00000 . 00000001
				Last	10 . 35 . 223 . 254	00001010.	0010	0010 . 110	11111 . 11111110

	32	Sri Lanka	10. 35. 224 . 0 / 19	First	10 . 35 . 224 . 1	00001010.	0010	0010 . 111	00000 . 00000001
				Last	10 . 35 . 255 . 254	00001010.	0010	0010 . 111	11111 . 11111110
	33	Thailand	10. 36 . 0 . 0 / 19	First	10 . 36 . 00 . 1	00001010.	0010	0011 . 000	00000 . 00000001
				Last	10 . 36 . 31 . 254	00001010.	0010	0011 . 000	11111 . 11111110
	34	Timor Leste	10. 36. 32 . 0 / 19	First	10 . 36. 32 . 1	00001010.	0010	0011 . 001	00000 . 00000001
				Last	10 . 36. 63 . 254	00001010.	0010	0011 . 001	11111 . 11111110
	35	Tonga	10. 36 . 64 . 0 / 19	First	10 . 36 . 64 . 1	00001010.	0010	0011 . 110	00000 . 00000001
				Last	10 . 36 . 95 . 254	00001010.	0010	0011 . 110	11111 . 11111110
APAC	36	Vanuatu	10. 36 . 96 . 0 / 19	First	10 . 36 . 96 . 1	00001010.	0010	0011 . 011	00000 . 00000001
				Last	10 . 36 . 127 . 254	00001010.	0010	0011 . 011	11111 . 11111110
	37	Vietnam	10. 36 . 128 . 0 / 19	First	10 . 36 . 128 . 1	00001010.	0010	0011 . 100	00000 . 00000001
				Last	10 . 36 . 159 . 254	00001010.	0010	0011 . 100	11111 . 11111110
	38	Isla de Pascua (Chilie)	10. 36 . 160 . 0 / 19	First	10 . 36 . 160 . 1	00001010.	0010	0011 . 101	00000 . 00000001
				Last	10 . 36 . 191 . 254	00001010.	0010	0011 . 101	11111 . 11111110
	39	French Polynesia	10. 36 . 192 . 0 / 19	First	10 . 36 . 192 . 1	00001010.	0010	0011 . 110	00000 . 00000001
				Last	10 . 36 . 223 . 254	00001010.	0010	0011 . 110	11111 . 11111110
	40	New Caledonia (French)	10. 36 . 224 . 0 / 19	First	10 . 36 . 224 . 1	00001010.	0010	0011 . 111	00000 . 00000001
				Last	10 . 36 . 255 . 254	00001010.	0010	0011 . 111	11111 . 11111110
	41	Wallis & Futuna Islands (French)	10. 37 . 0 . 0 / 19	First	10 . 37 . 0 . 1	00001010.	0010	0100 . 000	00000 . 00000001
				Last	10 . 37 . 31 . 254	00001010.	0010	0100 . 000	11111 . 11111110
	42	Niue (New Zealand)	10. 37 . 32 . 0 / 19	First	10 . 37 . 32 . 1	00001010.	0010	0100 . 001	00000 . 00000001
				Last	10 . 37 . 63 . 254	00001010.	0010	0100 . 001	11111 . 11111110

	43	Pecan Island (United Kingdom)	10. 37 . 64 . 0 / 19	First	10 . 37 . 64 . 1	00001010.	0010	0100 . 010	00000 . 00000001
				Last	10 . 37. 95 . 254	00001010.	0010	0100 . 010	11111 . 11111110
	44	American Samoa (United States)	10. 37 . 96 . 0 / 19	First	10 . 37. 96 . 1	00001010.	0010	0100 . 011	00000 . 00000001
				Last	10 . 37. 127 . 254	00001010.	0010	0100 . 011	11111 . 11111110
	45	Guam (United States)	10. 37 . 128 . 0 / 19	First	10 . 37. 128 . 1	00001010.	0010	0100 . 100	00000 . 00000001
				Last	10 . 37. 159 . 254	00001010.	0010	0100 . 100	11111 . 11111110
	46	Johnson Island Kingman Reef (United States)	10. 37 . 160 . 0 / 19	First	10 . 37. 160 . 1	00001010.	0010	0100 . 101	00000 . 00000001
				Last	10 . 37. 191 . 254	00001010.	0010	0100 . 101	11111 . 11111110
	47	Midway (United States)	10. 37 . 192 . 0 / 19	First	10 . 37. 192 . 1	00001010.	0010	0100 . 110	00000 . 00000001
				Last	10 . 37. 223 . 254	00001010.	0010	0100 . 110	11111 . 11111110
APAC	48	Northern Mariana Islands (United States)	10 . 37 .224. 0 / 19	First	10 . 37 . 224 . 1	00001010.	0010	0100 . 111	00000 . 00000001
				Last	10 . 37 . 255 . 254	00001010.	0010	0100 . 111	11111 . 11111110
	49	Palmyra (United States)	10 . 38 . 0 . 0 / 19	First	10 . 38 . 0 . 1	00001010.	0010	0101 . 000	00000 . 00000001
				Last	10 . 38 . 31 . 254	00001010.	0010	0101 . 000	11111 . 11111110
	50	Wake Islands (United States)	10. 38. 32 . 0 / 19	First	10 . 38 . 32 . 1	00001010.	0010	0101 . 001	00000 . 00000001
				Last	10 . 38 . 63 . 254	00001010.	0010	0101 . 001	11111 . 11111110
	51	VACANCY	10.37. 64 .0 / 19	First	10 . 38 . 64 . 1	00001010.	0010	0101 . 010	00000 . 00000001
				Last	10 . 38 . 95 . 254	00001010.	0010	0101 . 010	11111 . 11111110
	-	-	-						

	-	-	-						
	128	RESERVE	10. 47 . 2244 . 0 / 19	First	10 . 47 . 224 . 1	00001010.	0010	1111 . 111	00000 . 00000001
				Last	10 . 47 . 255 . 254	00001010.	0010	1111 . 111	11111 . 11111110

3.4 Using IPv4-Compatible Address Formats

In many instances, you can represent a 32-bit IPv4 address as a 128-bit IPv6 address. The transition mechanism defines the following two formats.

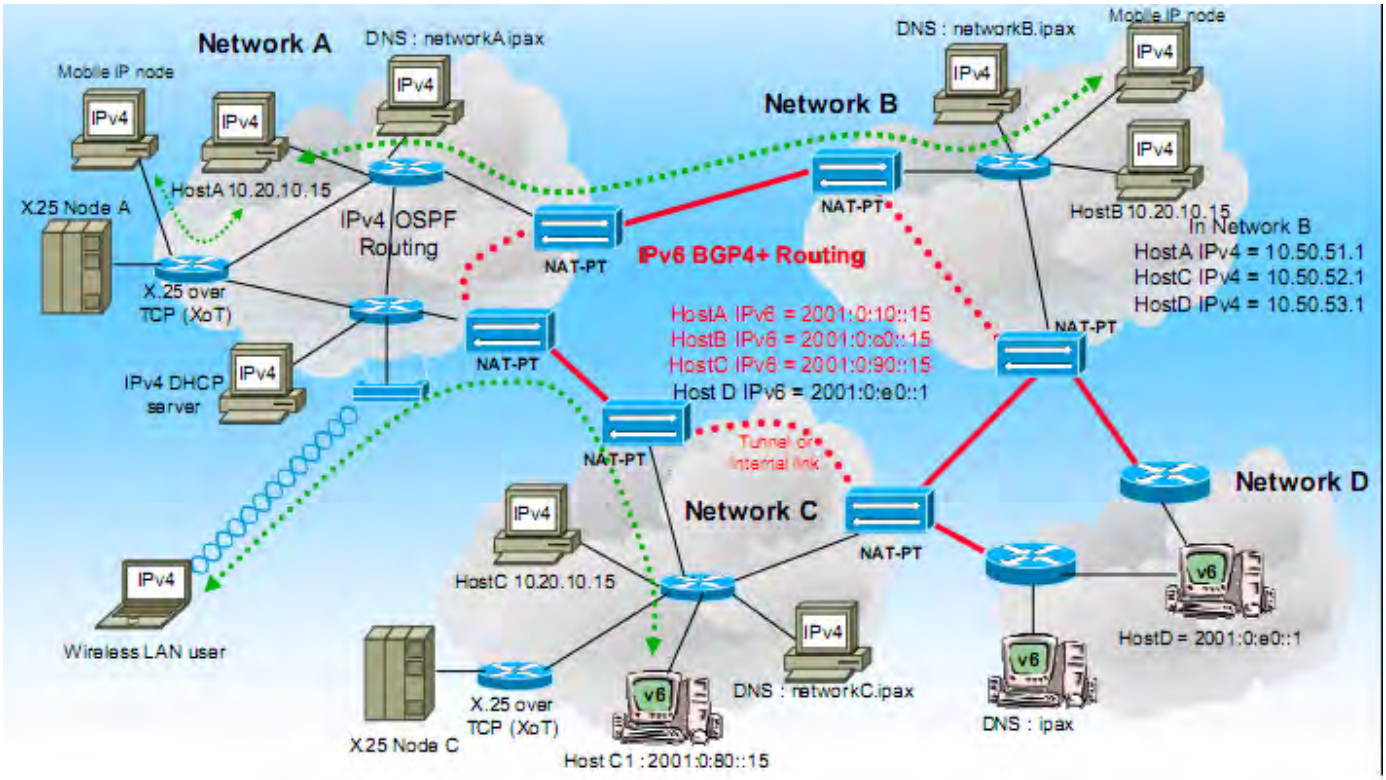
IPv4-compatible address

000 ... 000	IPv4 Address

IPv4-mapped address

000 ... 000	0xffff	IPv4 Address

The mapped address format is used to represent an IPv4 node. The only currently defined use of this address format is part of the socket API. An application can have a common address format for both IPv6 addresses and IPv4 addresses. The common address format can represent an IPv4 address as a 128-bit mapped address. However, IPv4-to-IPv6 protocol translators also allow these addresses to be used.



4. CONCLUSION

The meeting is invited to consider the proposed private network IPv4 address assignment for adoption. It is further recommended that the IPv4 address assignment table be modified to include States using Message Transfer Agent (MTA) only, since the connection between MTA and their associated User Agent (UA) is considered a local matter.

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA AND PACIFIC OFFICE

ASIA/PACIFIC ATN NETWORK SERVICE ACCESS POINT (NSAP) ADDRESSING PLAN

Third Edition – September 2010

TABLE OF CONTENTS

SCOPE OF THE DOCUMENT

This document provides technical guidance on the Planning and the transition of Aeronautical Fixed Telecommunications Network (AFTN) communications to Aeronautical Telecommunications Network (ATN) within the Asia/Pacific Region. The material is intended for Regional Planning, although the plan itself is left to the States to proceed with planning and implementation.

Based upon the ATN SARPs as published in ICAO Annex 10 and Technical specifications as specified in ICAO Doc. 9705, ICAO Regions are expected to develop naming and addressing plans. This document provides guidance for the assignment of NSAP addresses within the Asia/Pacific Region. Each field of the NSAP address is presented with the recommended method of assigning values. Fields which are purely local State matters are identified.

DOCUMENT CONTROL LOG

Edition	Date	Comments	Section/pages affected
First	2001	This document was adopted by 12th meeting of APANPIRG held in 2001 for distribution to States in the Asia/Pacific and adjacent regions.	All
Second	March 2004	Re-issued as 2nd Edition of the Regional ATN Planning Document in March 2004.	All
Third	September 2010	i. Editorial updates – change of document version number ii. Updated table of contents iii. Creation of document control log iv. Inclusion of common address prefix for the Asia, Pacific and North America ICAO regions for the ADM field	All 2 3 9 to 11

1. INTRODUCTION

This paper presents the Network Service Access Point (NSAP) address assignment conventions for use in the Asia/Pacific Region.

The Asia/Pacific Regional ATN Addressing Plan consists of a set of recommendations for each State to assign regional NSAP addresses in a consistent manner. Using these recommendations, it should be possible to develop efficient routing policies that limit the amount of information exchange while providing comprehensive ATN services. Further, the application of this plan will permit simplified ATN service growth with a minimum of router re-configuration.

1.1 Objectives

The objectives of the document are to provide:

- Guidance in the specification of NSAP addresses,
- Guidance in the specification of routing domain identifiers (RDI) for Routing Domains (RD) and Routing Domain Confederations (RDC).

In providing guidance on the specification of NSAP addresses, each NSAP address field is described with the recommendations on how the field may be used. This is important so that consistency in the use of NSAP addresses is obtained and efficiency in routing is maintained.

The guidance on the specification of RD and RDC identifiers is a continuation to the specification of the NSAP address structure. By applying the rules of the address assignments to the addressing of RDs and RDCs, it will be ensured that the efficiency of the routing mechanisms is maintained.

1.2 Scope

The scope of the document includes:

- Describing the NSAP address format, and
- Recommending the values in the fields of the regional NSAP addresses.

The Asia/Pacific Regional ATN Addressing Plan will comply with the NSAP format as specified in ICAO Doc. 9705.

The Asia/Pacific Regional ATN Addressing Plan defines the method for assigning values to each of the fields of the NSAP address. States within the Region may choose to assign their NSAP addresses based upon the recommendations made here.

1.3 Document Structure

Section 2 contains the background information for the formulation of recommendations.
Section 3 contains the assumptions on which the recommendations are based upon.
Section 4 contains the NSAP address structure and the recommended values to be used in Asia/Pacific Region.

1.4 Terms Used

Network Addressing Domain – A subset of the global addressing domain consisting of all the NSAP addresses allocated by one or more addressing authorities.

Network Entity (NE) – A functional portion of an internetwork router or host computer that is responsible for the operation of internetwork data transfer, routing information exchange and network layer management protocols.

Network Entity Title (NET) – The global address of a network entity.

Network Service Access Point (NSAP) Address – A hierarchically organized global address, supporting international, geographical and telephony-oriented formats by way of an address format identifier located within the protocol header. Although the top level of the NSAP address hierarchy is internationally administered by ISO, subordinate address domains are administered by appropriate local organizations.

NSAP Address Prefix – A portion of the NSAP Address used to identify groups of systems that reside in a given routing domain or confederation. An NSAP prefix may have a length that is either smaller than or the same size as the base NSAP Address.

Routing Domain (RD) – A set of End Systems and Intermediate Systems that operate the same routing policy and that are wholly contained within a single administrative domain.

Routing Domain Confederation (RDC) – A set of routing domains and/or routing domain confederations that have agreed to join together. The formation of a routing domain confederation is done by private arrangement between its members without any need for global coordination.

Routing Domain Identifier (RDI) – A generic network entity title as described in ISO/IEC 7498 and is assigned statically in accordance with ISO/IEC 8348. An RDI is not an address and cannot be used as a valid destination of an ISO/IEC 8473 PDU. However, RDIs are like ordinary NETs, assigned from the same addressing domain as NSAP addresses.

1.5 References

Reference 1	Manual of Technical Provisions for the ATN (Doc 9705-AN/956) Third Edition.
Reference 2	Comprehensive Aeronautical Telecommunication Network (ATN) Manual (Doc 9739-AN/961) Second Edition 2002.
Reference 3	ACCESS - ATN Compliant Communications European Strategy Study Define Network topology – Addressing Plan Addressing Plan of the European ATN Network
Reference 4	ICAO Location Indicators – Document 7910
Reference 5	Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services - Document 8585

2. BACKGROUND

2.1 System Level Requirements

The ATN SARPs are divided into a set of System Level Requirements. These requirements are found in the ICAO Annex 10 text and are repeated in ICAO Doc. 9705 (Reference 1), Sub-Volume 1. The System Level Requirements detail specific requirements that all ATN compliant systems must meet and form the basis for the technical specifications. Some of the System Level Requirements may best be satisfied through Regional Planning and Regional specification of procedures.

The following list presents the important System Level Requirements and Recommendations that form the basis of the NSAP Addressing Plan.

- System Level Requirement #11 (Annex 10) presents the basis for the definition of NSAP addresses: "The ATN shall provide a means to unambiguously address all ATN end and intermediate systems."
- System Level Requirement #13 (Annex 10) presents the basis for the need of Regional Planning: "The ATN addressing and naming plans shall allow State and organizations to assign addresses and names within their own administrative domains."

System Level Requirement #11 forms the basis for assigning at least one unique NSAP address for each end system and intermediate system. The assignment of NSAPs to systems enables the unambiguous identification of ATN components and applications.

System Level Requirement #13 forms the basis for Regional Planning in the area of NSAP address assignment. The establishment of Regional plans for assigning addresses assists States and Organizations within a Region to develop consistent address assignment procedures that will result in more efficient routing policies.

2.2 Basis for ATN Address Planning

2.2.1 Regional Planning

At the second meeting of the ATN Panel, it was recognized that the establishment of naming conventions and registration procedures were necessary for the successful deployment of the ATN. Two specific Recommendations were developed at that meeting and subsequently approved by the Air Navigation Commission.

Recommendation 4/1 Advice to States on ATN addressing issues
"That ICAO advise States and international organizations to take the necessary actions for the assignment, administration, and registration of ATN names and addresses within their allocated name/address space, using the information provided."

Recommendation 4/2 Setting up an ICAO ATN addressing process
"That ICAO take the necessary actions to provide a facility for maintaining an up-to-date repository of ATN addresses and names registered in the Air Traffic Services Communication (ATSC) domain, and publish the repository entries at usual regular intervals."

2.2.2 Asia/Pacific Regional Planning

The APANPIRG agreed that a consistent plan for naming and addressing is required to simplify the transition to ATN.

3. ASSUMPTIONS

In developing the recommendations for the Asia/Pacific Regional ATN Addressing Plan, several assumptions were made about the structure of the Region's ATN implementation. Some of these assumptions may appear unnecessary, but they tend to guide the development of the recommendations presented in Section 4.

- The Asia/Pacific Regional ATN Addressing Plan will comply with the rules in ICAO Doc. 9705 (Reference 1). This means that the syntax, semantics and encoding rules of the NSAP address fields as specified in ICAO Doc. 9705 must be observed.
- There will be a number of ATN routers deployed in the Region. This assumption drives the need for multiple routing domains within the Region and the need to develop a plan that allows for efficient routing.
- The regional routing architecture will eventually include RDCs such as Island RDCs and Backbone RDCs. Therefore the Asia/Pacific Regional ATN Addressing Plan must allow for the addressing of these RDCs.
- The Region will have at least one ATN router in each defined routing domain. This assumption is based on the ATN requirement for the establishment of routing domains.
- The Region will support both ground-ground and air-ground services and applications.

4. NSAP ADDRESSING PLAN

4.1 Introduction

The Asia/Pacific Regional ATN Addressing Plan provides guidance to the States within the Region in assigning NSAP addresses to their ATN systems. The Plan addresses the need for consistency within the Region for address assignment.

To find a suitable ATN addressing convention that would be acceptable for use in the Asia/Pacific Region requires a routing architecture that minimizes routing updates and overheads within the ground ATN infrastructure for both ground-ground and air-ground services and applications.

The ATN addressing convention must allow for an addressing scheme that is:

- Practical - to provide autonomous administration of ATN addresses for States and Organizations, and
- Flexible - to allow for future expansion and/or routing re-configuration of the ground ATN infrastructure with minimal re-assigning of ATN addresses.

The recommendations made in the Asia/Pacific Regional ATN Addressing Plan are based on the work performed by the European ACCESS[1] Project (Reference 3).

4.2 NSAP Address Format

The NSAP address format is defined in ICAO Doc. 9705 (Reference 1), Sub-Volume 5. The format is based upon the requirements specified in the base standard (ISO/IEC 8348) and incorporates the specific ATN requirements for addressing both ground and mobile systems.

The structure of the Network Service Access Point (NSAP) address is depicted in Figure 4.2-1.

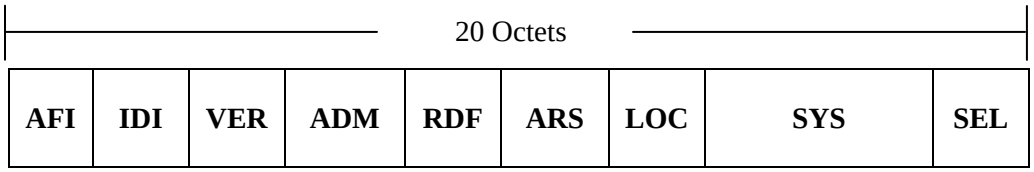


Figure 4.2-1 NSAP Address Format

The NSAP address structure contains 9 fields, which are described in Table 4.2-1.

Field Name	Field Description	Size	Syntax	Number of Characters/ Digits	Field Encoding
AFI	Authority and format Identifier	1 Octet	Decimal	2 Digits	BCD
IDI	Initial domain Identifier	2 Octets	Decimal	4 Digits	BCD
VER	Version	1 Octet	Hex	2 Digits	Binary
ADM	Administration Identifier	3 Octets	Alpha or Hex/Alpha	3 Characters 2 Digits character	IA-5 Binary/ IA-5
RDF	Routing Domain Format	1 Octet	Hex	2 Digits	Binary
ARS	Administration Region Selector	3 Octets	Hex	6 Digits	Binary
LOC	Location	2 Octets	Hex	4 Digits	Binary
SYS	System Identifier	6 Octets	Hex	12 Digits	Binary
SEL	NSAP Selector	1 Octet	Hex	2 Digits	Binary

Table 4.2-1 – Encoding Rules for the ATN NSAP

4.3 Recommended values for NSAP Address Fields assignment

4.3.1 The AFI and IDI Fields

The ATN Internet SARPs (Reference 1) require allocation of the following values:

- Decimal for the AFI field to indicate the type of NSAP being used. This value has been assigned the character sequence “47”.

[1] ACCESS (ATN Compliant Communications European Strategy Study) is a project funded by the European Commission and jointly produced by the following companies and administrations: National Air Traffic Services (NATS), Deutsche Flugsicherung (DFS) and Service Technique de la Navigation Aerienne (STNA).

- Decimal for the IDI field to designate ICAO. This value has been assigned the character sequence "0027".

As recommended in Reference ATN NSAP addresses and NETs will be written as the character sequence "470027+" where the "+" is used to separate the Binary Coded Decimal (BCD) fields from subsequent Hexadecimal fields. Hence the AFI and IDI fields will be set to 470027.

4.3.2 The VER Field

The VER field is used to partition the ATN Network Addressing domain into a number of sub-ordinate Addressing Domains.

The values currently specified in Reference for the VER field are summarized in Table 4.3.2-1.

VER Field Value	Network Addressing Domain	Common NSAP Address Prefix for Domain	Values to be used by States of Asia/Pacific Region
[0000 0001]	Fixed AINSC	470027+01	
[0100 0001]	Mobile AINSC	470027+41	
[1000 0001]	Fixed ATSC	470027+81	470027+81 (ATSO ISs and ESs)
[1100 0001]	Mobile ATSC	470027+C1	470027+C1 (General Aviation)

Table 4.3.2-1 – Defined Values for the VER Field

4.3.3 The ADM Field

The ADM field is used to further partition the ATN Network Addressing Domain. The field designates a single State or Organization. Depending on what the VER field is set to will determine what values should be used in the ADM field.

When the VER field is set to "01" (Fixed AINSC) or "41" (Mobile AINSC), three alphanumeric characters derived from Doc. 8585 should be used.

When the VER field is set to "81" (Fixed ATSC) or "C1" (Mobile ATSC), the ATN SARPs permits two possible ways for encoding the ADM field.

The first method recommends that the State's three character alphanumeric ISO country code is used, as defined in ISO 3166. States may choose this method, however it will provide less flexibility than the second method for the addressing of regional entities (e.g. regional RDCs or regional organizations that are not country specific).

The second method that is recommended for use in the Asia/Pacific Region is to use the first octet of the field to define the ICAO region. Individual regions may be indicated or a combined Asia, Pacific, North America (NAM) region may be used. This would permit the reduction of the routing information that would otherwise be generated. It is recommended that the remaining two octets of the field will further identify the country, RDCs and the regional organizations that are not country specific as follows:

- For the identification of a country, it is recommended that States use the ICAO two letter location indicator (Reference 4) instead of the two character alphanumeric ISO 3166 country code. The structure of the ICAO two letter location indicator allows for a more efficient identification of a location. For example, indicators starting with the same letter "V" designate several countries in the same local region (e.g. Thailand, Sri Lanka, India, Cambodia etc). The second letter will actually define the specific country within this local region (e.g. "VT" for Thailand, "VC" for Sri Lanka etc.). Where a country has several ICAO two letter location indicators allocated to it, the assigning authority of the ADM field will be responsible in determining the preferred location indicator to represent that country. For example, the indicators "VA", "VI", "VO", "VE" are assigned to India and one of these indicators will be selected to represent India. The encoding of the ICAO two letter location indicators will be upper case alphanumeric values.

- For regional organizations that are not country specific, it is recommended to allocate a lower case alphanumeric value so as there will be no conflict with the ICAO two letter location indicators.

- For the addressing of RDCs (e.g. Island RDCs, Backbone RDCs), in particular for those that are not country specific, it is recommended to allocate codes with the most significant bit set to 1 in the second octet. Valid values would be in the hexadecimal range [8000 – FFFF].

ICAO Asia/Pacific Regional Office would be the allocation authority of the ADM field. In summary, the values allocated for the ADM field is indicated in Table 4.3.3-1.

VER Field Network Addressing Domain	**ADM Field Values**
Fixed AINSC	Derived from the set of three-character alphanumeric characters from Doc. 8585 (Reference 5).
Mobile AINSC	Derived from the set of three-character alphanumeric characters from Doc. 8585.
Fixed ATSC	To allow for efficient routing information to be exchanged, it is proposed that the ICAO Regional code be used in the first octet of the ADM field followed by the ICAO two-letter location indicator for countries. The Regional codes are shown below. Regional Codes: [1000 0000] Africa [1000 0001] Asia [1000 0010] Caribbean [1000 0011] Europe [1000 0100] Middle East [1000 0101] North America [1000 0110] North Atlantic [1000 0111] Pacific [1000 1000] South America [1001 0001] Asia/Pacific/NAM For example Thailand would be represented as part of the Asia region by the hexadecimal sequence "815654" or as part of the combined Asia/Pacific/NAM region by the hexadecimal sequence "915654". Table 4.3.3-2 provides further examples

	for a selected number of countries. Where a two letter country code is not applicable, the following rules would apply: ICAO would assign lower case alphanumeric characters using a two letter value to organizations that wish to be based in a particular region. For example, if an organization is to be based in the Pacific region and wanted to be represented by the characters 'sa', this would be represented by the following hexadecimal sequence: 877361. ICAO would assign regional codes for RDCs where a country code or organization code is not applicable. Values would be assigned with the most significant bit set to 1 in the second octet. For example a RDC established in the Pacific region would be represented by the following hexadecimal sequence: 878100.
Mobile ATSC	Same for Fixed ATSC

Table 4.3.3-1 – Defined Values for the ADM Field

Fixed or Mobile Asia/Pacific ATSC Addressing Domain	Hexadecimal Code of the ADM Field	Comment
Australia	915942	Asia/Pacific/NAM Region + 'YB'
China	915A42	Asia/Pacific/NAM Region + 'ZB'
India	915649	Asia/Pacific/NAM Region + 'VA'
Fiji	914E46	Asia/Pacific/NAM Region + 'NF'
Japan	91524A	Asia/Pacific/NAM Region + 'RJ'
New Zealand	914E5A	Asia/Pacific/NAM Region + 'NZ'
Singapore	915753	Asia/Pacific/NAM Region + 'WS'
Thailand	915654	Asia/Pacific/NAM Region + 'VT'
United States	915553	Asia/Pacific/NAM Region + 'US'
Viet Nam	915656	Asia/Pacific/NAM Region + 'VV'

Table 4.3.3-2 – Example of Proposed ADM Value Assignment for Selected Asia, Pacific, and North America Entities

4.3.4 The RDF Field

The RDF field is historical and is not used. Therefore the RDF field shall be set to [0000 0000].

4.3.5 The ARS Field

The ARS field is used to:

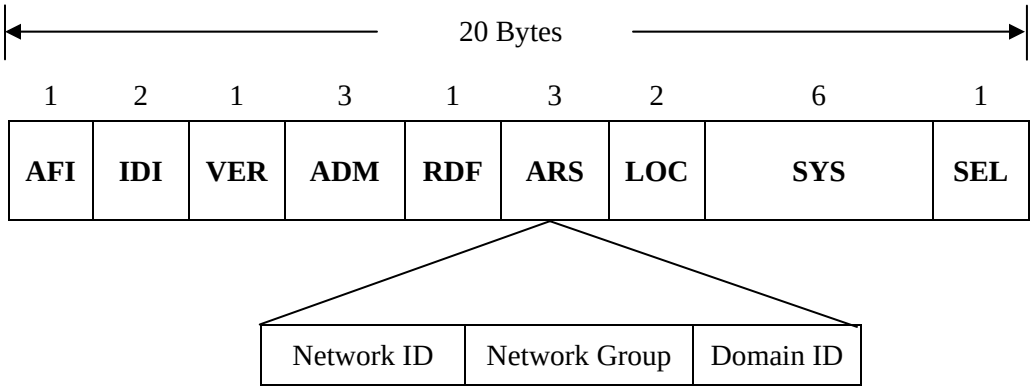
- Distinguish Routing Domains operated by the same State or Organization (in Fixed Network Addressing domains); and
- Identify the aircraft on which the addressed system is located (in Mobile Network Addressing Domains).

Each State or Organization identified in the ADM field will be responsible for assigning the values for the ARS field.
In accordance with the SARPs, for a Mobile Network Addressing Domain, the 24-bit ICAO Aircraft Identifier is inserted in the ARS field. However, no specific values have been specified for Fixed Network Addressing Domains.

The ARS field shall be assigned in a manner that simplifies the routing of data and makes provision for any potential lower level organizational units that could, in the future, operate an ATN Routing Domain.

The Asia/Pacific Regional ATN Addressing Plan recommends the ARS field be decomposed into three subfields as shown in Figure 4.3.5-1: Network ID, Network Group ID and Domain ID.

Figure 4.3.5-1 Recommended structure for ARS field



4.3.5.1 Network ID

Potential future operators of an ATN Routing Domain could be:

- A national Air Traffic Service Organization(s) (ATSO);
- A national military organization;
- A national meteorological organization; and
- An airport operator.

At present it is assumed that military organizations and meteorological organizations will not start up their own ATN Routing Domains and will be located within a national ATSO ATN Routing Domain. The same may apply to airport operators.

However in planning for the long term it is deemed necessary that provision is made available for these future possibilities.

In allowing for this possible expansion, it is recommended that the different ranges of values for the Network ID sub-field be allocated to the different national organizations as follows:

- Hexadecimal values [00 – 1F] of the first octet of the ARS field be reserved for the addressing of domains and systems operated by the national ATSO.
- Hexadecimal values [20 – 3F] of the first octet of the ARS field be reserved for the addressing of domains and systems operated by the national military organization.
- Hexadecimal values [40 – 5F] of the first octet of the ARS field be reserved for the addressing of domains and systems operated by the national airport operators. (Note: this range matches the ASCII range of alphabetical upper case characters).
- Hexadecimal values [60 – 7F] of the first octet of the ARS field is reserved for the addressing of domains and systems operated by the national meteorological organization.
- Hexadecimal values [80 – FF] are reserved.

A national organization would then be able to register one or several values for the Network ID sub-field within the range that has been reserved for its organization category.

In addition to the Network ID sub-field being used for distinguishing the different national organizations, it is proposed that this sub-field also be used for the identification of the particular role of the addressed domain. For example, setting the Network ID sub-field to the hexadecimal value “01” would represent the set of operational Routing Domains of the national ATSO. Setting the Network ID sub-field to hexadecimal “11” would represent the set of non-operational Routing Domains of the national ATSO. In using the Network ID sub-field in this manner, allow national ATSOs to provide for a duplicate non-operational network to be used for trials and pre-operational testing. Similar arrangements could be used for the other national organizations.

4.3.5.2 Network Group ID

This sub-field can be used to subdivide a ground ATN network into smaller groups. This field is unique within a particular network. This may be useful for future expansion by allowing regions to be formed within a particular network as defined by the Network ID. The formation of regions may be useful for the routing traffic exchanged within the network.

This sub-field is also used to designate an RDC. RDCs can also be used to assist in the formation of regions within an Administrative Domain and they offer an additional level of flexibility when used to combine RDs into a confederation. RDCs are designated by setting the uppermost bit of this sub-field to “1”.

4.3.5.3 Domain ID

This sub-field is a unique identifier assigned to each Routing Domain in the Network Group.

Table 4.3.5.3-1 shows possible examples on how the ARS field could be used. In the table two Network Groups "01" and "02" are defined. These two Network Groups can, for example, represent two FIRs in a country. One of the two Network Group contains two RDs and the other one contains three RDs. These two Network Groups can also address the initial RDs in a country (i.e. two RDs) with a planned expansion towards five RDs.

Network ID	Network Group ID	Domain ID	Comment
01	01	01 02	Network ID "01" indicates an ATSO operational network that contains two Network Groups "01" and "02". Network Group "01" contains two RDs "01" and "02". Network Group "02" contains three RDs "01", "02" and "03".
	02	01 02 03	

Table 4.3.5.3-1 – Example of ARS Value Assignment

4.3.5.4 Addressing RDCs in the ARS field

The Network Group ID sub-field is used to segregate the addressing space of actual RDs and RDCs. When the uppermost bit of the Network Group ID sub-field is set to "1" the second and third octets of the ARS field are assigned from the RDC addressing space (i.e., 8000-FFFF) and must be unique within that addressing domain. Otherwise, the sub-fields are assigned from the NSAP Address Space as described above for the Network Group ID and Domain ID sub-fields.
Similar principles as explained in sections 4.3.5.2 and 4.3.5.3 for the addressing of RDs can be applied to the addressing of RDCs, as required:

- The second octet of the ARS field may identify a group of RDCs.
- The third octet of the ARS field identifies RDCs.

4.3.6 The LOC Field

The LOC field is used to:

- Distinguish Routing Areas within Fixed Routing Domains, identified by the ARS field; and
- Distinguish Routing Areas and Routing domains within aircraft identified by the ARS field.

The assignment of the LOC field value is the responsibility of the State or organization that is the addressing authority for the routing domain in which the identified routing area is contained.
To assist States or organizations, it is recommended that the LOC field be divided into two sub-fields as shown in Figure 4.3.6-1: Sub-domain Group ID and Sub-domain ID.

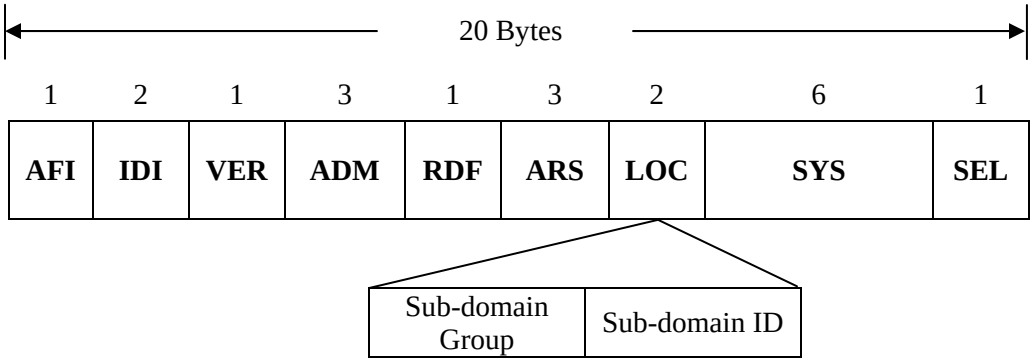


Figure 4.3.6-1 Proposed LOC Field Format

4.3.6.1 Sub-domain Group ID

This sub-field can be used to subdivide a domain into separate groups. For example, each control centre could define as a routing domain. A control centre may contain an En-Route facility, Terminal facilities, and Tower facilities. Each of these facilities can be classified as a different Sub-domain Group allowing addressing to be delegated to each facility, if desired. For this example, this sub-field can be assigned as shown in the Table 4.3.6.1-1.

Value (hex)	Description
00	Reserved
01	No specific group. Used for RDs that do not require subdivision
02	En-Route Sub-domain
03 – FF	Assigned as required

Table 4.3.6.1-1 – Example of Sub-domain Group ID Value Assignment

4.3.6.2 Sub-domain ID

This sub-field is a unique identifier assigned to each routing area within a Sub-domain Group. This sub-field allows multiple areas to exist within a sub-domain group and must be unique within the sub-domain. This subfield could be assigned as shown in the Table 4.3.6.2-1.

Value (hex)	Description
00	Reserved
01	No specific area. Used for Sub-domains that do not require subdivision
02 – FF	Assigned as required by the Sub-domain Group Addressing Authority

Table 4.3.6.2.1 – Example of Sub-domain ID Value Assignment

4.3.7 The SYS Field

The SYS field is used to uniquely identify an End-System or Intermediate-System. The allocation of the SYS field value is the responsibility of the organization that is the addressing authority for the routing area that contains the identified ATN End-System or Intermediate-System.

The type of values or structure for the SYS field is for individual authorities to choose, as appropriate.

It has been suggested that the 48-bit LAN address of a device attached to an IEEE 802 local area network that is being used as an ATN ES or IS, could be used in this field. However, this may have ramification if the SYS field is tied to a sub-network dependent information such as the physical network address (e.g. 48-bit LAN address) that is associated with a particular device. The problem will occur when the device is replaced by another device which will use a different 48-bit LAN address, requiring the NSAP address of the ATN ES or IS to be changed.

It is therefore recommended that the SYS field be used to identify the system without any dependency on physical information. Possible examples of this is to define whether the system is an IS or an ES, the type of function or role the system is used for (e.g. primary system, hot standby system, cold standby system, etc.), or the type of applications that are running on the system (e.g. AMHS, AIDC, ADS, CPDLC, Network Management, etc.).

A requirement found in Section 7.1.4.b.1 of ISO 10589 IS-IS states that all Level 2 ISs within a Routing Domain must have a unique SYS field value. In order to enforce this requirement related to IS-IS Level 2 addressing, it is recommended that the values assigned to the LOC sub-fields also be assigned to the upper two octets of the SYS field. Using this approach enables the addressing authority for each Sub-domain Group the flexibility to assign addresses without conflicting with addresses of other groups within the same Routing Domain.

4.3.8 The SEL Field

The SEL field is used to identify the End-System or Intermediate-System network entity or network service user process responsible for originating or receiving Network Service Data Units (NSDUs).

Table 4.3.8-1 identifies the defined values that shall be used in this field in accordance with Reference.

SEL Field Value	Usage
[0000 0000]	Used for an IS network entity except in the case of an airborne IS implementing the procedures for the optional non-use of IDRP.
[0000 0001]	Used for the ISO 8073 COTP protocol in the Ground or Airborne End-systems.
[0000 0010]	Used for the ISO 8602 CLTP protocol in the Ground or Airborne End-systems.
[1111 1110]	Used for an IS network entity belonging to an airborne IS implementing the procedures for the optional non-use of IDRP.
[1111 1111]	Reserved

Table 4.3.8-1 – Defined Values for the SEL field

4.4 Authority Responsible for NSAP Field Assignments

The responsibility for the assignment of values to each of the NSAP address fields is held by only one organization. This is to ensure that each NSAP address is unique within the ATN. Table 4.4-1 identifies which organization is responsible for the assignment of each field.

NSAP Field	Assignment Authority
AFI	ITU-T and ISO
IDI	ITU-T and ISO
VER	ICAO – defined in Doc. 9705
ADM	States or Organizations identified by the VER field and according to rules found in Doc. 9705 – Recommended values and responsible authority are provided in this plan.
RDF	Reserved
ARS	States or Organizations at the discretion – Recommended values in this plan
LOC	States or Organizations
SYS	States or Oganizations
SEL	ITU-T and ISO for standard transport protocol, States and Organizations for other values/uses

Table 4.4-1 – NSAP Address Field Assignment Responsibility

ANNEX C

Test Procedure
for
ATN Router Connection Test

ANNEX C

of

AMHS Manual

Document Control Log

Edition	Date	Comments	Section/pages affected
1.0	11/04/2007	Creation of the document.	all
1.0	September 2007	Document is endorsed by APANPIRG/18	all
2.0	22/09/2008	Editorial updates – change of document version number	all
3.0	September 2009	Editorial updates – change of document version number	all
3.1	September 2010	Proposed amendments	66-82

Table of Contents

1. Introduction

1.1 This document describes the test procedure for the Ground-Ground (G/G) Aeronautical Telecommunication Network (ATN) router connection.

2. References

[1] Asia/Pacific Regional ATN G/G Router ICD for ISO/IEC 8202 Sub-Network.

[2] ASIA/PAC Interface Control Document (ICD) for ATN G/G Router

[3] Test Plan for AMHS Technical Trial between Hong Kong, China and Japan.

[4] "Technical Memorandum of Cooperation between Engineering & Systems Division, Civil Aviation Department, Hong Kong China and Operations and Flight Inspection Division, Civil Aviation Bureau, Ministry of Land, Infrastructure and Transport, Japan: AMHS Trials and Service between Japan and Hong Kong, China", February 2003. (Amended 24 August 2004)

3. Test Overview and Scope

3.1 A joint ATN Router Connection Test between AMHSLAND1 and AMHSLAND2 using a 9.6kbps X.25 PSDN (packet-switched data network) circuit.

3.2 An ATN Router Connection Test is scheduled to verify the connectivity, interoperability, data relaying/routing and redundancy capabilities (where applicable) of the ATN Ground-Ground routers in AMHSLAND1 and AMHSLAND2.

3.3 The ATN Router Connection Test will also confirm that the functions of the AMHSLAND1 and AMHSLAND2 ATN routers were configured in preparation for more than 2 routers tests.

3.4 The system configuration for the test is shown in Figure 1. Routers in AMHSLAND1 and AMHSLAND2 are linked by an X.25 virtual circuit (VC) over a leased line connection (e.g.64 kbps).

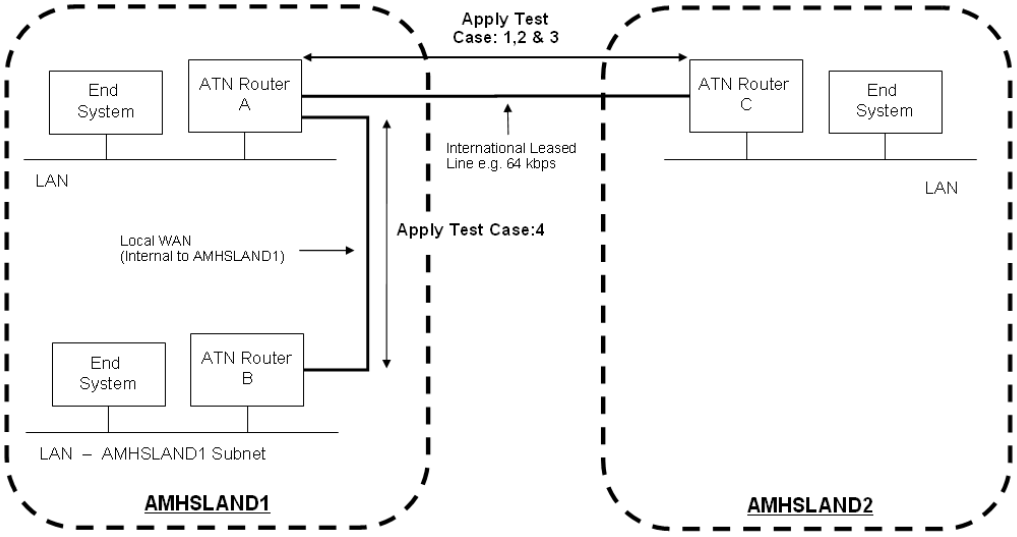


Figure 1 ATN Router Connection Test Configuration

3.5 To test data relay and routing functions, CLNP Echo Request (ERQ) Network Protocol Data Units (NPDU) will be generated by the routers and End Systems. To support these tests, all Intermediate Systems shall be capable of generating CLNP ERQ PDUs, and all Intermediate Systems and End Systems shall be capable of transmitting CLNP Echo Response (ERP) PDUs in response to the receipt of ERQ PDUs. Further, it is desirable that End Systems be capable of generating CLNP ERQ PDUs. Execution of some test items is contingent on End Systems' capabilities.

3.6 Since both AMHSLAND1 and AMHSLAND2 are ATN backbone sites, the proper updating of their routing tables should be tested in detail. This will ensure that the router could relay the data received from its counterpart to another router either within or outside its own domain/ATN site.

3.7 The ATN router network test is to verify the connectivity, interoperability, data relaying/routing and redundancy capabilities (where applicable) of the ATN Ground-Ground routers when expanded to a three and then four domains configuration. The system test configuration is as shown in Figure 2.

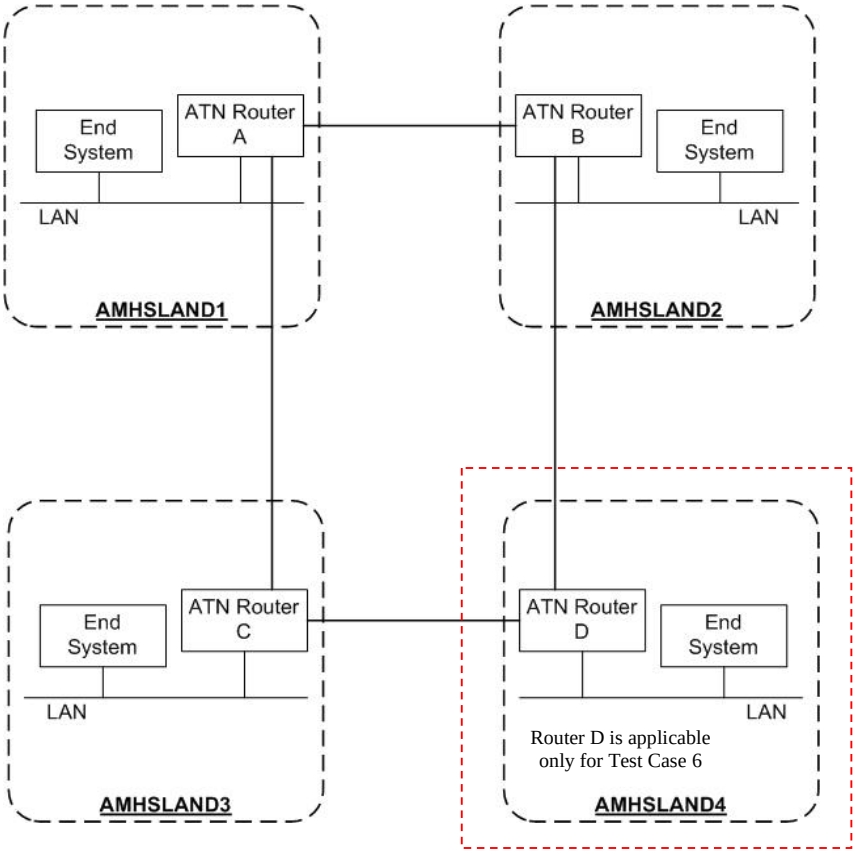


Figure 2 ATN Routers Connection (Multiple Domains) Test Configuration

3.8 A summary of test items for the ATN Router Connection Test is shown in Table 1.

Table 1 Summary of Test Items for ATN Router Connection Test

No.	Test Item	Details
1	Router Connection Establishment and Maintenance	Establish LAPB, X.25 VC and IDRP connections between routers. Exchange of KEEPALIVE PDUs to maintain IDRP connection.
2	NPDU Relay	Tests to confirm CLNP Echo function of routers, correct NPDU relay, and validation of handling of PDUs with invalid security option parameter.
3	Router end-to-end tests	IDRP route addition/deletion, carrier medium failure/restoration and router failure/recovery.
4	ATN router environment tests	Multiple router route addition/deletion, carrier medium failure/restoration and router failure/recovery.
5	ATN router network tests	Multiple router route addition/deletion, carrier medium failure/restoration and router failure/recovery in three-domain configurations. Confirm routing table updates and automatic re-route.
6	ATN router network tests	Multiple router route addition/deletion, carrier medium failure/restoration and router failure/recovery in four-domain configurations. Confirm routing table updates and automatic re-route.

4. Communication Parameters

4.1 The proposed communication parameters for the connection between the routers of AMHSLAND1 and AMHSLAND2 for test case 1 to 4 are listed in Table 2.

4.2 The proposed CLNP communication parameters for the End Systems are listed in Table 5. It is proposed to use the NSAP addresses of the AMHS systems that will be used in actual operation for the ES NSAP addresses.

4.3 The proposed communications parameters for the connection between the routers of AMHSLAND1, AMHSLAND2, AMHSLAND3 and AMHSLAND4 for test case 5 and 6 are listed in Table 6.

5. Schedule and Test Item Overview

5.1 The test items and planned schedule are shown in Table 7.

Table 2Router Communication Parameters

Protocol	Item No.	Item	Parameter		Note
			Router (AMHSLAND1)	**Router (AMHSLAND2)**	
	1.1	NSAP/NET	ROUTER A: 47.0027.81.91524A.00.010101.0302.000000000000.00 ROUTER B (simulated third domain): 47.0027.81.914b00.00.010101.0302.000000000000.00	ROUTER C: 47.0027.81.915648.00.010101.0202.0202.012A.0100.00	1
CLNP (RPDU)	2.1	Priority	14	14	2
IDRP	3.1	NLRI	ROUTER A: 47.0027.81.91524A.00.010101 ROUTER B: 47.0027.81.914b00.00.010101	ROUTER C: 47.0027.81.915648.00.010101	
	3.2	RDI	ROUTER A: 47.0027.81.91524A.00.010101 ROUTER B: 47.0027.81.914b00.00.010101	ROUTER C: 47.0027.81.915648.00.010101	
	3.3	SecurityRegistrationID	06 04 2B 1B 00 00	06 04 2B 1B 00 00	2
	3.4	Tag Set Name	07 (ATSC Class Security Tag Set)	07 (ATSC Class Security Tag Set)	2
	3.5	ATSC Class	Class C	Class C	2
	3.6	Holding Time	180 sec	180 sec	2
	3.7	KEEPALIVE Send Timer	60 sec	60 sec	2, 3
	3.8	OPEN PDU Transmission	ROUTER A: AMHSLAND1-AMHSLAND2 : OPEN-PDU send ROUTER A: local circuit: OPEN-PDU send ROUTER B: OPEN-PDU receive	ROUTER C: AMHSLAND2 -AMHSLAND1: OPEN-PDU receive ROUTER C: local circuit: OPEN-PDU send	

Note 1: Compliant with Asia/Pacific ATN addressing plan.

Note 2: For all routers used in tests.

Note 3: The value of the KEEPALIVE send timer is the holding timer value divided by 3.

Table 3Router Communication Parameters (continued)

Protocol	Item No.	Item	Parameter		Note
			Router (AMHSLAND1)	**Router (AMHSLAND2)**	
X.25	4.1	DTE Address	ROUTER A AMHSLAND1-AMHSLAND2 : 44442000023903 ROUTER A local circuit: 44442000023903 ROUTER B local circuit: 44440110110202	ROUTER C AMHSLAND1-AMHSLAND2 : 48404701021800 ROUTER C local circuit: local matter	
	4.2	LCGN	0	0	4
	4.3	LCN	10	10	4
	4.4	Packet Size	1024	1024	4
	4.5	Window Size	7	7	4
	4.6	Window Size Negotiation	Yes	Yes	4
	4.7	CR Packet Transmission	ROUTER A AMHSLAND1-AMHSLAND2 : Caller (CR send) ROUTER A local circuit: Caller (CR send) ROUTER B local circuit: Called (CR receive)	ROUTER C AMHSLAND1-AMHSLAND2 : Called (CR receive) ROUTER C local circuit: Caller (CR send)	
	4.8	Use of SQ	Yes	Yes	4
	4.9	Packet Sequence	Modulo 8	Modulo 8	4
	4.10	Packet Negotiation	Yes	Yes	4
	4.11	D Bit	OFF	OFF	4
	4.12	M Bit	Yes	Yes	4
	4.13	Restart Request Retransmission Count (R20)	1	1	4
	4.14	Reset Request Retransmission (R22)	1	1	4
	4.15	Clear Request Retransmission Count (R23)	1	1	4
	4.16	Restart Request Timer (T20)	180 sec	180 sec	4
	4.17	DTE Call Request timer (T21)	200 sec	200 sec	4
	4.18	Reset Confirmation Timer (T22)	180 sec	180 sec	4
	4.19	DTE Clear Confirmation Timer (T23)	180 sec	180 sec	4

Note 4: For AMHSLAND1-AMHSLAND2 circuit. Parameters for local circuits used in more than 2 routers tests are a local matter.

Table 4Router Communication Parameter (continued)

Protocol	Item No.	Item	Parameter		Note
			Router (AMHSLAND1)	**Router (AMHSLAND2)**	
LAPB	5.1	Address	ROUTER A AMHSLAND1-AMHSLAND2 : 03 ROUTER A local circuit: 03 ROUTER B local circuit: 01	ROUTER C AMHSLAND1-AMHSLAND2 : 01 ROUTER C local circuit: local matter	
	5.2	Max Outstanding Number	7	7	5
	5.3	Idle Channel State Timer (T3)	60 sec	60 sec	5, 6
	5.4	ACK Receipt Timer (T1)	3 sec	3 sec	5, 7
	5.5	Frame Retransmission Count	5	5	5
	5.6	Maximum Number of bits in I-Frame (N1)	8248	8248	5, 8
	5.7	Frame Sequence	Modulo 8	Modulo 8	5
Physical	6.1	Interface	X.21/V.11 (Line Speed: 64 kbps)	V.11 (Line Speed: 64 kbps)	5
	6.2	Clock	Local Matter	Local Matter	5

Note 5: For AMHSLAND1-AMHSLAND2 circuit. Parameters for local circuits used in more than 2 routers tests are a local matter.

Note 6: APAC ROUTER ICD (ref. [1]) specifies router A: 18–60 seconds, router B: 12–60 seconds.

Note 7: APAC ROUTER ICD (ref. [1]) specifies 6 sec, based on 9,600bps line speed and 256 byte packets.

Note 8: Value depends on the max. X.25 packet size. N1 = packet header size (3) + packet size (bytes) + LAPB address part (1) + LAPB control part (1) + LAPB FCS part (2) in BITS. So if the packet size is 1024 bytes, then N1 is (3 + 1024 + 1 + 1 + 2) * 8 = 8248 bits.

Table 5 End System CLNP Communication Parameters

Protocol	Item No.	Item	Parameter	
			Router (AMHSLAND1)	**Router (AMHSLAND2)**
	7.1	NSAP	AMHSLAND1 ES: 470027.81.91524A.00.010101.0302.128001091001.01 Third domain ES: 470027.81.914b00.00.010101.0302.000000010051.01	AMHSLAND2 ES: 47.0027.81.915648.00.010101.0202.0202.8002.0100.01
CLNP	7.1	Traffic Type	1 (ATSC/No Traffic Type Policy Preference)	1 (ATSC/No Traffic Type Policy Preference)
	7.2	Security Class	1 (Unclassified)	1 (Unclassified)
	7.3	Priority	8	8
	7.4	Partial Route Recording	No	No

Table 6 Router Communication Parameters (continued)

Protocol	Item No.	Item	Parameter		Note
			Router (AMHSLAND1 & AMHSLAND3)	**Router (AMHSLAND2 & AMHSLAND4)**	
	8.1	NSAP/NET	ROUTER A (AMHSLAND1): 47.0027.81.91524A.00.010101.0302.000000000000.00 ROUTER C (AMHSLAND3): 47.0027.81.915654.00.010101.0302.000000000000.00	ROUTER B (AMHSLAND2): 47.0027.81.915648.00.010101.0202.0202.012A.0100.00 ROUTER D (AMHSLAND4): 47.0027.81.915753.00.010101.0202.0202.012A.0100.00	1
CLNP (RPDU)	9.1	Priority	14	14	2
IDRP	10.1	NLRI	ROUTER A: 47.0027.81.91524A.00.010101 ROUTER C: 47.0027.81.915654.00.010101	ROUTER B: 47.0027.81.915648.00.010101 ROUTER D: 47.0027.81.915753.00.010101	
	10.2	RDI	ROUTER A: 47.0027.81.91524A.00.010101 ROUTER C: 47.0027.81.915654.00.010101	ROUTER B: 47.0027.81.915648.00.010101 ROUTER D: 47.0027.81.915753.00.010101	
	10.3	SecurityRegistrationID	06 04 2B 1B 00 00	06 04 2B 1B 00 00	2
	10.4	Tag Set Name	07 (ATSC Class Security Tag Set)	07 (ATSC Class Security Tag Set)	2
	10.5	ATSC Class	Class C	Class C	2
	10.6	Holding Time	180 sec	180 sec	2
	10.7	KEEPALIVE Send Timer	60 sec	60 sec	2, 3
	11.1	NSAP	AMHSLAND1 ES: 470027.81.91524A.00.010101.0302.128001091001.01 AMHSLAND3 ES: 470027.81.915654.00.010102.0302.000000010051.01	AMHSLAND2 ES: 47.0027.81.915648.00.010101.0202.0202.8002.0100.01 AMHSLAND4 ES: 47.0027.81.915753.00.010101.0202.0202.8002.0100.01	

Note 1: Compliant with Asia/Pacific ATN addressing plan.

Note 2: For all routers used in tests.

Note 3: The value of the KEEPALIVE send timer is the holding timer value divided by 3.

Table 7 Test Items and Schedule

Schedule (UTC)		Test Item No.			Description
Day	**Time**				
		1			**Router Connection Establishment and Maintenance**
			1	1～2	Data link establishment
			2	1～4	X.25 VC establishment
			3	1～2	IDRP connection establishment
			4	1～2	Exchange of routing information (UPDATE PDU transmission)
			5	1～2	Maintenance of IDRP connection (KEEPALIVE PDU transmission)
		2			**NPDU Relay**
			1	1～3	ERQ/ERP NPDU transmission /reply from AMHSLAND1 router to AMHSLAND2 router
			2	1～3	ERQ/ERP NPDU transmission /reply from AMHSLAND2 router to AMHSLAND1 router
			3	1～3	ERQ/ERP NPDU transmission/reply from AMHSLAND1 ES to valid destination in AMHSLAND2 domain
			4	1～3	ERQ/ERP NPDU transmission from AMHSLAND2 ES to valid destination in AMHSLAND1 domain (Subject to AMHSLAND2 ES ERQ NDU transmission capability.)
			5	1～2	ERQ NPDU transmission from AMHSLAND1 ES to unreachable ES in AMHSLAND2 domain
			6	1～2	ERQ NPDU transmission from AMHSLAND2 ES to unreachable ES in AMHSLAND1 domain (Subject to AMHSLAND2 ES ERQ NDU transmission capability.)
			7	1～2	Routing process in AMHSLAND1 router for NPDU with invalid security option parameter
			8	1～2	Routing process in AMHSLAND2 router for NPDU with invalid security option parameter (Subject to AMHSLAND2 ES ERQ NDU transmission capability.)
		3			**Router end-to-end tests**
			1	1～5	Manual router disconnection at AMHSLAND1 router and route deletion
			2	1	Route activation from AMHSLAND1 router
			3	1～5	Manual router disconnection at AMHSLAND2 router and route deletion
			4	1	Route activation from AMHSLAND2 router
			5	1～3	Carrier medium failure and route deletion at AMHSLAND1 router
			6	1	Carrier medium restoration and route addition at AMHSLAND1 router

Schedule (UTC)		Test Item No.			Description
Day	Time				
			7	1～3	Carrier medium failure and route deletion at AMHSLAND2 router
			8	1	Carrier medium restoration and route addition at AMHSLAND2 router
			9	1～2	Failure and recovery of AMHSLAND1 router (redundant configuration)
			10	1～2	Failure and recovery of AMHSLAND2 router
		4			**ATN Router Tests: Third Domain connected to AMHSLAND1**
			1	1 ~ 5	Router connection of ROUTER B to ROUTER A (ROUTER A–ROUTER C connection already established)
			2	1 ~ 5	Manual router disconnection at ROUTER A of ROUTER A–ROUTER B route
			3	1 ~ 4	Re-activation at ROUTER A of ROUTER A-ROUTER B route
			4	1 ~ 5	Manual router disconnection at ROUTER B of ROUTER A-ROUTER B route
			5	1 ~ 4	Re-activation at ROUTER B of ROUTER A–ROUTER B route
			6	1 ~ 5	Router connection of ROUTER C to ROUTER A (ROUTER A-ROUTER B connection already established)
			7	1 ~ 5	Manual router disconnection at ROUTER C of ROUTER C–ROUTER A route
			8	1 ~ 4	Re-activation at ROUTER C of ROUTER C-ROUTER A route
			9	1 ~ 5	Manual router disconnection at ROUTER A of ROUTER C–ROUTER A route
			10	1 ~ 4	Re-activation at ROUTER A of ROUTER C–ROUTER A route
			11	1 ~ 3	Carrier medium failure of ROUTER A–ROUTER B circuit
			12	1 ~ 4	Carrier medium recovery of ROUTER A–ROUTER B circuit
			13	1 ~ 3	Carrier medium failure of ROUTER C–ROUTER A circuit
			14	1 ~ 4	Carrier medium recovery of ROUTER C–ROUTER A circuit
			15	1 ~ 2	Failure and recovery of ROUTER C
			16	1 ~ 2	Failure and recovery of ROUTER A
			17	1 ~ 2	Failure and recovery of ROUTER B
			18	1～6	End-to-End CLNP Echo Test between end systems in ROUTER C and ROUTER B domains (Subject to AMHSLAND2 ES ERQ NDU transmission capability.)

Schedule (UTC)		Test Item No.			Description
Day	**Time**				
		5			**ATN Router Network Test: Three Domain Configuration**
			1	1～4	Router Connection of ROUTER A to ROUTER B (ROUTER A – ROUTER C and ROUTER B – ROUTER C established)
			2	1～3	CLNP echo test between routers
			3	1～6	Manual router disconnection at ROUTER A of ROUTER A – ROUTER B route
			4	1 ~ 3	Router re-activation from ROUTER A
			5	1 ~ 6	ROUTER B – ROUTER C route
			6	1 ~ 3	Route re-activation from ROUTER B
			7	1 ~ 6	Manual router disconnection at ROUTER C of ROUTER C – ROUTER A route
			8	1 ~ 3	Route re-activation from ROUTER C
			9	1 ~ 4	Carrier media failure of ROUTER A – ROUTER B circuit and route deletion
			10	1 ~ 3	Carrier media restoration of ROUTER A – ROUTER B circuit and router addition
			11	1 ~ 4	Carrier media failure of ROUTER B – ROUTER C circuit and route deletion
			12	1 ~ 3	Carrier media restoration of ROUTER B – ROUTER C circuit and router addition
			13	1 ~ 4	Carrier media failure of ROUTER C – ROUTER A circuit and route deletion
			14	1 ~ 3	Carrier media restoration of ROUTER C – ROUTER A circuit and router addition
			15	1 ~ 2	Failure and recovery of ROUTER A
			16	1 ~ 2	Failure and recovery of ROUTER B
			17	1 ~ 2	Failure and recovery of ROUTER C
			18	1 ~ 3	CLNP echo test between routers

Schedule (UTC)		Test Item No.			Description
Day	**Time**				
		6			**ATN Router Network Test: Four Domain Configuration**
			1	1～6	Router Connection of ROUTER A to ROUTER B (ROUTER A – ROUTER C and ROUTER B – ROUTER D established)
			2	1～3	Router connection of ROUTER C to ROUTER D
			3	1～4	CLNP echo test between routers
			4	1 ~ 4	Manual router disconnection at ROUTER A of ROUTER A – ROUTER B route
			5	1 ~ 3	Route re-activation from ROUTER A
			6	1 ~ 4	Manual router disconnection at ROUTER B of ROUTER B – ROUTER D route
			7	1 ~ 3	Route re-activation from ROUTER B
			8	1 ~ 4	Manual router disconnection at ROUTER D of ROUTER D – ROUTER C route
			9	1 ~ 3	Route re-activation from ROUTER D
			10	1 ~ 4	Manual router disconnection at ROUTER C of ROUTER C – ROUTER A route
			11	1 ~ 3	Route re-activation from ROUTER C
			12	1 ~ 4	Carrier media failure of ROUTER A – ROUTER B circuit
			13	1 ~ 3	Carrier media restoration of ROUTER A – ROUTER B circuit and router addition
			14	1 ~ 4	Carrier media failure of ROUTER B – ROUTER D circuit
			15	1 ~ 3	Carrier media restoration of ROUTER B – ROUTER D circuit and router addition
			16	1 ~ 4	Carrier media failure of ROUTER D – ROUTER C circuit
			17	1 ~ 3	Carrier media restoration of ROUTER D – ROUTER C circuit and router addition
			18	1 ~ 4	Carrier media failure of ROUTER C – ROUTER A circuit
			19	1 ~ 3	Carrier media restoration of ROUTER C – ROUTER A circuit and router addition
			20	1 ~ 2	Failure and recovery of ROUTER A
			21	1 ~ 2	Failure and recovery of ROUTER B
			22	1 ~ 2	Failure and recovery of ROUTER C
			23	1 ~ 2	Failure and recovery of ROUTER D
			24	1 ~ 3	CLNP echo test between routers

6. Test Cases

The table below shows the protocol abbreviations used in sequence diagrams.

Table 8 Protocol Abbreviations

Abbreviation	Protocol	Name
SABM	LAPB	Set Asynchronous Balanced Mode
UA	LAPB	Acknowledgement frame
SQ	X.25	Restart Request
SI	X.25	Restart Indication
SF	X.25	Restart Confirmation
CR	X.25	Call Request
CC	X.25	Call Connected
CQ	X.25	Clear Request
CF	X.25	Clear Confirmation
OPEN PDU	IDRP	OPEN Protocol Data Unit
UPDATE PDU	IDRP	UPDATE Protocol Data Unit
KEEPALIVE PDU	IDRP	KEEPALIVE Protocol Data Unit
CEASE PDU	IDRP	CEASE Protocol Data Unit
ERQ NPDU	CLNP	Echo request Network PDU
ERP NPDU	CLNP	Echo response Network PDU
ER NPDU	CLNP	Error report Network PDU

6.1. Test Case 1: Router Connection Establishment and Maintenance

a) **Objective**

This test is to verify the establishment of LAPB data link, X.25 Virtual Circuit and IDRP connections between the AMHSLAND2 and AMHSLAND1 routers, the exchange of routing information by UPDATE PDUs, and the maintenance of the IDRP connection by the periodic exchange of KEEPALIVE PDUs. The test configuration is shown in Figure 3.

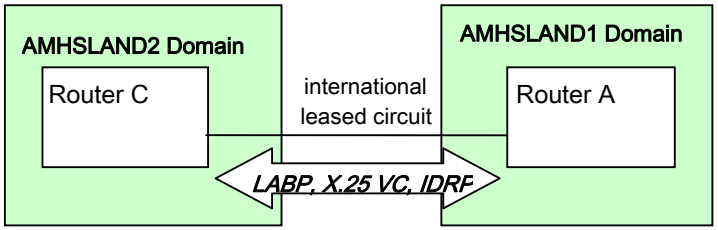


Figure 3 Configuration for router Connection & Maintenance Test

b) **Test Items**

- 1-1: Data link (LAPB) establishment
- 1-2: X.25 Virtual Circuit establishment
- 1-3: IDRP connection establishment (exchange of OPEN PDUs)
- 1-4: Exchange of routing information (exchange of UPDATE PDUs)
- 1-5: Maintenance of IDRP connection (exchange of KEEPALIVE PDUs)

Table 9 Router Connection Establishment & Maintenance Test Procedure

1. Router Connection Establishment & Maintenance		**Test Item**	**Procedure**	**Result**	**Date/Time**
Data link establishment	SABM transmission	1-1-1	Send SABM frame (address: 01) from ROUTER A and confirm ROUTER C receives it.	OK / NG	/ /
	UA transmission	1-1-2	Send UA frame (address: 03) from ROUTER C and confirm ROUTER A receives it and data link is established.	OK / NG	/ /
VC establishment	SQ transmission	1-2-1	Confirm ROUTER A sends SQ packet and ROUTER C receives it. (ROUTER C may send SQ packet, depending on the situation.)	OK / NG	/ /
	SI transmission	1-2-2	After receiving SQ packet from ROUTER A, confirm ROUTER C sends SI packet and ROUTER A receives it. (ROUTER C may send SQ packet, depending on the situation.)	OK / NG	/ /
	CR transmission	1-2-3	Confirm ROUTER A sends CR packet (packet size: 1024, LCGN: 0, LCN: 10, calling DTE address: ROUTER A DTE address, called DTE address: ROUTER C DTE address). Confirm ROUTER C receives it.	OK / NG	/ /
	CC transmission	1-2-4	Confirm ROUTER C sends CC packet (packet size: 1024, LCGN: 0, LCN: 10, calling DTE address: ROUTER A DTE address, called DTE address: ROUTER C DTE address). Confirm ROUTER A receives it, and VC is established.	OK / NG	/ /
IDRP connection establishment	OPEN PDU transmission from ROUTER A	1-3-1	After VC establishment, confirm ROUTER A sends an OPEN PDU. Confirm ROUTER C receives it.	OK / NG	/ /
	OPEN PDU transmission from ROUTER C	1-3-2	After receiving OPEN PDU from ROUTER A, confirm ROUTER C sends an OPEN PDU. Confirm that ROUTER A receives it, and IDRP connection is established.	OK / NG	/ /

1. Router Connection Establishment & Maintenance		**Test Item**	**Procedure**	**Result**	**Date/Time**
UPDATE PDU transmission	UPDATE PDU transmission from ROUTER A	1-4-1	After IDRP connection established, confirm ROUTER A sends an UPDATE PDU (security registration ID: 06042B1B0000, tag set name: 07, ATSC Class: ATSC Class C, holding timer: 180 sec) to ROUTER C. At ROUTER C, confirm UPDATE PDU is received, and routing information for ROUTER A is added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER C	1-4-2	After IDRP connection established, confirm ROUTER C sends an UPDATE PDU (security registration ID: 06042B1B0000, tag set name: 07, ATSC Class: ATSC Class C, holding timer: 180 sec) to ROUTER A. At ROUTER A, confirm UPDATE PDU is received, and routing information for ROUTER C is added.	OK / NG	/ /
IDRP connection maintenance	KEEPALIVE PDU transmission from ROUTER A	1-5-1	After IDRP connection established, confirm ROUTER A sends a KEEPALIVE PDU to ROUTER C every 60 seconds. At ROUTER C, confirm routing information received from ROUTER A is not deleted by receiving KEEPALIVE PDU continuously.	OK / NG	/ /
	KEEPALIVE PDU transmission from ROUTER C	1-5-2	After IDRP connection established, confirm ROUTER C sends a KEEPALIVE PDU to ROUTER A every 60 seconds. At ROUTER A, confirm routing information received from ROUTER C is not deleted by receiving KEEPALIVE PDU continuously.	OK / NG	/ /

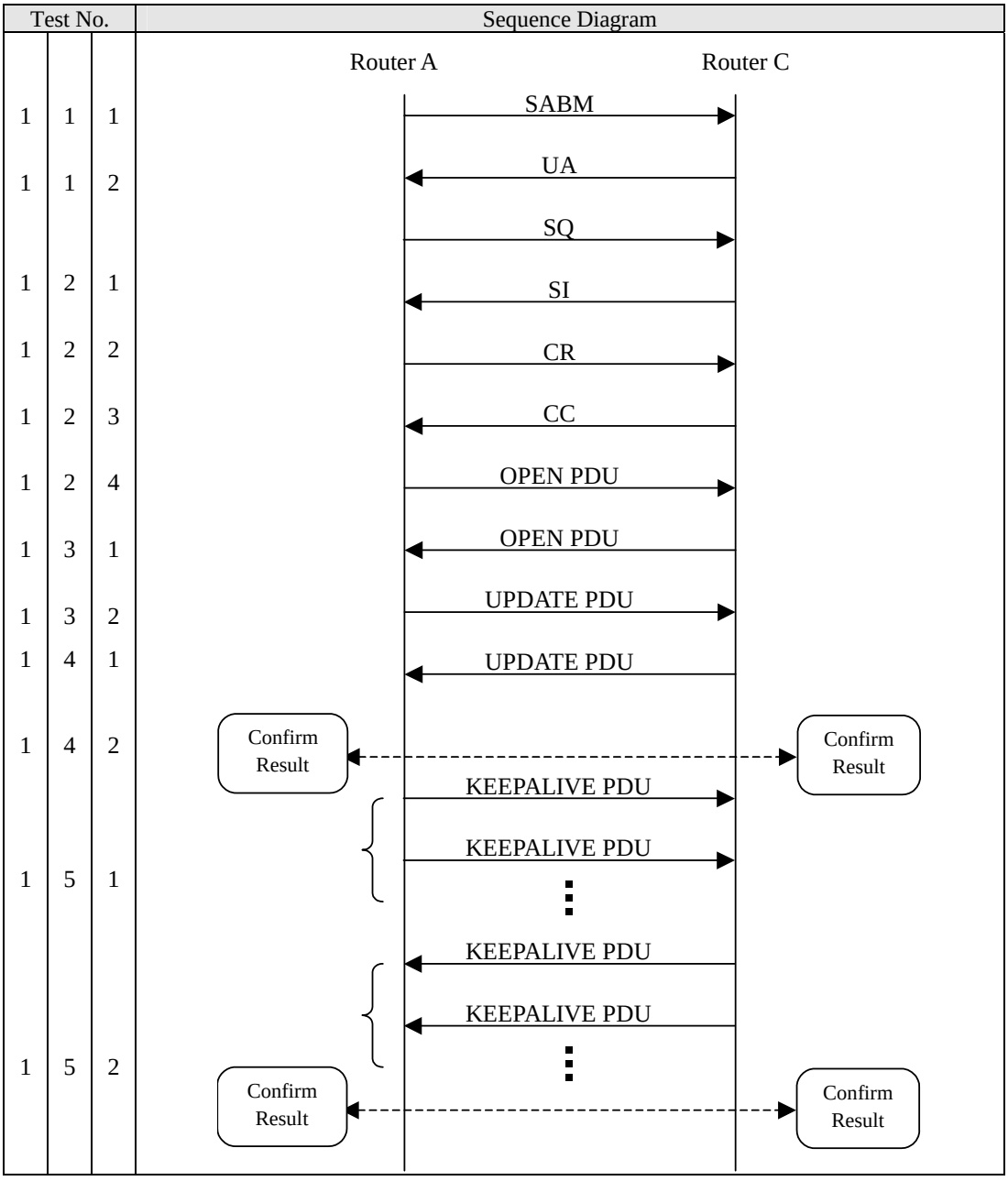


Figure 4 Sequence: Router Connection Establishment and Maintenance

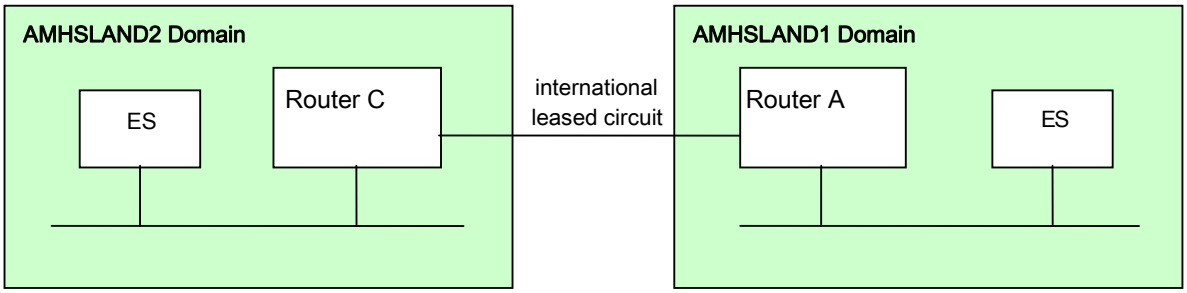
6.2. Test Case 2 : NPDU Relay

a) **Overview**

This test uses the CLNP Echo function to test correct relay and routing of CLNP NPDUs by the AMHSLAND2 and AMHSLAND1 routers. End Systems in both domains are used to verify end-to-end transmission of CLNP PDUs via the routers. The test configuration is shown in Figure 5. The test verifies the following:

(i) CLNP Echo Request/Echo Response function of both routers.
(ii) Relay of CLNP NPDUs by routers to the peer domain.
(iii) ER-PDU returned by peer router when sending a CLNP NPDU to an unknown address in the peer domain.
(iv) Non-relay of CLNP PDUs with incorrect security parameter by own domain router.

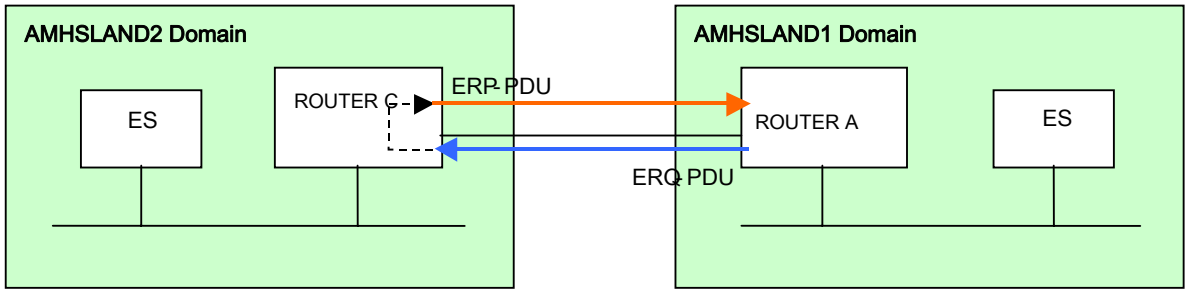
Figure 5 NPDU Transmission and Relay Test Configuration



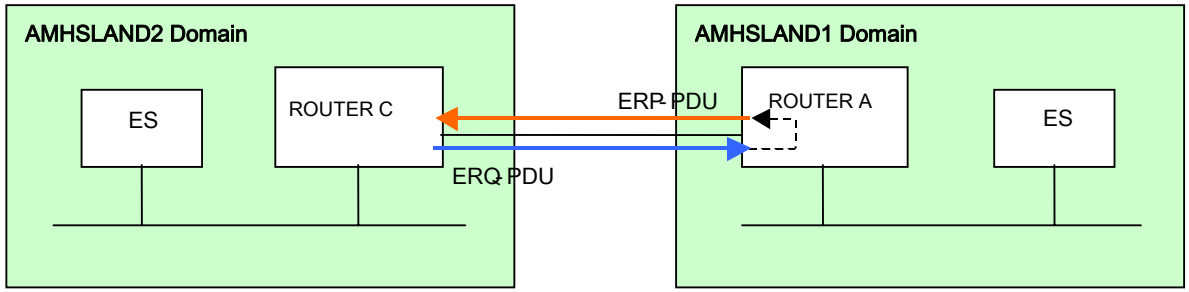
b) **Test Items**

Note: Some of these test items may not be carried out, depending on the capability of End Systems in each domain in to transmit ERQ-PDUs.

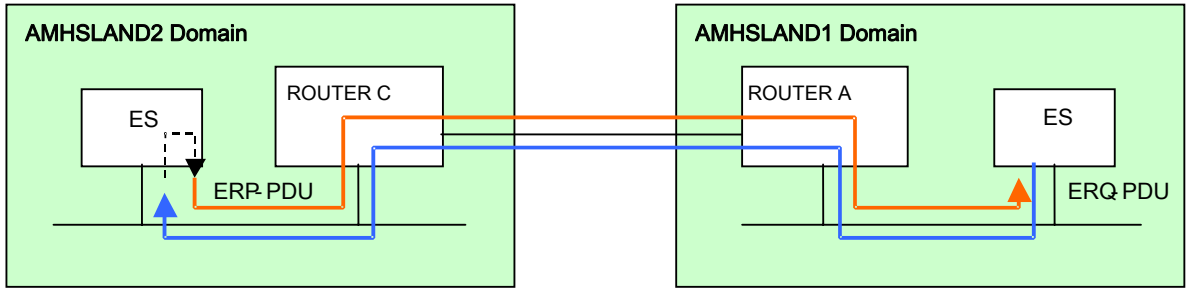
- 2-1: CLNP Echo from AMHSLAND1 router to AMHSLAND2 router.



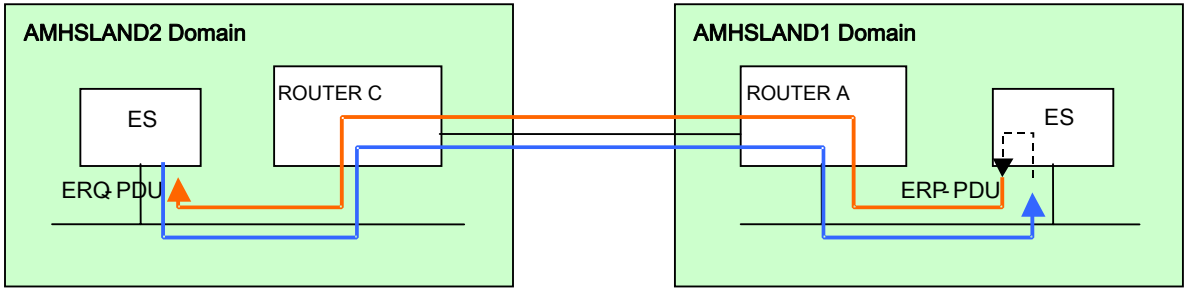
- 2-2: CLNP Echo from AMHSLAND2 router to AMHSLAND1 router.



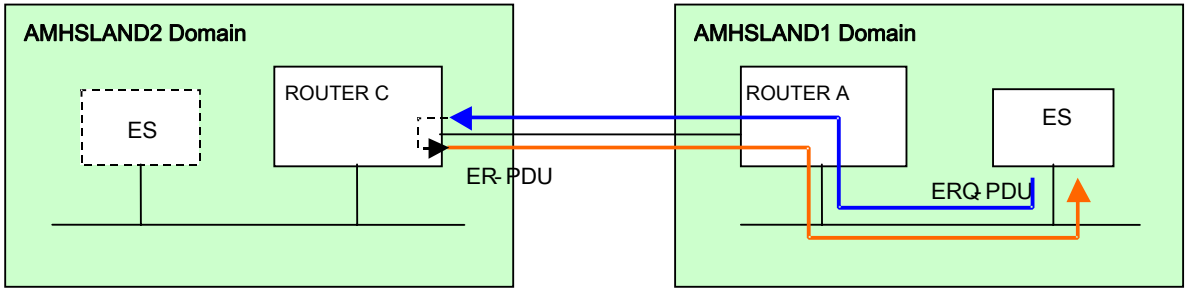
- 2-3: CLNP Echo from AMHSLAND1 End System to valid destination at AMHSLAND2.



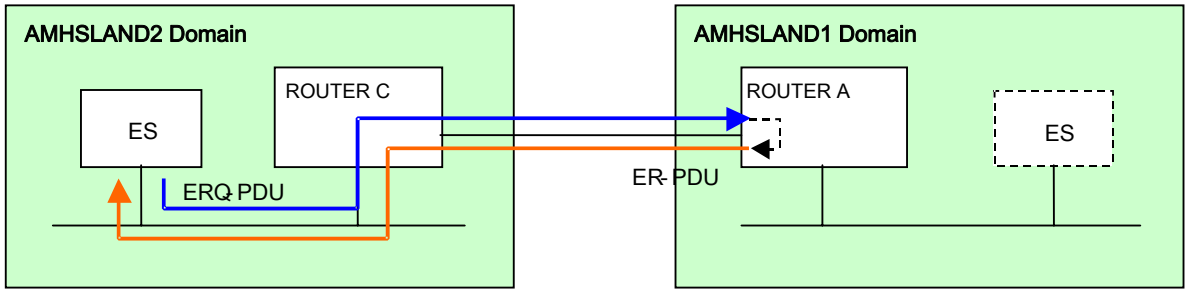
- 2-4: CLNP Echo from AMHSLAND2 End System to valid destination at AMHSLAND1.



- 2-5: CLNP Echo from AMHSLAND1 End System to unreachable AMHSLAND2 End System.

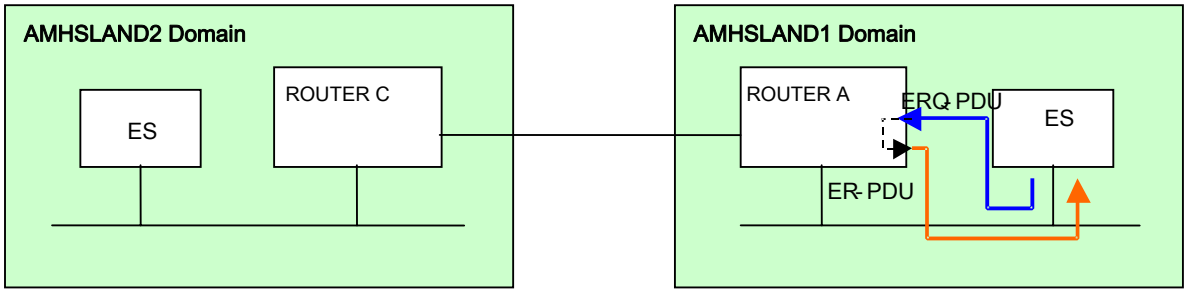


- 2-6: CLNP Echo from AMHSLAND2 End System to unreachable AMHSLAND1 End System.



- 2-7: Routing process in AMHSLAND1 router for NPDU with invalid security parameter.

Note: Transmission of ER NPDU depends on a value in the ERQ NPDU header.



- 2-8: Routing process in AMHSLAND2 router for NPDU with invalid security parameter.

Note: Transmission of ER NPDU depends on a value in the ERQ NPDU header.

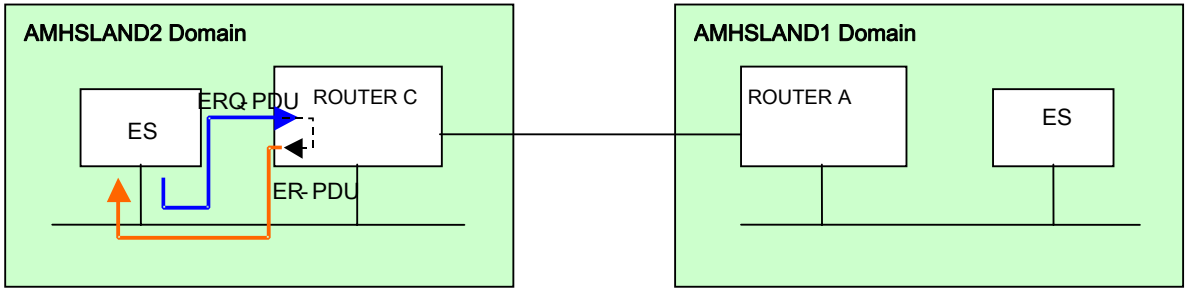


Table 10 NPDU Relay Test Procedure

2. NPDU Relay		**Test Item**	**Procedure**	**Result**	**Date/Time**
ERQ NPDU transmission from AMHSLAND1 router	ERQ NPDU transmission	2-1-1	Send ERQ NPDU from ROUTER A to ROUTER C. Confirm ROUTER C receives it.	OK / NG	/ /
	ERP NPDU transmission	2-1-2	After receiving ERQ NPDU, ROUTER C sends ERP NPDU to ROUTER A. Confirm ROUTER A receives it.	OK / NG	/ /
	Continuous ERQ/ERP NPDU transmission	2-1-3	Repeat from 2-1-1 to 2-1-2 ten times and confirm there is no problem with ERQ/ERP transmission.	OK / NG	/ /
ERQ NPDU transmission from AMHSLAND2 router	ERQ NPDU transmission	2-2-1	Send ERQ NPDU from ROUTER C to ROUTER A. Confirm ROUTER A receives it.	OK / NG	/ /
	ERP NPDU transmission	2-2-2	After receiving ERQ NPDU, ROUTER A sends an ERP NPDU to ROUTER C. Confirm ROUTER C receives it.	OK / NG	/ /
	Continuous ERQ/ERP NPDU transmission	2-2-3	Repeat from 2-2-1 to 2-2-2 ten times and confirm there is no problem with ERQ/ERP transmission.	OK / NG	/ /
ERQ NPDU transmission from AMHSLAND1 ES	ERQ NPDU transmission	2-3-1	Send ERQ NPDU from AMHSLAND1 ES to AMHSLAND2 ES. Confirm the AMHSLAND2 ES receives it.	OK / NG	/ /
	ERP NPDU transmission	2-3-2	After receiving ERQ NPDU, the AMHSLAND2 ES sends an ERP NPDU to the AMHSLAND1 ES. Confirm the AMHSLAND1 ES receives it.	OK / NG	/ /
	Continuous ERQ/ERP transmission	2-3-3	Repeat from 2-3-1 to 2-3-2 ten times and confirm there is no problem with ERQ/ERP transmission.	OK / NG	/ /
ERQ NPDU transmission from AMHSLAND2 ES	ERQ NPDU transmission	2-4-1	Send ERQ NPDU from the AMHSLAND2 ES to the AMHSLAND1 ES. Confirm the AMHSLAND1 ES receives it.	OK / NG	/ /
	ERP NPDU transmission	2-4-2	After receiving ERQ NPDU, the AMHSLAND1 ES sends an ERP NPDU to the AMHSLAND2 ES. Confirm the AMHSLAND2 ES receives it.	OK / NG	/ /
	Continuous ERQ/ERP transmission	2-4-3	Repeat from 2-4-1 to 2-4-2 ten times and confirm there is no problem with ERQ/ERP transmission.	OK / NG	/ /

2. NPDU Relay		**Test Item**	**Procedure**	**Result**	**Date/Time**
ERQ NPDU transmission from AMHSLAND1 ES to unreachable system in AMHSLAND2 domain	ERQ NPDU transmission from AMHSLAND1 ES	2-5-1	AMHSLAND1 ES sends an ERQ NPDU with destination NSAP address set to an unreachable address in AMHSLAND2 domain. Confirm ROUTER C receives it.	OK / NG	/ /
	ERQ NPDU handling in AMHSLAND2 router	2-5-2	Confirm that ROUTER C discards the ERQ NPDU from AMHSLAND1 ES. Confirm that ROUTER C sends an ER NPDU to the AMHSLAND1 ES, and that the AMHSLAND1 ES receives it.	OK / NG	/ /
ERQ NPDU transmission from AMHSLAND2 ES to unreachable system in AMHSLAND1 domain	ERQ NPDU transmission from AMHSLAND2 ES	2-6-1	AMHSLAND2 ES sends an ERQ NPDU with destination NSAP address set to an unreachable address in AMHSLAND1 domain. Confirm ROUTER A receives it.	OK / NG	/ /
	ERQ NPDU handling in AMHSLAND1 router	2-6-2	Confirm that ROUTER A discards the ERQ NPDU. Confirm that ROUTER A sends an ER NPDU to the AMHSLAND2 ES, and that the AMHSLAND2 ES receives it.	OK / NG	/ /
Routing process in AMHSLAND1 router for NPDU with invalid security option parameter	ERQ NPDU transmission from AMHSLAND1 ES	2-7-1	AMHSLAND1 ES sends an ERQ NPDU with an invalid security option parameter (ATN Systems Management Communications/No Traffic Policy Preference) addressed to the AMHSLAND2 ES. Confirm ROUTER A receives it.	OK / NG	/ /
	ERQ NPDU processing in AMHSLAND1 router	2-7-2	Confirm ROUTER A discards ERQ NPDU and sends an ER NPDU to AMHSLAND1 ES. Confirm the AMHSLAND1 ES receives the ER NPDU.	OK / NG	/ /

2. NPDU Relay		**Test Item**	**Procedure**	**Result**	**Date/Time**
Routing process in AMHSLAND2 router for NPDU with invalid security option parameter	ERQ NPDU transmission from AMHSLAND2 ES	2-8-1	AMHSLAND2 ES sends ERQ NPDU with an invalid security option parameter (ATN Systems Management Communications/No Traffic Policy Preference) addressed to the AMHSLAND1 ES. Confirm ROUTER C receives it.	OK / NG	/ /
	ERQ NPDU processing in AMHSLAND2 router	2-8-2	Confirm ROUTER C discards ERQ NPDU and ROUTER C sends an ER NPDU to the AMHSLAND2 ES. Confirm the AMHSLAND2 ES receives the ER NPDU.	OK / NG	/ /

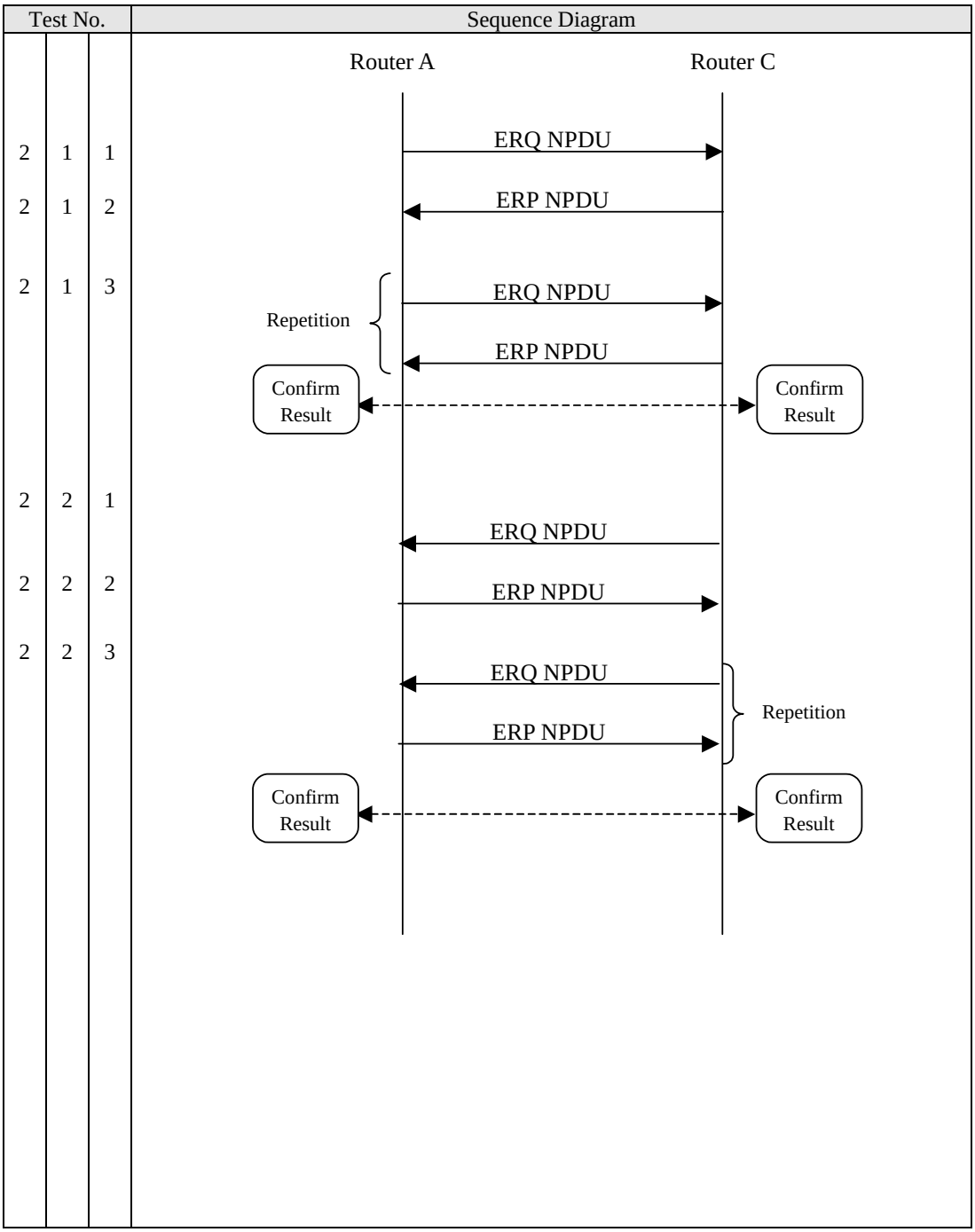


Figure 6 Sequence: NPDU Transmission between Routers

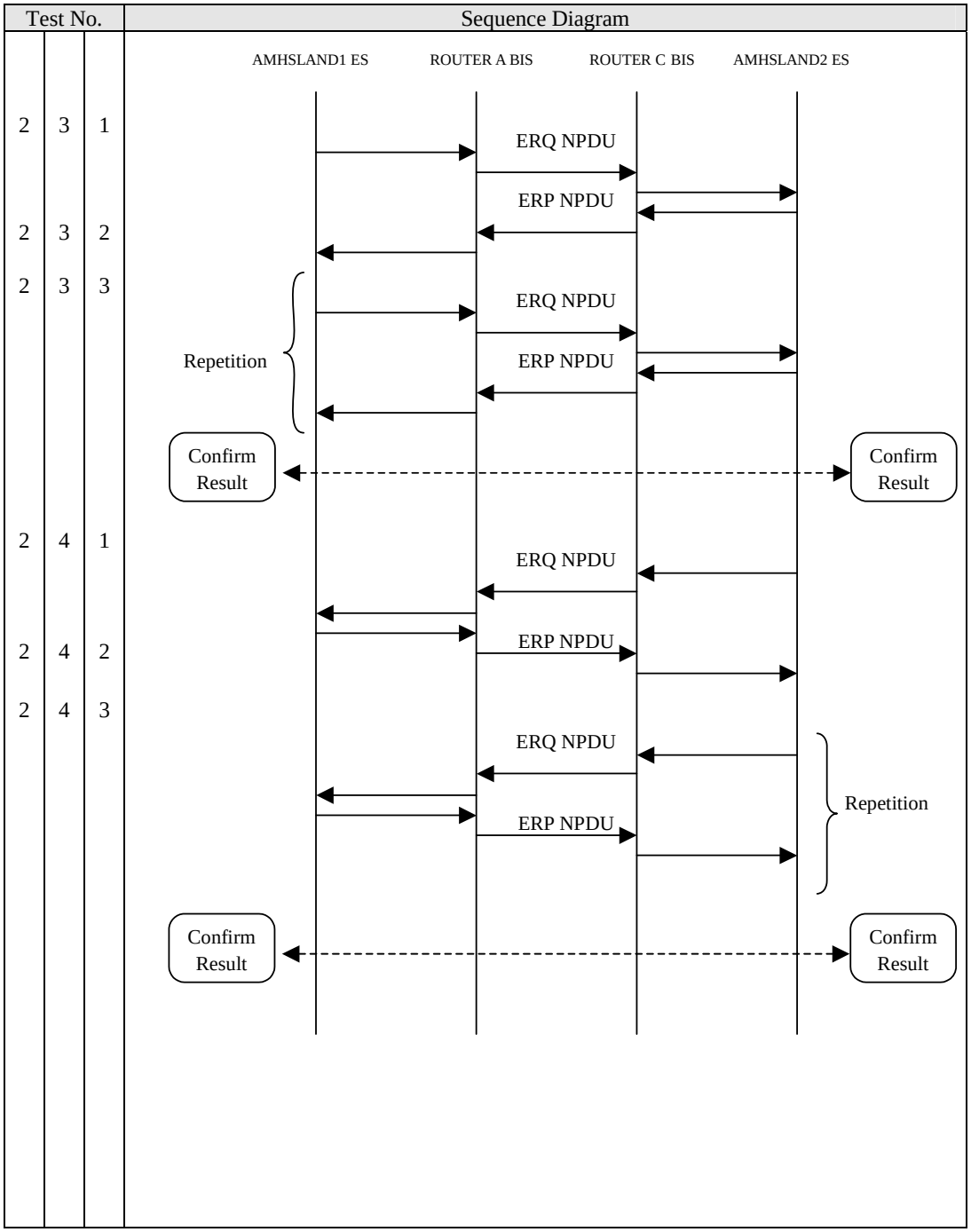


Figure 7 Sequence: NPDU Transmission between End Systems

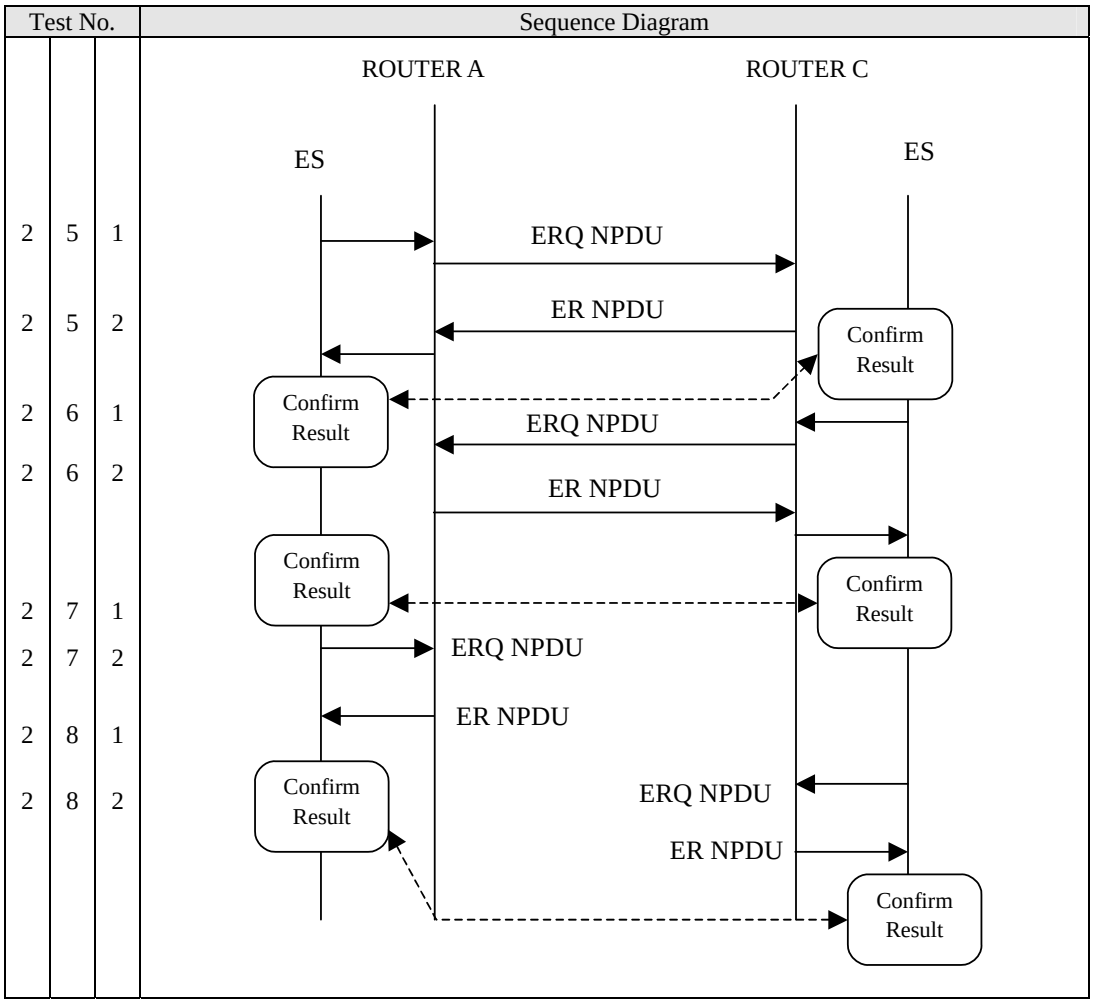


Figure 8 Sequence: NPDU Transmission to Unreachable ES and Handling of NPDU with Invalid Security Parameter

6.3. Test Case 3: Router End-to-End Tests

a) **Objective**

Technical trial to verify the automatic updating of routing tables in the ATN routers through IDRP protocol with routers connecting in end-to-end configuration between AMHSLAND1 and AMHSLAND2.

b) **Test Configuration**

The configuration for this test is shown in Figure 9.

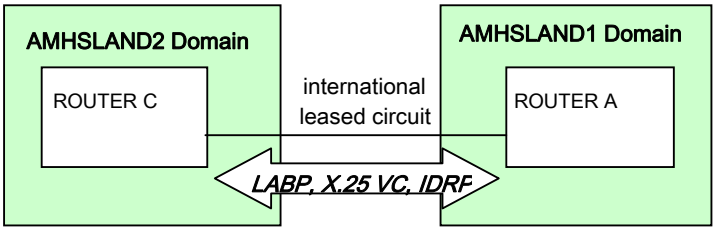


Figure 9 Router End-to-End Test Configuration

c) **Test Item Overview**

3-1: Manual router disconnection at AMHSLAND1 router and route deletion
3-2: Route addition (re-activation of connection) from AMHSLAND1 router
3-3: Manual router disconnection at AMHSLAND2 router and route deletion
3-4: Route addition (re-activation of connection) from AMHSLAND2 router
3-5: Carrier medium failure and route deletion at AMHSLAND1 router
3-6: Carrier medium restoration and route addition at AMHSLAND1 router
3-7: Carrier medium failure and route deletion at AMHSLAND2 router
3-8: Carrier medium restoration and route addition at AMHSLAND2 router
3-9: Failure and recovery of AMHSLAND1 router (redundant configuration)
3-10: Failure and recovery of AMHSLAND2 router

Note:
A detailed test of normal router connection (LAPB, X.25 VC and IDRP) is carried out in Test Items 1-1 through 1-5, and so is not repeated here.

Table 11 Router End-to-End Tests Test Procedure

3. Router End-to-End Tests		**Test Item**	**Procedure**	**Result**	**Date/Time**
Manual router disconnection at AMHSLAND1 router and route deletion	CEASE PDU transmission from AMHSLAND1 router	3-1-1	At ROUTER A, manually close the router connection to ROUTER C. Confirm ROUTER A sends CEASE PDU.	OK / NG	/ /
	CEASE PDU transmission from AMHSLAND2 router and route deletion	3-1-2	Confirm ROUTER C receives CEASE PDU. After receiving CEASE PDU, confirm that ROUTER C sends CEASE PDU to ROUTER A, and that routing information for ROUTER A is deleted.	OK / NG	/ /
	Route deletion at AMHSLAND1 router	3-1-3	Confirm that ROUTER A receives CEASE PDU from ROUTER C, and that routing information for ROUTER C is deleted.	OK / NG	/ /
	CQ transmission	3-1-4	After IDRP disconnected, confirm ROUTER A sends CQ packet to ROUTER C. Confirm ROUTER C receives it.	OK / NG	/ /
	CF transmission	3-1-5	After receiving CQ packet, confirm ROUTER C sends CF packet to ROUTER A. Confirm ROUTER A receives CF packet, and VC is closed.	OK / NG	/ /
Route addition (re-activation of connection) from AMHSLAND1 router	Router connection restoration after disconnection	3-2-1	At ROUTER A, manually initiate router connection with ROUTER C. (VC call: originate, OPEN PDU: send.) Confirm the router connection is re-established.	OK / NG	/ /

3. Router End-to-End Tests		Test Item	Procedure	Result	Date/Time
Manual router disconnection at AMHSLAND2 router and route deletion	CEASE PDU transmission from AMHSLAND2 router	3-3-1	At ROUTER C, manually close the router connection to ROUTER A. Confirm ROUTER C sends CEASE PDU.	OK / NG	/ /
	CEASE PDU transmission from AMHSLAND1 router and route deletion	3-3-2	Confirm ROUTER A receives CEASE PDU. After receiving CEASE PDU, confirm that ROUTER A sends CEASE PDU to ROUTER C, and that routing information for ROUTER C is deleted.	OK / NG	/ /
	Route deletion at AMHSLAND2 router	3-3-3	Confirm that ROUTER C receives CEASE PDU from ROUTER A, and that routing information for ROUTER A is deleted.	OK / NG	/ /
	CQ transmission	3-3-4	After IDRP disconnected, confirm ROUTER C sends CQ packet to ROUTER A. Confirm ROUTER A receives it.	OK / NG	/ /
	CF transmission	3-3-5	After receiving CQ packet, confirm ROUTER A sends CF packet to ROUTER C. Confirm ROUTER C receives CF packet, and VC is closed.	OK / NG	/ /
Route addition (re-activation of connection) from AMHSLAND2 router	Router connection restoration after disconnection	3-4-1	At ROUTER C, manually initiate router connection to ROUTER A. (VC call: receive, OPEN PDU: receive.) Confirm the router connection is re-established.	OK / NG	/ /
Carrier medium failure and route deletion at AMHSLAND1 router	Data link and VC disconnection	3-5-1	At ROUTER A, simulate a circuit failure by physically disconnecting ROUTER A from the DSU/modem. Confirm that the data link and VC are disconnected between ROUTER A and ROUTER C.	OK / NG	/ /
	IDRP disconnection at AMHSLAND1	3-5-2	After circuit failure, confirm IDRP connection at ROUTER A is closed.	OK / NG	/ /
	IDRP disconnection at AMHSLAND2	3-5-3	After circuit failure, confirm IDRP connection at ROUTER C is closed when the IDRP holding timer expires.	OK / NG	/ /

3. Router End-to-End Tests		Test Item	Procedure	Result	Date/Time
Carrier medium restoration and route addition at AMHSLAND1 router	Data link, VC, and router connection re-establishment	3-6-1	At ROUTER A, restore the circuit by re-connecting ROUTER A to the DSU/modem. Confirm router connection is re-established between ROUTER A and ROUTER C.	OK / NG	/ /
Carrier medium failure and route deletion at AMHSLAND2 router	Data link and VC disconnection	3-7-1	At ROUTER C, simulate a circuit failure by disconnecting the leased line circuit from the modem. Confirm data link and VC are disconnected between ROUTER A and ROUTER C.	OK / NG	/ /
	IDRP disconnection at AMHSLAND2	3-7-2	After circuit failure, confirm IDRP connection at ROUTER C is closed when the IDRP holding timer expires.	OK / NG	/ /
	IDRP disconnection at AMHSLAND1	3-7-3	After circuit failure, confirm IDRP connection at ROUTER A is closed.	OK / NG	/ /
Carrier medium restoration and route addition at AMHSLAND2 router	Data link, VC, and router connection re-establishment	3-8-1	At ROUTER C, restore circuit. Confirm the router connection is re-established between ROUTER A and ROUTER C.	OK / NG	/ /
Failure and recovery of AMHSLAND1 router	Failover from active to standby node	3-9-1	At ROUTER A, force failover from active node (#1) to standby node (#2) by rebooting active node. At ROUTER A, confirm WAN line switches from active to standby node. Confirm that router connection is closed and then re-established.	OK / NG	/ /
	Failover back to previous active node	3-9-2	At ROUTER A, force failover from active node (#2) to standby node (#1) by rebooting active node. At ROUTER A, confirm WAN line switches from active to standby node. Confirm that router connection is closed and then re-established.	OK / NG	/ /

3. Router End-to-End Tests		**Test Item**	**Procedure**	**Result**	**Date/Time**
Failure and recovery of AMHSLAND2 router	Failover from active to standby node	3-10-1	At ROUTER C, force failover from active node (#1) to standby node (#2). At ROUTER C, confirm WAN line switches from active to standby node. Confirm that router connection is closed and then re-established.	OK / NG	/ /
	Failover back to previous active node	3-10-2	At ROUTER C, force failover from active node (#2) to standby node (#1). At ROUTER C, confirm WAN line switches from active to standby node. Confirm that router connection is closed and then re-established.	OK / NG	/ /

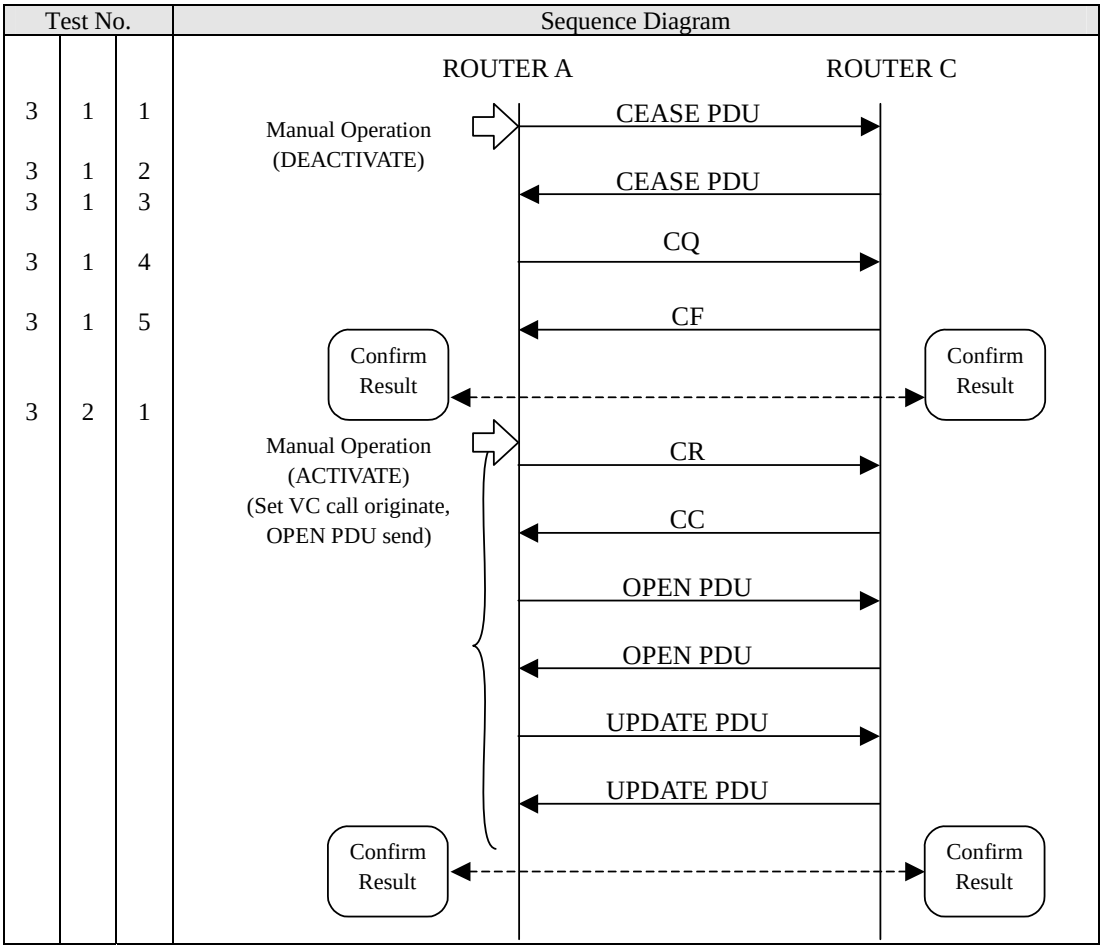


Figure 10 Sequence: Manual router Disconnection and Re-connection at AMHSLAND1 router

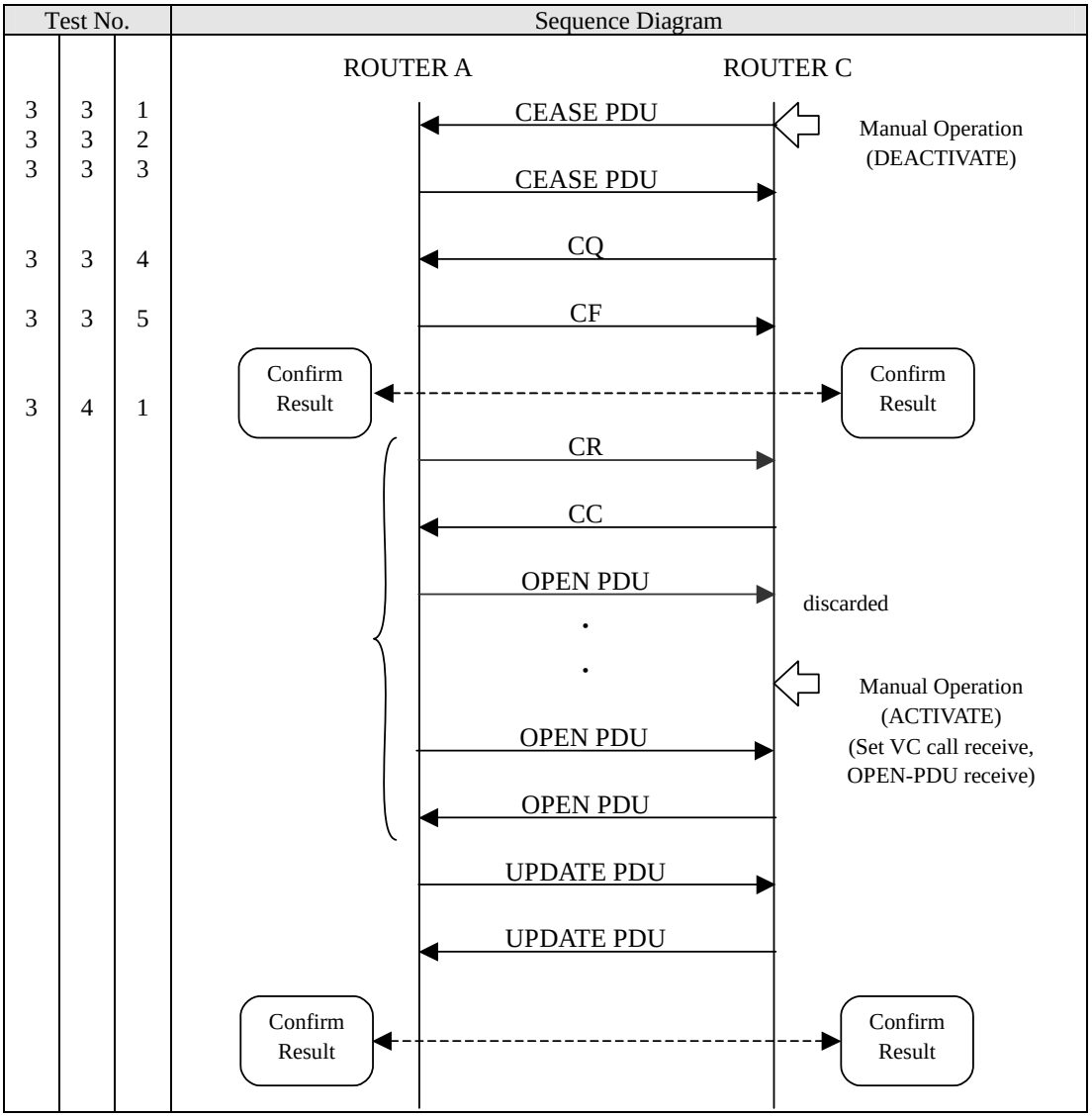


Figure 11 Sequence: Manual router Disconnection and Re-connection at AMHSLAND2 router

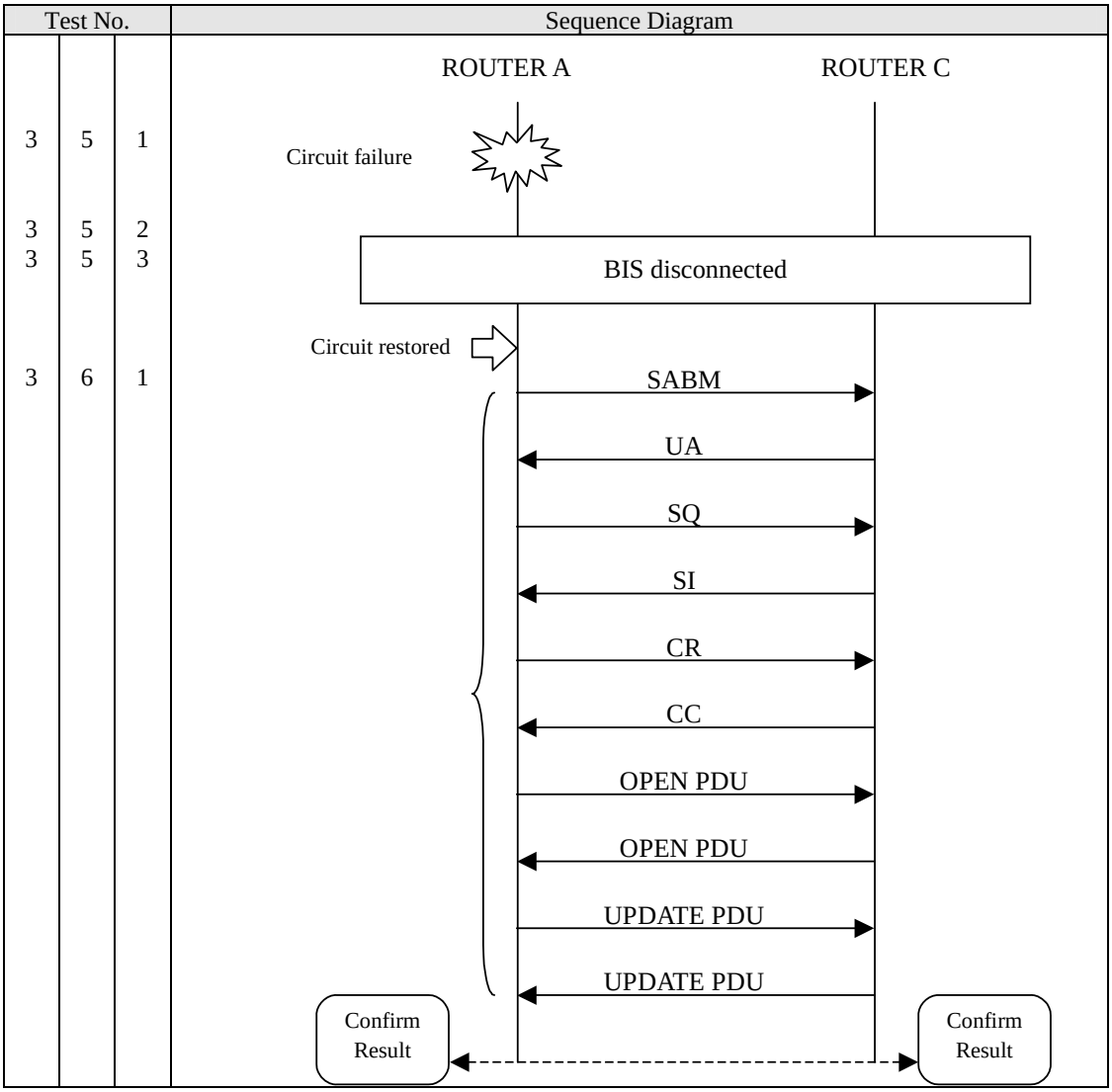


Figure 12 Sequence: Carrier medium failure and recovery at AMHSLAND1 router

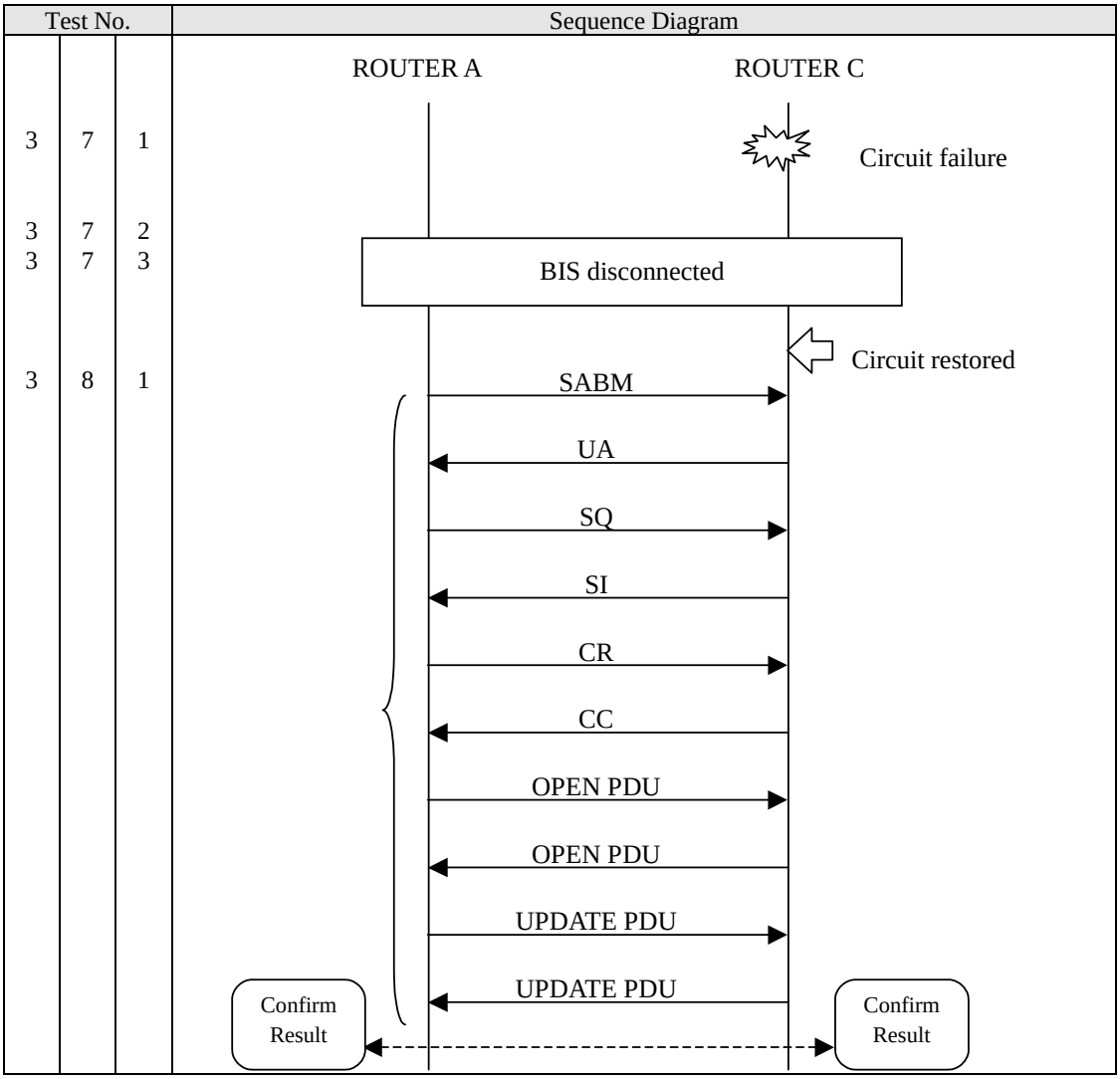


Figure 13 Sequence: Carrier medium failure and recovery at AMHSLAND2 router

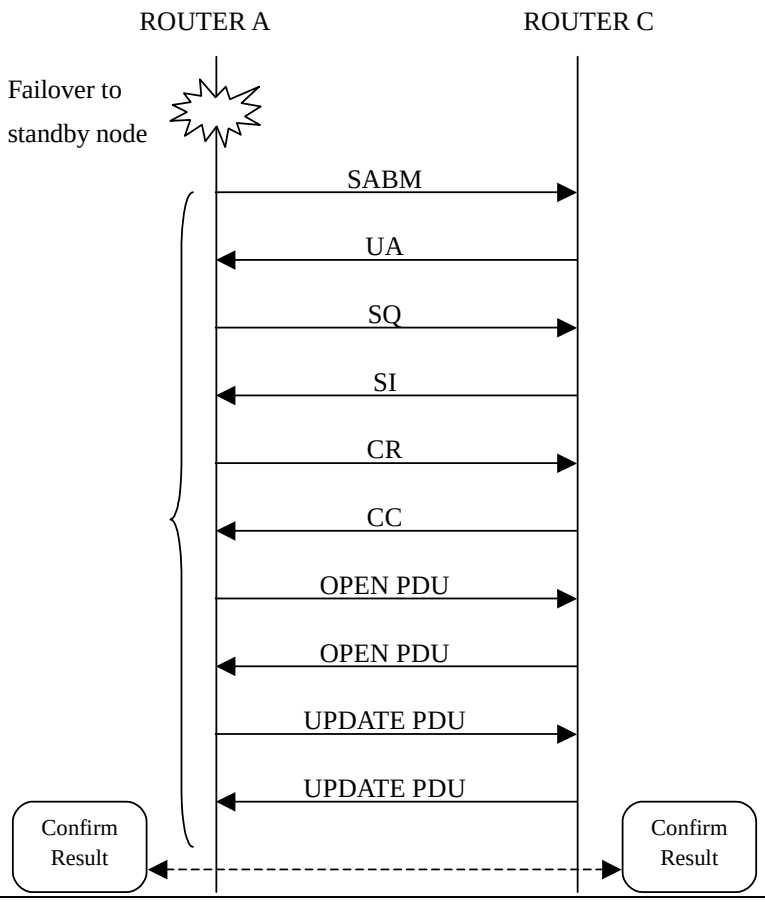
Test No.			Sequence Diagram
3 3	9 9	1 2	

Figure 14 Sequence: AMHSLAND1 router Failure and Recovery

Test No.			Sequence Diagram
3	10	1	
3	10	2	

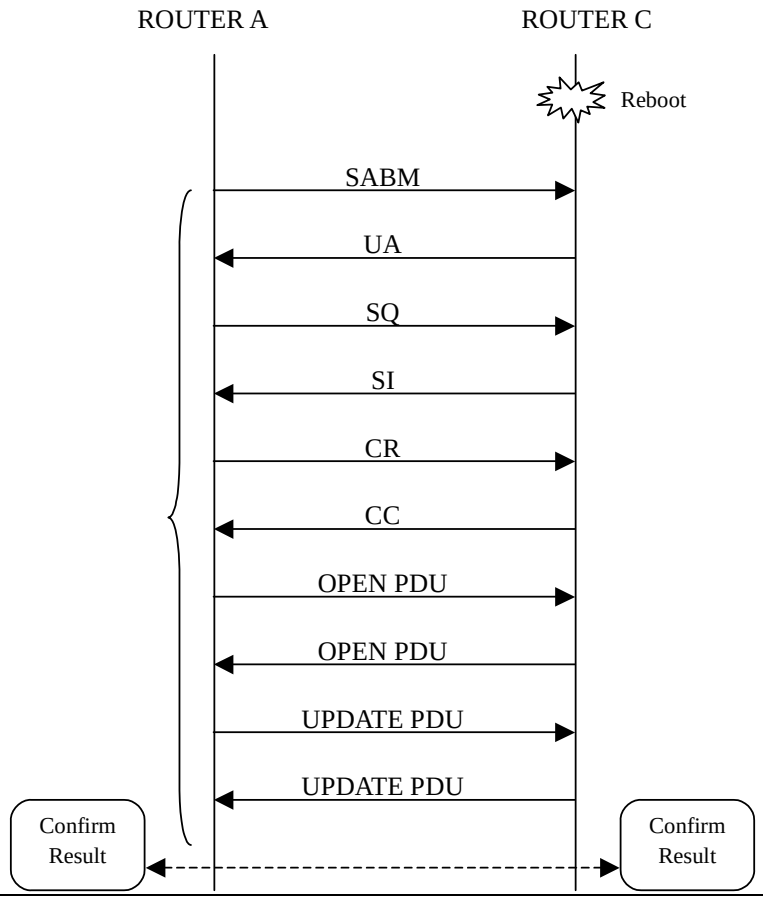


Figure 15 Sequence: AMHSLAND2 router Failure and Recovery

6.4. Test Case 4: ATN Router Tests (This cover additional tests for subnetwork)

a) **Objective**

Technical trial to verify the automatic updating of routing tables in ATN routers through the IDRP protocol with routers connected in 3routers configurations between AMHSLAND1, AMHSLAND2 and simulated third domains connected to AMHSLAND1 and AMHSLAND2. The test configurations are shown below.

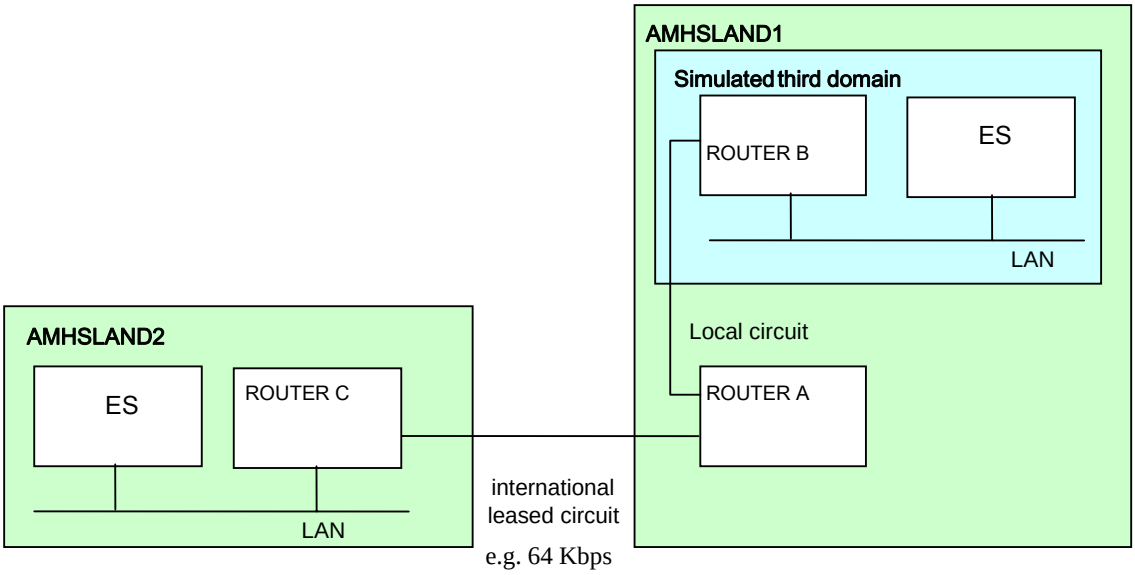


Figure 16 Test Configuration: Simulated Third Domain connected to AMHSLAND1

b) **Test Overview**

(i) Simulated third domain connected to AMHSLAND1.

ROUTER CONNECTION, DISCONNECTION AND RE-ACTIVATION

4-1: Router connection of ROUTER B to ROUTER A (ROUTER A-ROUTER C already established).
4-2, 4-3: Manual router disconnection at ROUTER A of ROUTER A-ROUTER B route and re-activation.
4-4, 4-5: Manual router disconnection at ROUTER B of ROUTER A-ROUTER B route and re-activation.
4-6: Router connection of ROUTER C to ROUTER A (ROUTER B-ROUTER A already established).
4-7, 4-8: Manual router disconnection at ROUTER C of ROUTER C-ROUTER A route and re-activation.
4-9, 4-10: Manual router disconnection at ROUTER A of ROUTER C-ROUTER A route and re-activation.

COMMUNICATION CIRCUIT FAILURE AND RECOVERY

4-11, 4-12: Failure and recovery of ROUTER A-ROUTER B circuit.
4-13, 4-14: Failure and recovery of ROUTER C-ROUTER A circuit.

ROUTER FAILURE AND RECOVERY

4-15: Failure and recovery of ROUTER C.
4-16: Failure and recovery of ROUTER A.
4-17: Failure and recovery of ROUTER B.

END-TO-END DATA RELAY

4-18: End-to-End CLNP Echo Test between End Systems in ROUTER C and ROUTER B domains.
(Subject to End System ERQ-PDU transmission capabilities.)

Table 12 Router Connection, Disconnection and Re-activation Test Procedure: Router A – Router B

4. ATN Router Tests		**Test Item**	**Procedure**	**Result**	**Date/Time**
Router connection of ROUTER B to ROUTER A	Data link establishment between ROUTER A and ROUTER B	4-1-1	With VC and IDRP connections established between ROUTER C and ROUTER A, switch on ROUTER B to initiate router connection. Check and confirm data link and VC are established between ROUTER A and ROUTER B.	OK / NG	/ /
	IDRP connection establishment between ROUTER A and ROUTER B	4-1-2	After VC establishment, check and confirm IDRP connection established between ROUTER A and ROUTER B by exchange of OPEN PDUs. (First OPEN PDU sent by ROUTER A.)	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER B	4-1-3	After IDRP connection established, confirm ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, after receiving UPDATE PDU from ROUTER A, check that route information on ROUTER A and ROUTER C are added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER B to ROUTER A	4-1-4	After IDRP connection established, confirm ROUTER B sends an UPDATE PDU to ROUTER A. At ROUTER A, after receiving UPDATE PDU from ROUTER B, check and confirm route information of ROUTER B is updated correctly.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER C	4-1-5	At ROUTER A, after receiving UPDATE PDU from ROUTER B, confirm ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, confirm that UPDATE PDU is received, and that route information of ROUTER B is added.	OK / NG	/ /
Manual router disconnection at ROUTER A of ROUTER A-ROUTER B route	CEASE PDU transmission from ROUTER A	4-2-1	At ROUTER A, manually close the router connection to ROUTER B. Confirm ROUTER A sends a CEASE PDU to ROUTER B.	OK / NG	/ /
	CEASE PDU transmission from ROUTER B and route deletion	4-2-2	At ROUTER B, confirm receipt of CEASE PDU from ROUTER A. Confirm ROUTER B sends a CEASE PDU to ROUTER A, and that route information for ROUTER A and ROUTER C are deleted.	OK / NG	/ /
	Route deletion at ROUTER A	4-2-3	At ROUTER A, confirm receipt of CEASE PDU from ROUTER B, and that route information for ROUTER B is deleted.	OK / NG	/ /

4. ATN Router Tests		Test Item	Procedure	Result	Date/Time
	VC disconnection between ROUTER A and ROUTER B	4-2-4	Confirm that the VC between ROUTER A and ROUTER B is closed normally.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER C, and route deletion	4-2-5	Confirm that ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, confirm that UPDATE PDU is received from ROUTER A, and that route information for ROUTER B is deleted.	OK / NG	/ /
Route re-activation from ROUTER A	Router connection re-activation from ROUTER A	4-3-1	At ROUTER A, manually initiate router connection to ROUTER B (VC call: caller, OPEN PDU: send). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER B	4-3-2	Confirm that ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, check that route information to ROUTER A and ROUTER C are added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER B to ROUTER A	4-3-3	Confirm that ROUTER B sends an UPDATE PDU to ROUTER A. At ROUTER A, check that route information to ROUTER B is added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER C and route addition	4-3-4	Confirm that ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, check that route information to ROUTER B is added.	OK / NG	/ /
Manual router disconnection at ROUTER B of ROUTER A-ROUTER B route	CEASE PDU transmission from ROUTER B	4-4-1	At ROUTER B, manually close the router connection to ROUTER A. Confirm ROUTER B sends a CEASE PDU to ROUTER A.	OK / NG	/ /
	CEASE PDU transmission from ROUTER A and route deletion	4-4-2	At ROUTER A, confirm receipt of CEASE PDU from ROUTER B. Confirm ROUTER A sends CEASE PDU to ROUTER B, and that route information for ROUTER B is deleted.	OK / NG	/ /

4. ATN Router Tests		Test Item	Procedure	Result	Date/Time
	Route deletion at ROUTER B	4-4-3	At ROUTER B, confirm receipt of CEASE PDU from ROUTER A, and that route information for ROUTER A and ROUTER C are deleted.	OK / NG	/ /
	VC disconnection between ROUTER A and ROUTER B	4-4-4	Confirm that the VC between ROUTER A and ROUTER B is closed normally.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER C, and route deletion	4-4-5	Confirm that ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, confirm that an UPDATE PDU is received from ROUTER A, and that route information for ROUTER B is deleted.	OK / NG	/ /
Route re-activation from ROUTER B	Router connection re-activation from ROUTER B	4-5-1	At ROUTER B, manually initiate router connection to ROUTER A (VC call: called, OPEN PDU: receive). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER B	4-5-2	Confirm that ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, confirm UPDATE PDU is received, and that route information to ROUTER A and ROUTER C are added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER B to ROUTER A	4-5-3	Confirm that ROUTER B sends an UPDATE PDU to ROUTER A. At ROUTER A, confirm UPDATE PDU is received, and that route information to ROUTER B is added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER C and route addition	4-5-4	Confirm that ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, confirm UPDATE PDU is received, and that route information to ROUTER B is added.	OK / NG	/ /

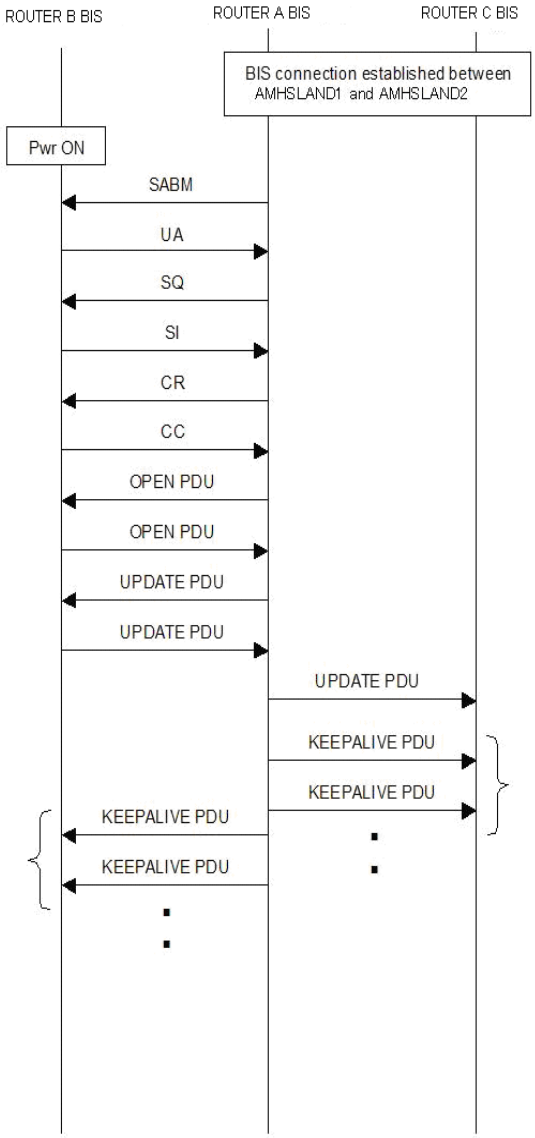
Test No.			Sequence Diagram
			
4	1	1	
4	1	2	
4	1	3	
4	1	4	
4	1	5	

Figure 17 Sequence: router connection of ROUTER B to ROUTER A (ROUTER A-ROUTER C already established)

Test No.			Sequence Diagram
4	2	1	
4	2	2	
4	2	3	
4	2	4	
4	2	5	
4	3	1	
4	3	2	
4	3	3	
4	3	4	

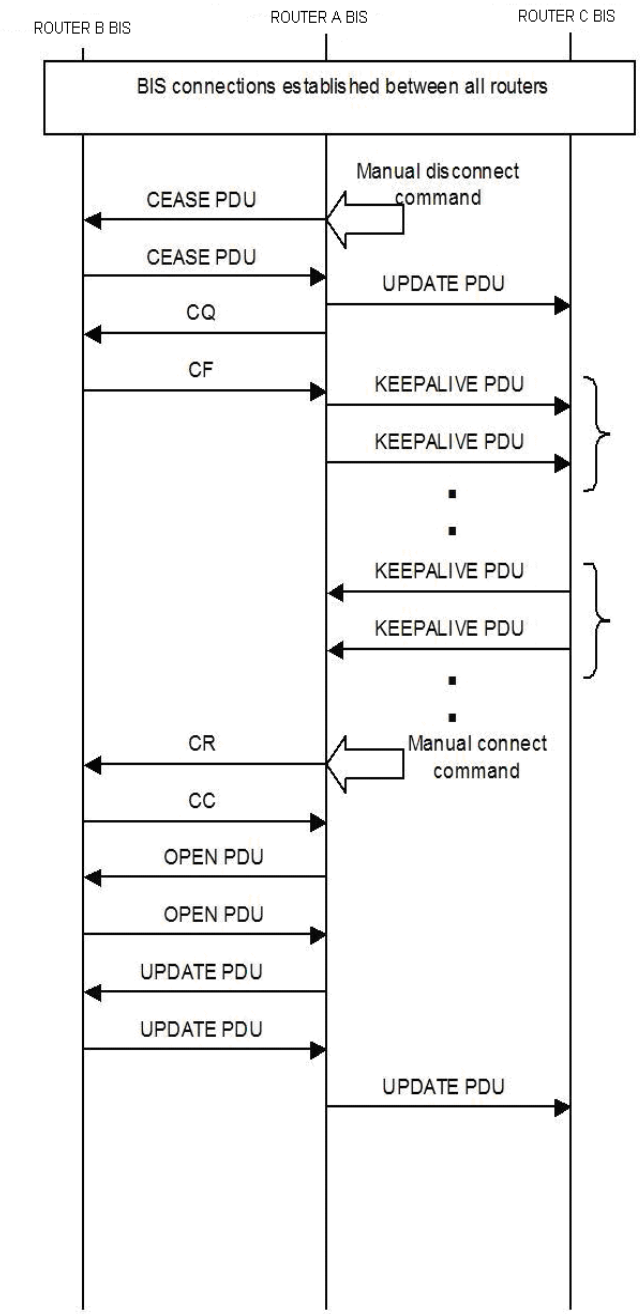


Figure 18 Sequence: Manual router disconnection at ROUTER A of ROUTER A-ROUTER B route and re-activation.

Test No.			Sequence Diagram
4	4	1	
4	4	2	
4	4	3	
4	4	4	
4	4	5	
4	5	1	
4	5	2	
4	5	3	
4	5	4	

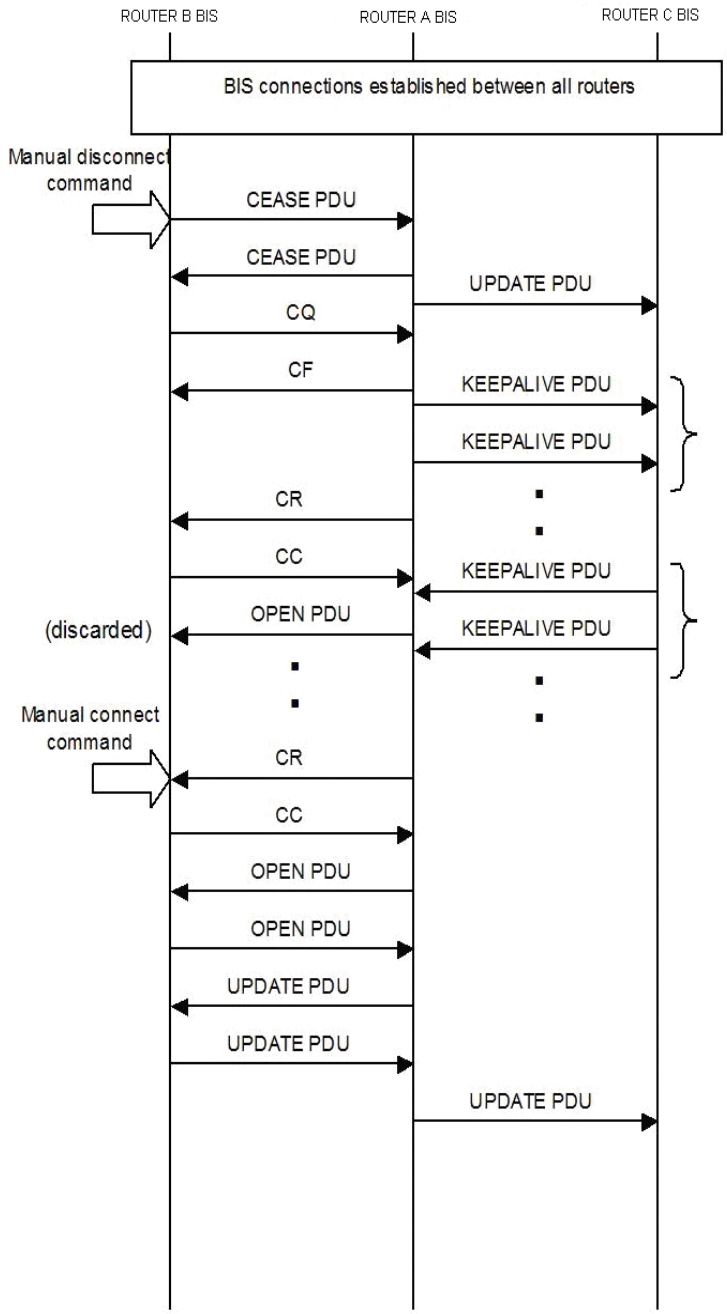


Figure 19 Sequence: Manual router disconnection at ROUTER B of ROUTER A-ROUTER B route and re-activation.

Table 13 Router Connection, Disconnection and Re-activation Test Procedure: ROUTER C-ROUTER A

4. ATN Router Tests		**Test Item**	**Procedure**	**Result**	**Date/Time**
Router connection of ROUTER C to ROUTER A	Data link establishment between ROUTER C and ROUTER A	4-6-1	With VC and IDRP connections established between ROUTER A and ROUTER B, at ROUTER A, initiate router connection to ROUTER C. Check and confirm data link and VC are established between ROUTER C and ROUTER A.	OK / NG	/ /
	IDRP connection establishment between ROUTER C and ROUTER A	4-6-2	After VC establishment, check and confirm IDRP connection established between ROUTER C and ROUTER A by exchange of OPEN PDUs. (First OPEN PDU sent by ROUTER A.)	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER C	4-6-3	After IDRP connection established, confirm ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, after receiving UPDATE PDU from ROUTER A, check that route information on ROUTER A and ROUTER B are added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER C to ROUTER A	4-6-4	After IDRP connection established, confirm ROUTER C sends an UPDATE PDU to ROUTER A. At ROUTER A, after receiving UPDATE PDU from ROUTER C, confirm route information of ROUTER C is added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER B	4-6-5	At ROUTER A, after receiving UPDATE PDU from ROUTER C, confirm ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, after receiving UPDATE PDU from ROUTER A, confirm that route information of ROUTER C is added.	OK / NG	/ /
Manual router disconnection at ROUTER C of ROUTER C-ROUTER A route	CEASE PDU transmission from ROUTER C	4-7-1	At ROUTER C, manually close the router connection to ROUTER A. Confirm ROUTER C sends a CEASE PDU to ROUTER A.	OK / NG	/ /
	CEASE PDU transmission from ROUTER A and route deletion	4-7-2	At ROUTER A, confirm receipt of CEASE PDU from ROUTER C. Confirm ROUTER A sends CEASE PDU to ROUTER C, and that route information for ROUTER C is deleted.	OK / NG	/ /

4. ATN Router Tests		Test Item	Procedure	Result	Date/Time
	Route deletion at ROUTER C	4-7-3	At ROUTER C, confirm receipt of CEASE PDU from ROUTER A, and that route information for ROUTER A and ROUTER B are deleted.	OK / NG	/ /
	VC disconnection between ROUTER C and ROUTER A	4-7-4	Confirm that the VC between ROUTER C and ROUTER A is closed normally.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER B, and route deletion	4-7-5	Confirm that ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, confirm that UPDATE PDU is received from ROUTER A, and that route information for ROUTER C is deleted.	OK / NG	/ /
Route re-activation from ROUTER C	Router connection re-activation from ROUTER C	4-8-1	At ROUTER C, manually initiate router connection to ROUTER A (VC call: called, OPEN PDU: receive). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER C	4-8-2	Confirm that ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, confirm UPDATE PDU is received, and that route information to ROUTER A and ROUTER B are added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER C to ROUTER A	4-8-3	Confirm that ROUTER C sends an UPDATE PDU to ROUTER A. At ROUTER A, confirm UPDATE PDU is received, and that route information to ROUTER C is added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER B and route addition	4-8-4	Confirm that ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, confirm that UPDATE PDU is received, and that route information to ROUTER C is added.	OK / NG	/ /
Manual router disconnection at ROUTER A of ROUTER C-ROUTER A route	CEASE PDU transmission from ROUTER A	4-9-1	At ROUTER A, manually close the router connection to ROUTER C. Confirm ROUTER A sends a CEASE PDU to ROUTER C.	OK / NG	/ /

4. ATN Router Tests		Test Item	Procedure	Result	Date/Time
	CEASE PDU transmission from ROUTER C and route deletion	4-9-2	At ROUTER C, confirm receipt of CEASE PDU from ROUTER A, and that route information for ROUTER A and ROUTER B are deleted.	OK / NG	/ /
	Route deletion at ROUTER A	4-9-3	At ROUTER A, confirm receipt of CEASE PDU from ROUTER C, and that route information for ROUTER C is deleted.	OK / NG	/ /
	VC disconnection between ROUTER C and ROUTER A	4-9-4	Confirm that the VC between ROUTER C and ROUTER A is closed normally.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER B, and route deletion	4-9-5	Confirm that ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, confirm UPDATE PDU is received from ROUTER A, and that route information for ROUTER C is deleted.	OK / NG	/ /
Route re-activation from ROUTER A	Router connection re-activation from ROUTER A	4-10-1	At ROUTER A, manually initiate router connection to ROUTER C (VC call: caller, OPEN PDU: send). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER C	4-10-2	Confirm that ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, confirm UPDATE PDU is received, and that route information to ROUTER A and ROUTER B are added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER C to ROUTER A	4-10-3	Confirm that ROUTER C sends an UPDATE PDU to ROUTER A. At ROUTER A, confirm UPDATE PDU is received, and that route information to ROUTER C is added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER B and route addition	4-10-4	Confirm that ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, confirm UPDATE PDU is received, and that route information to ROUTER C is added.	OK / NG	/ /

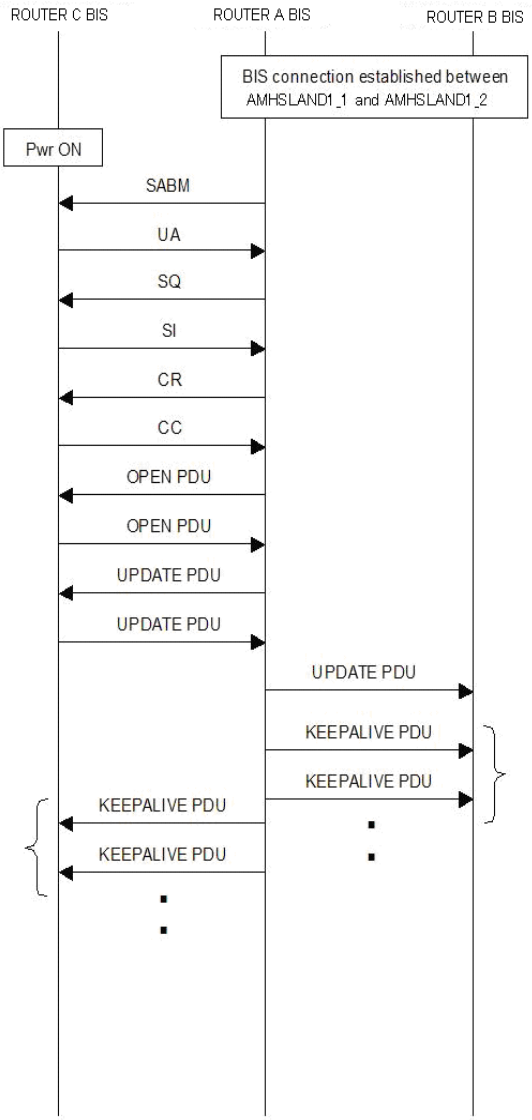
Test No.			Sequence Diagram
			
4	6	1	
4	6	2	
4	6	3	
4	6	4	
4	6	5	

Figure 20 Sequence: Router connection of ROUTER C to ROUTER A (ROUTER B-ROUTER A already established)

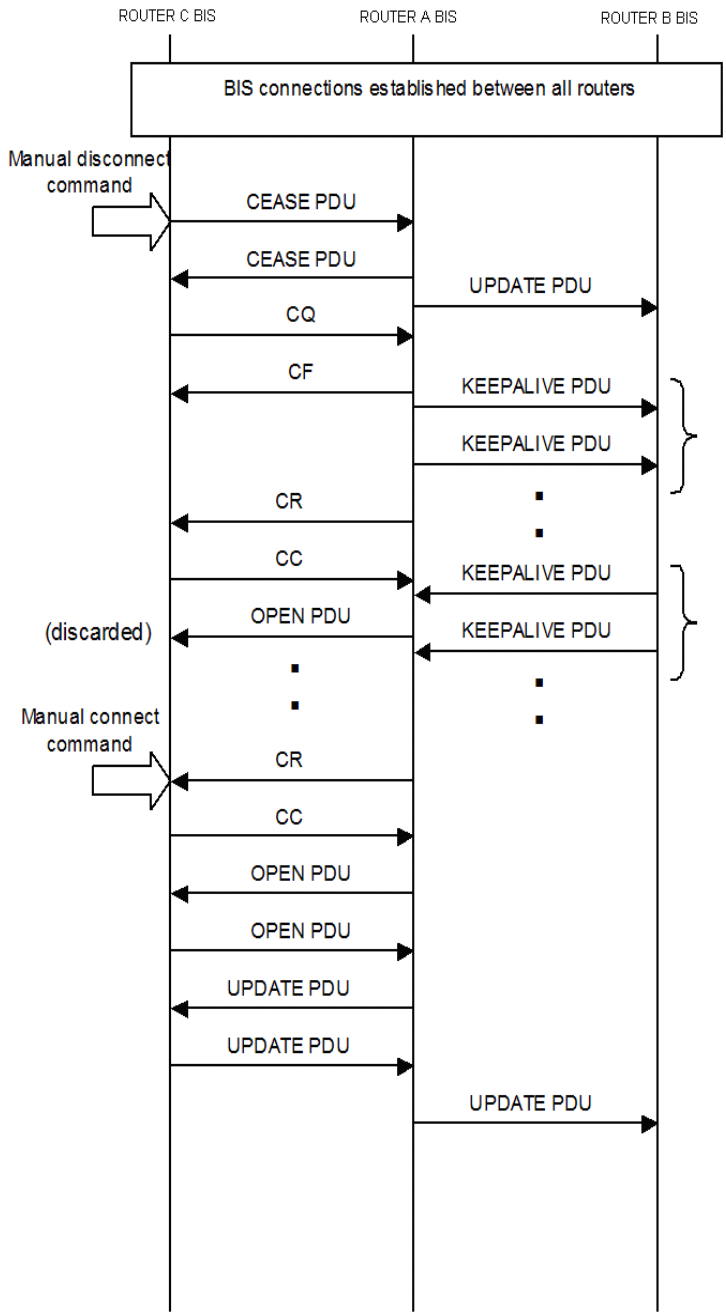
Test No.			Sequence Diagram
4	7	1	
4	7	2	
4	7	3	
4	7	4	
4	7	5	
4	8	1	
4	8	2	
4	8	3	
4	8	4	

Figure 21 Sequence: Manual router disconnection at ROUTER C of ROUTER C-ROUTER A route and re-activation

Test No.			Sequence Diagram
4	9	1	
4	9	2	
4	9	3	
4	9	4	
4	9	5	
4	10	1	
4	10	2	
4	10	3	
4	10	4	

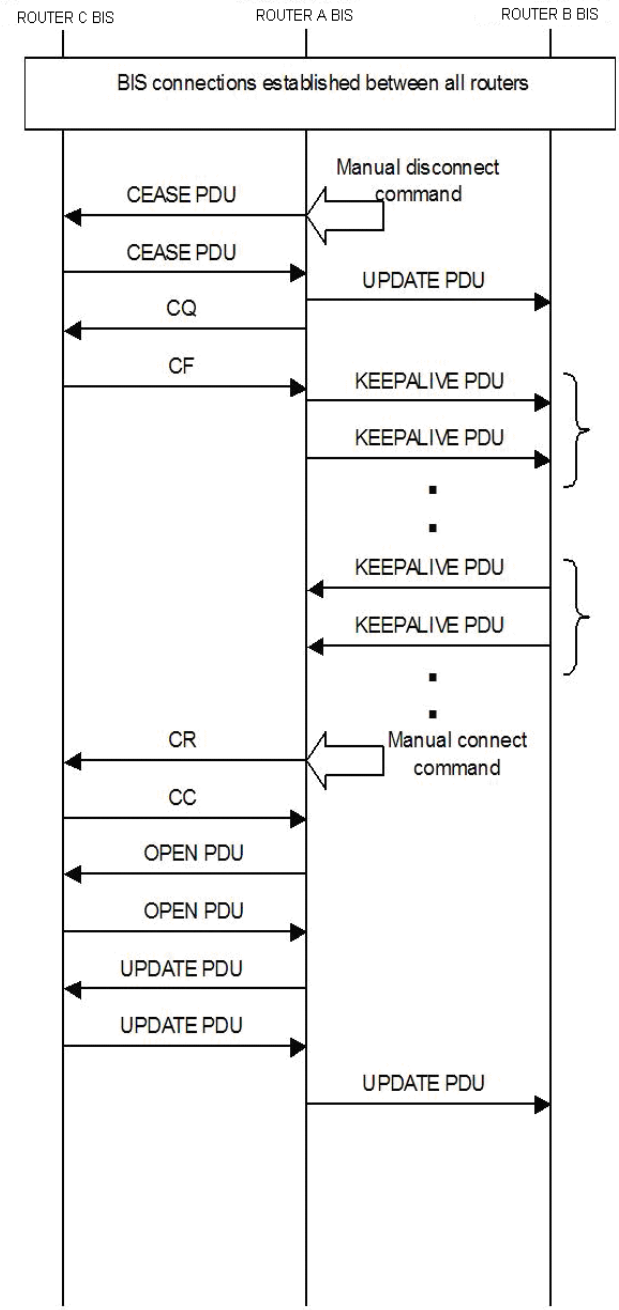


Figure 22 Sequence: Manual router disconnection at ROUTER A of ROUTER C-ROUTER A route and re-activation

Table 14 Communication Circuit Failure and Recovery Test Procedure: Third Domain connected to AMHSLAND1

4. ATN Router Tests		**Test Item**	**Procedure**	**Result**	**Date/Time**
Carrier media failure of ROUTER A-ROUTER B circuit and route deletion	Data link and VC disconnection	4-11-1	Simulate carrier medium failure between ROUTER A and ROUTER B by disconnecting WAN cable from ROUTER B. Check and confirm data link and VC are disconnected between ROUTER A and ROUTER B.	OK / NG	/ /
	IDRP disconnection and route update	4-11-2	Check and confirm that IDRP connection between ROUTER A and ROUTER B is closed. At ROUTER A, check that route information for ROUTER B is deleted. At ROUTER B, check that route information for ROUTER A and ROUTER C is deleted.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A and route update	4-11-3	Check that ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, check UPDATE PDU is received from ROUTER A, and that route information for ROUTER B is deleted.	OK / NG	/ /
Carrier media restoration of ROUTER A-ROUTER B circuit and route addition	Data link, VC, and router connection re-establishment	4-12-1	Restore the ROUTER A-ROUTER B router connection. Confirm router connection is re-established between ROUTER A and ROUTER B.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A	4-12-2	After IDRP connection is established, confirm that ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, check that an UPDATE PDU is received from ROUTER A, and that route information for ROUTER A and ROUTER C are added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER B	4-12-3	After receiving UPDATE PDU from ROUTER A, check that ROUTER B sends an UPDATE PDU to ROUTER A. At ROUTER A, after receiving UPDATE PDU from ROUTER B, check that route information is added for ROUTER B.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A	4-12-4	Check that ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, check that an UPDATE PDU is received from ROUTER A, and that route information is added for ROUTER B.	OK / NG	/ /

4. ATN Router Tests		**Test Item**	**Procedure**	**Result**	**Date/Time**
Carrier media failure of ROUTER C-ROUTER A circuit and route deletion	Data link and VC disconnection	4-13-1	Simulate carrier medium failure between ROUTER C and ROUTER A by disconnecting WAN cable from ROUTER C. Check and confirm data link and VC are disconnected between ROUTER C and ROUTER A.	OK / NG	/ /
	IDRP disconnection and route update	4-13-2	Check and confirm that IDRP connection between ROUTER C and ROUTER A is closed. At ROUTER C, check that route information for ROUTER A and ROUTER B are deleted. At ROUTER A, check that route information for ROUTER C is deleted.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A and route update	4-13-3	Check that ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, check that UPDATE PDU is received from ROUTER A, and that route information for ROUTER C is deleted.	OK / NG	/ /
Carrier media restoration of ROUTER C-ROUTER A circuit and route addition	Data link, VC, and Router connection re-establishment	4-14-1	Restore the ROUTER C-ROUTER A router connection. Confirm router connection is re-established between ROUTER C and ROUTER A.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A	4-14-2	After IDRP connection is established, confirm that ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, check that an UPDATE PDU is received from ROUTER A, and that route information for ROUTER A and ROUTER B are added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER C	4-14-3	After receiving UPDATE PDU from ROUTER A, check that ROUTER C sends an UPDATE PDU to ROUTER A. At ROUTER A, after receiving UPDATE PDU from ROUTER C, check that route information is added for ROUTER C.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A	4-14-4	Check that ROUTER A sends an UPDATE PDU to ROUTER B. At ROUTER B, check that an UPDATE PDU is received from ROUTER A, and that route information is added for ROUTER C.	OK / NG	/ /

Test No.			Sequence Diagram
4	11	1	
4	11	2	
4	11	3	
4	12	1	
4	12	2	
4	12	3	
4	12	4	

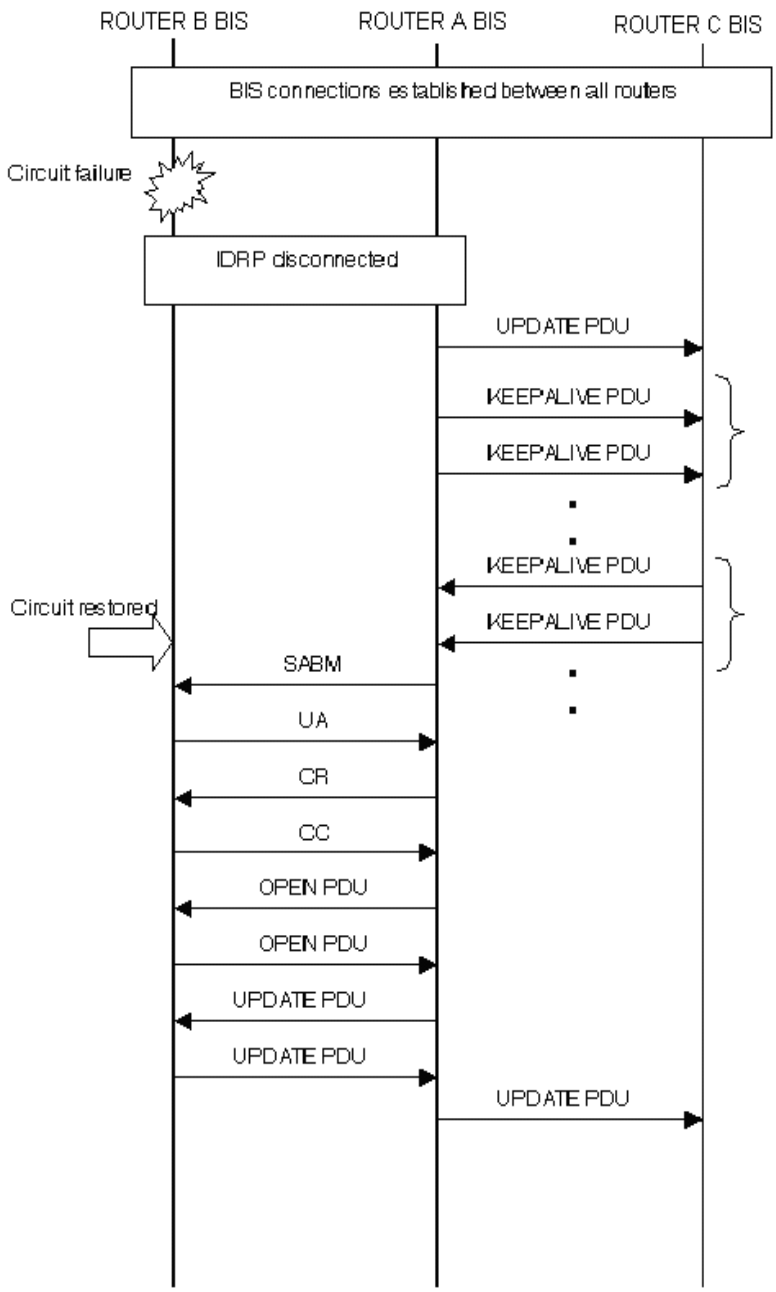


Figure 23 Sequence: Failure and recovery of ROUTER B-ROUTER A circuit

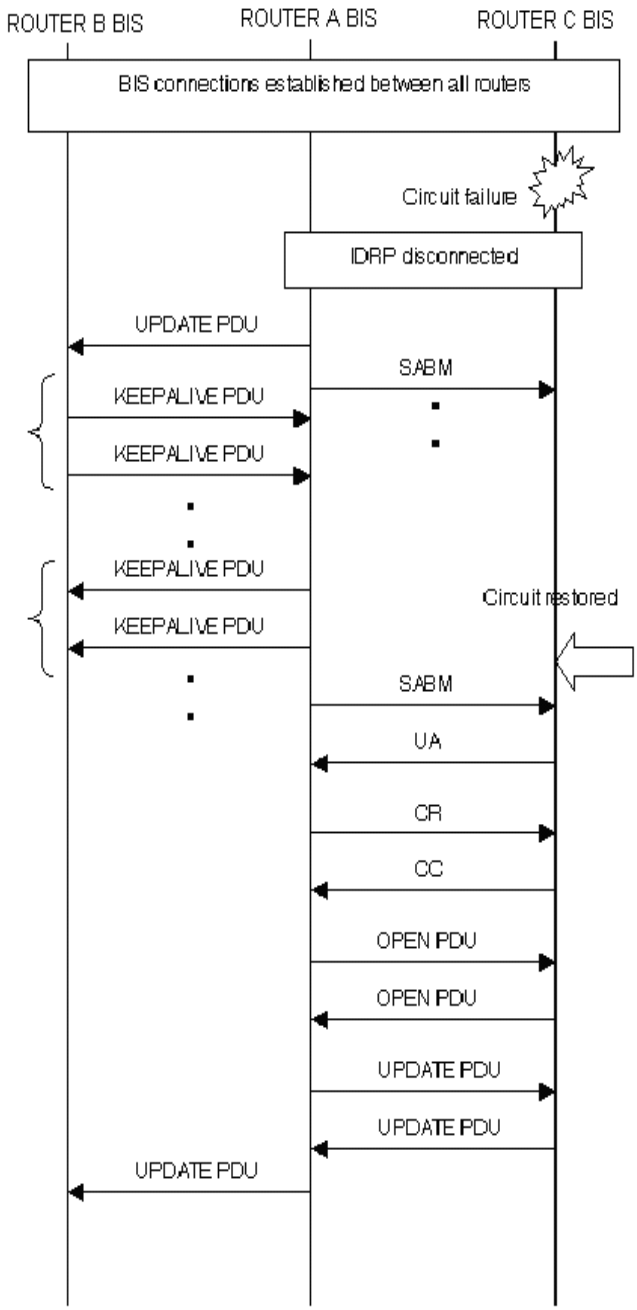
Test No.			Sequence Diagram
4	13	1	
4	13	2	
4	13	3	
4	14	1	
4	14	2	
4	14	3	
4	14	4	

Figure 24 Sequence: Failure and recovery of ROUTER C-ROUTER A circuit

Table 15 Router Failure and Recovery Test Procedure

4. ATN Router Tests		**Test Item**	**Procedure**	**Result**	**Date/Time**
Failure and recovery of ROUTER C	Failure of ROUTER C	4-15-1	Simulate failure and recovery of ROUTER C by rebooting the router. At failure: ・ At ROUTER A, check that routing information for ROUTER C is deleted. ・ At ROUTER B, check that routing information for ROUTER C is deleted.	OK / NG	/ /
	Recovery of ROUTER C	4-15-2	Check that the ROUTER C-ROUTER A router connection is automatically re-established after ROUTER C recovers. After recovery: ・At ROUTER A, check that routing information for ROUTER C is added. ・At ROUTER B, check that routing information for ROUTER C is added.	OK / NG	/ /
Failure and recovery of ROUTER A	Failure of ROUTER A	4-16-1	Simulate failure and recovery of ROUTER A by forcing failover. At failure: ・At ROUTER B, check that routing information for ROUTER A and ROUTER C are deleted ・At ROUTER C, check that routing information for ROUTER A and ROUTER B are deleted.	OK / NG	/ /

4. ATN Router Tests		**Test Item**	**Procedure**	**Result**	**Date/Time**
	Recovery of ROUTER A	4-16-2	Check that the ROUTER C-ROUTER A and ROUTER A-ROUTER B router connections are automatically re-established after ROUTER A recovers. After recovery: ・At ROUTER A, check that routing information is added for ROUTER C and ROUTER B. ・At ROUTER B, check that routing information for ROUTER C and ROUTER A are added. ・At ROUTER C, check that routing information for ROUTER A and ROUTER B are added.	OK / NG	/ /
Failure and recovery of ROUTER B	Failure of ROUTER B	4-17-1	Simulate failure and recovery of ROUTER B by rebooting the router. At failure: ・At ROUTER A, check that routing information for ROUTER B is deleted. ・At ROUTER C, check that routing information for ROUTER B is deleted.	OK / NG	/ /
	Recovery of ROUTER B	4-17-2	Check that the ROUTER A-ROUTER B router connection is automatically re-established after ROUTER B recovers. After recovery: ・At ROUTER A, check that routing information for ROUTER B is added. ・At ROUTER C, check that routing information for ROUTER B is added. ・At ROUTER B, check that routing information for ROUTER A and ROUTER C are added.	OK / NG	/ /

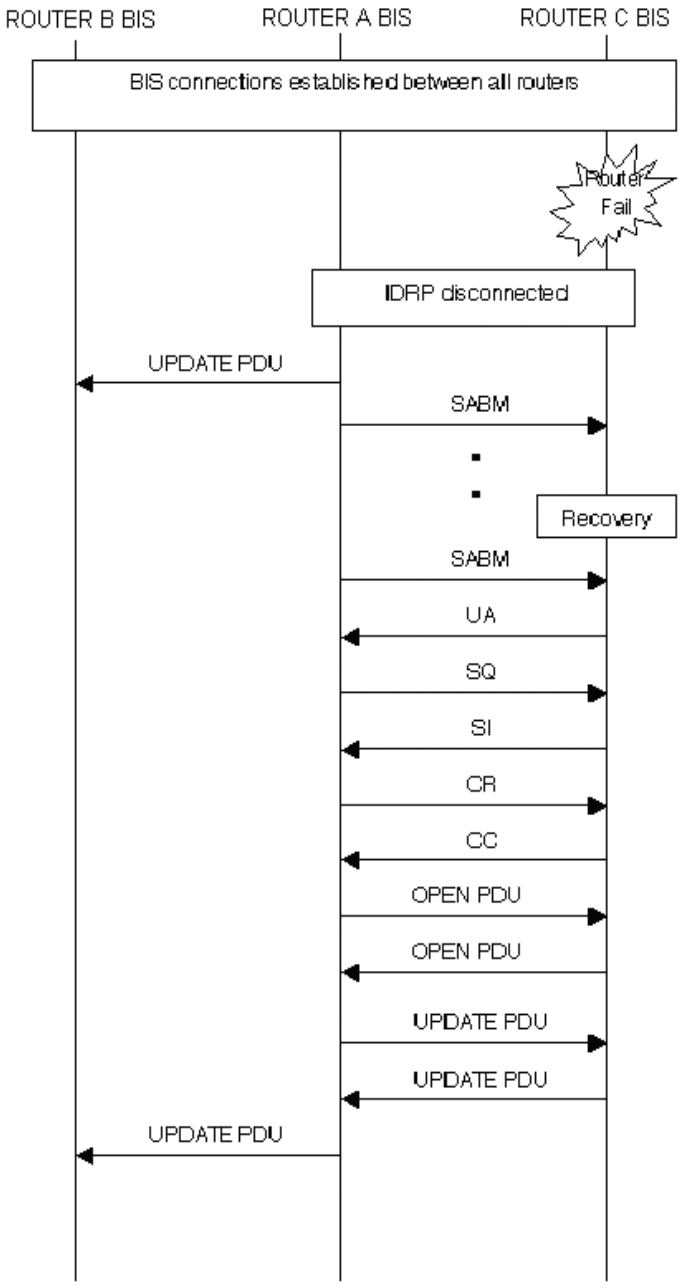
Test No.			Sequence Diagram
4	15	1	
4	15	2	

Figure 25 Sequence: Failure and Recovery of ROUTER C

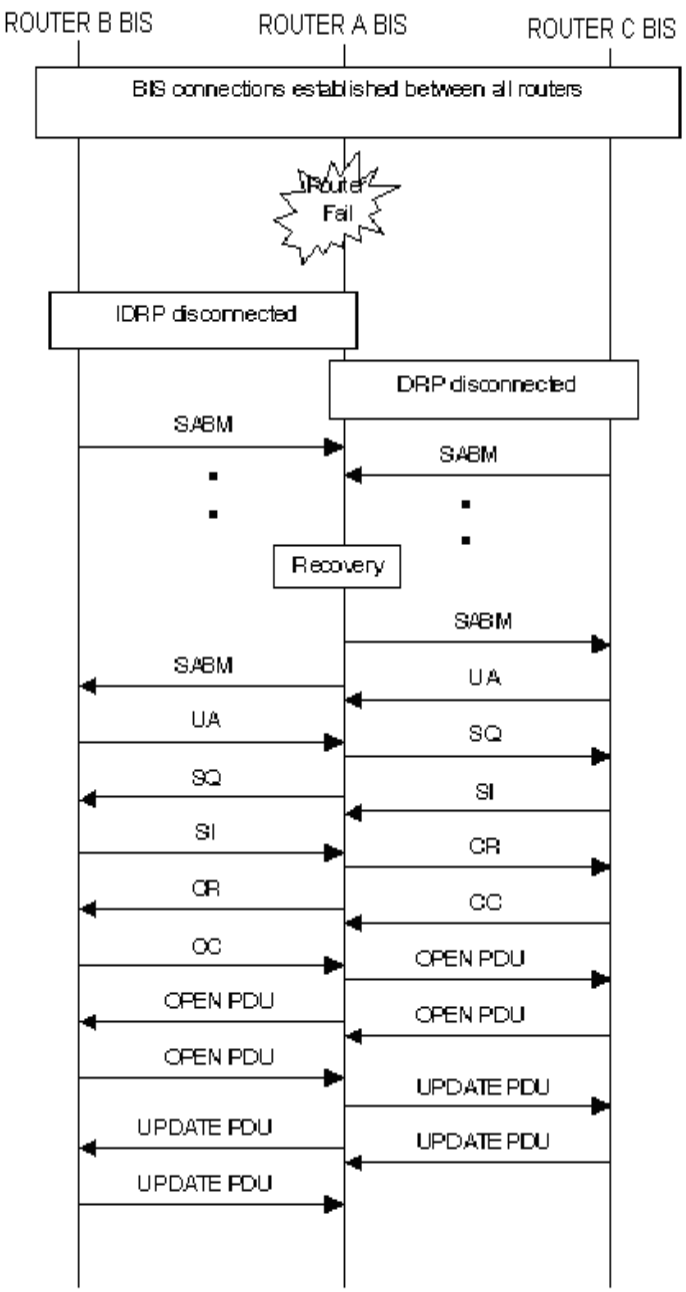
Test No.			Sequence Diagram
4	16	1	
4	16	2	

Figure 26 Sequence: Failure and Recovery of ROUTER A

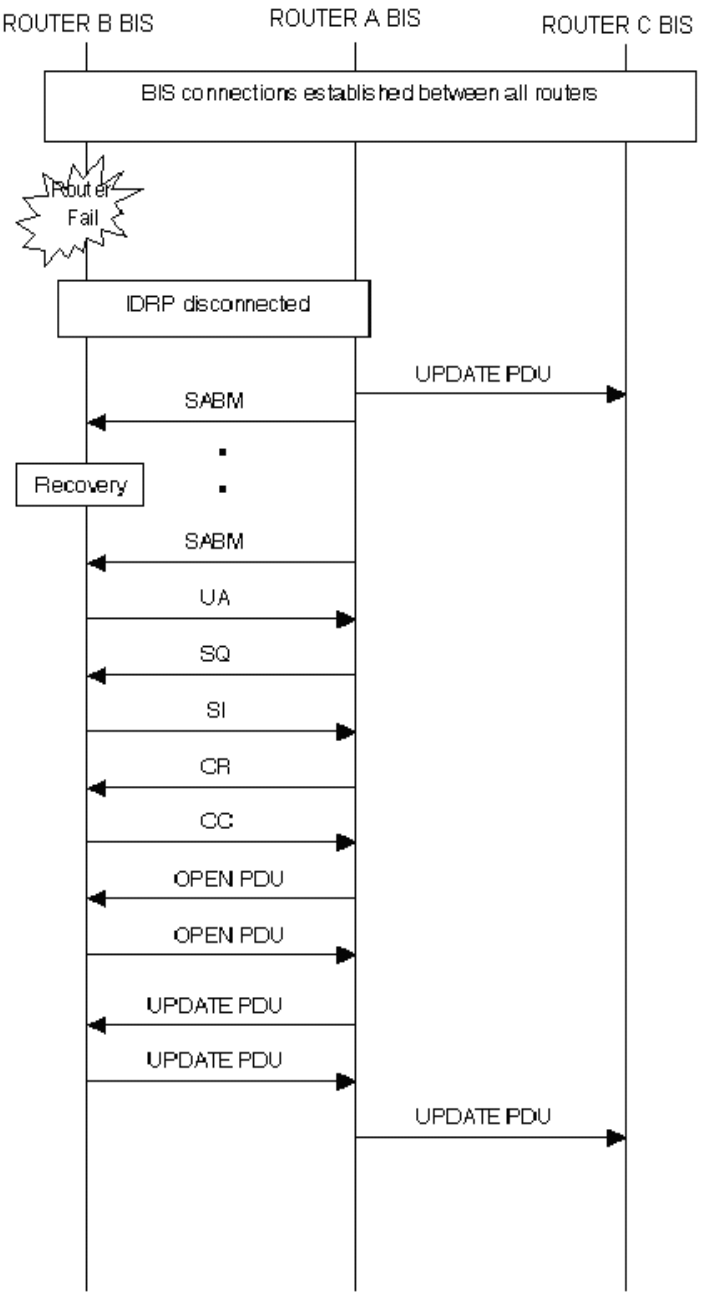
Test No.			Sequence Diagram
4	17	1	
4	17	2	

Figure 27 Sequence: Failure and Recovery of ROUTER B

Table 16 End-to-End CLNP Echo Test Procedure

4. ATN Router Tests		**Test Item**	**Procedure**	**Result**	**Date/Time**
End-to-End CLNP Echo Test between end systems in ROUTER C domain and ROUTER B domain	ERQ transmission	4-18-1	Send ERQ PDU from ES in ROUTER C domain to ES in ROUTER B domain. Confirm receipt of ERQ PDU at ES in ROUTER B domain.	OK / NG	/ /
	ERP transmission	4-18-2	Send ERP PDU from ES in ROUTER B domain to ES in ROUTER C domain. Confirm receipt of ERP PDU at ES in ROUTER C domain.	OK / NG	/ /
	Continuous ERQ/ERP transmission	4-18-3	Repeat 4-18-1 to 4-18-2 ten times to confirm that there is no problem with ERQ/ERP transmission and relay through the ROUTER A.	OK / NG	/ /
	ERQ transmission	4-18-4	Send ERQ PDU from ES in ROUTER B domain to ES in ROUTER C domain. Confirm receipt of ERQ PDU at ES in ROUTER C domain.	OK / NG	/ /
	ERP transmission	4-18-5	Send ERP PDU from ES in ROUTER B domain to ES in ROUTER C domain. Confirm receipt of ERP PDU at ES in ROUTER C domain.	OK / NG	/ /
	Continuous ERQ/ERP transmission	4-18-6	Repeat 4-18-4 to 4-18-6 ten times to confirm that there is no problem with ERQ/ERP transmission and relay through the ROUTER A.	OK / NG	/ /

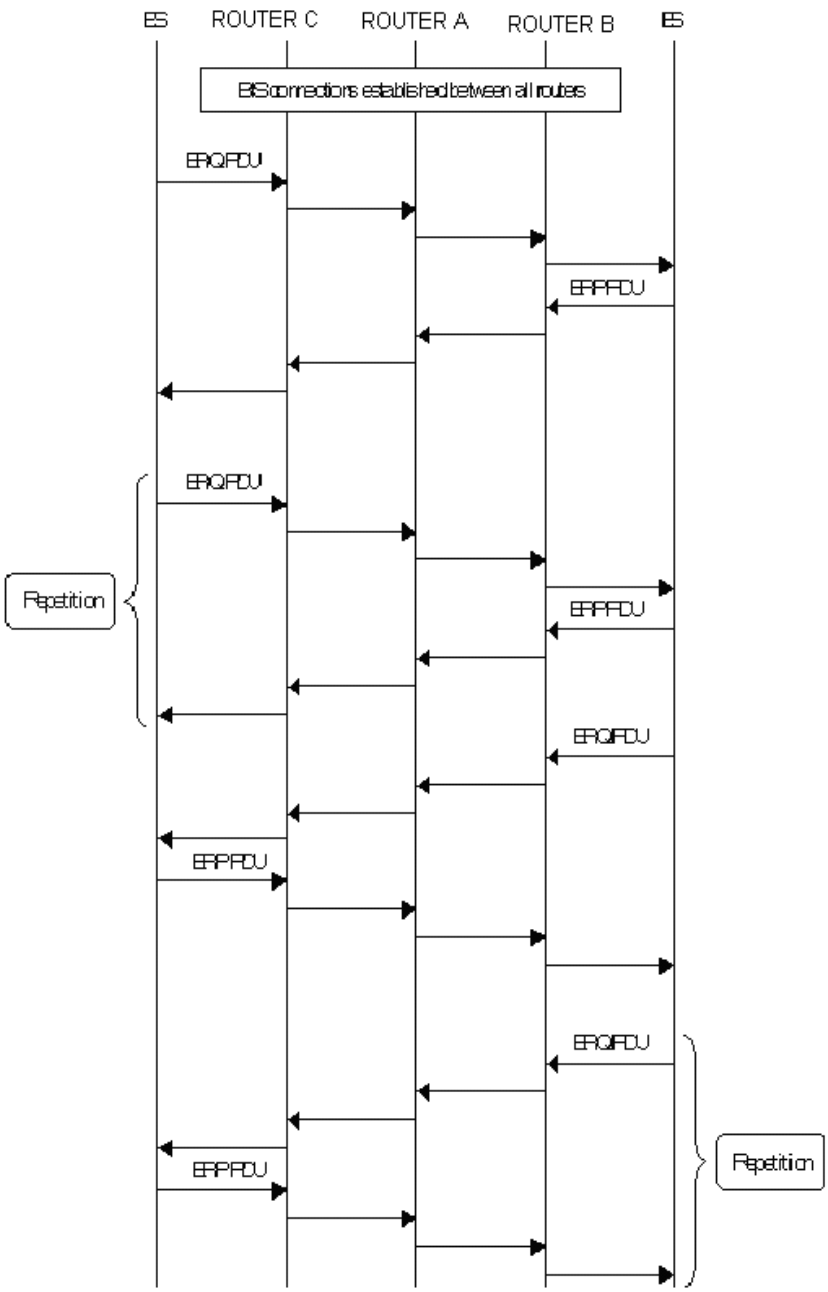
Test No.			Sequence Diagram
4	18	1	
4	18	2	
4	18	3	
4	18	4	
4	18	5	
4	18	6	

Figure 28 Sequence: End-to-End CLNP Echo Tests

6.5. Test Case 5: ATN Router Network Test

a) Objective

Technical trial to verify multiple router addition/deletion, carrier medium failure/restoration and router failure/recovery with routers connected in three-domain configurations i.e. AMHSLAND1, AMHSLAND2 and AMHSLAND3. The test will also verify routing table updates and automatic re-route. The test configurations are as shown below.

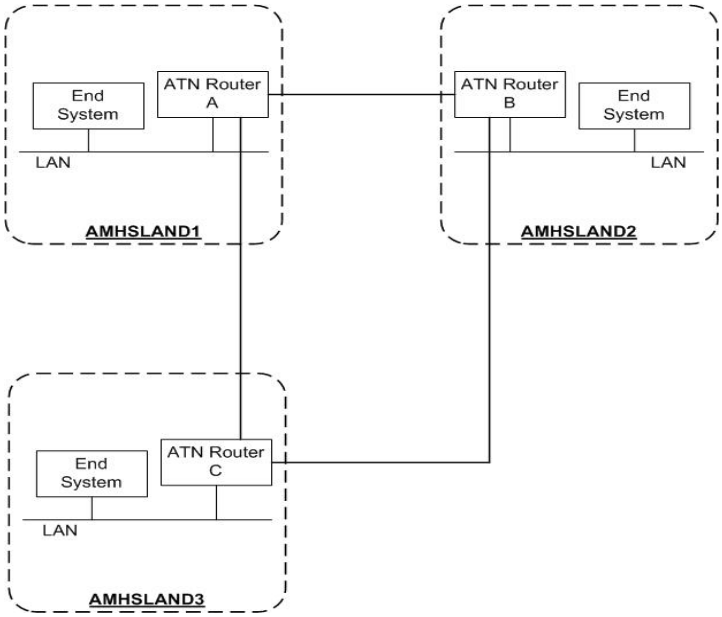


Figure 29 Test Configuration: Routers connected in three-domain configuration

b) Test Overview

(i) Router connected in three-domain configurations

ROUTER CONNECTION AND ECHO REQUEST (TABLE 17)

5-1: Router connection of ROUTER A to ROUTER B (ROUTER A-ROUTER C and ROUTER B-ROUTER C established).

5-2: Echo test between all routers.

ROUTER DISCONNECTION AND RE-ACTIVATION (TABLE 18)

5-3, 5-4: Manual router disconnection at ROUTER A of ROUTER A-ROUTER B route and re-activation.

5-5, 5-6: Manual router disconnection at ROUTER B of ROUTER B-ROUTER C route and re-activation.

5-7, 5-8: Manual router disconnection at ROUTER C of ROUTER C-ROUTER A route and re-activation.

COMMUNICATION CIRCUIT FAILURE AND RECOVERY (TABLE 19)

5-9, 5-10: Failure and recovery of ROUTER A-ROUTER B circuit.

5-11, 5-12: Failure and recovery of ROUTER B-ROUTER C circuit.

5-13, 5-14: Failure and recovery of ROUTER C-ROUTER A circuit.

ROUTER FAILURE AND RECOVERY (TABLE 20)

5-15: Failure and recovery of ROUTER A.

5-16: Failure and recovery of ROUTER B.

5-17: Failure and recovery of ROUTER C.

ROUTER CONNECTION AND ECHO REQUEST (TABLE 21)

5-18: Echo test between all routers.

Table 17 Router Connection and Echo Test Procedure: Routers A, B, C

5. ATN Router Network Test		**Test Item**	**Procedure**	**Result**	**Date/Time**
Router connection of ROUTER A to ROUTER B	Data link establishment between ROUTER A and ROUTER B	5-1-1	With VC and IDRP connections established between ROUTER A and ROUTER C and also ROUTER B and ROUTER C, initiate the router connection between ROUTER A and ROUTER B. Check and confirm data link and VC are established between ROUTER A and ROUTER B.	OK / NG	/ /
	IDRP connection establishment between ROUTER A and ROUTER B	5-1-2	After VC establishment, check and confirm IDRP connection established between ROUTER A and ROUTER B by exchange of OPEN PDUs.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER B	5-1-3	After IDRP connection established, confirm ROUTER A sends UPDATE PDUs to ROUTER B. At ROUTER B, after receiving UPDATE PDUs from ROUTER A, check that route information on ROUTER A via one direct hop is added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER B to ROUTER A	5-1-4	After IDRP connection established, confirm ROUTER B sends UPDATE PDUs to ROUTER A. At ROUTER A, after receiving UPDATE PDUs from ROUTER B, check that route information on ROUTER B via one direct hop is added.	OK / NG	/ /
CLNP Echo Test between routers	ERQ transmission	5-2-1	Send ERQ PDU from ROUTER A to each of the other 2 routers (B, C). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /
	ERQ transmission	5-2-2	Send ERQ PDU from ROUTER B to each of the other 2 routers (A, C). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /
	ERQ transmission	5-2-3	Send ERQ PDU from ROUTER C to each of the other 2 routers (A, B). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /

Table 18 Router Disconnection and Re-activation Test Procedure: Routers A, B, C

5. ATN Router Network Test		**Test Item**	**Procedure**	**Result**	**Date/Time**
Manual router disconnection at ROUTER A of ROUTER A-ROUTER B route	CEASE PDU transmission from ROUTER A	5-3-1	At ROUTER A, manually close the router connection to ROUTER B. Confirm ROUTER A sends a CEASE PDU to ROUTER B.	OK / NG	/ /
	CEASE PDU transmission from ROUTER B and route update	5-3-2	At ROUTER B, confirm receipt of CEASE PDU from ROUTER A. Confirm ROUTER B sends a CEASE PDU to ROUTER A and that route to ROUTER A is now via ROUTER C.	OK / NG	/ /
	Route update at ROUTER A	5-3-3	At ROUTER A, confirm receipt of CEASE PDU from ROUTER B, and that route to ROUTER B is now via ROUTER C.	OK / NG	/ /
	VC disconnection between ROUTER A and ROUTER B	5-3-4	Confirm that the VC between ROUTER A and ROUTER B is closed normally.	OK / NG	/ /
	ERQ transmission	5-3-5	Send ERQ PDU from ROUTER A to ROUTER B. Confirm receipt of ERP PDU from ROUTER B.	OK / NG	/ /
	ERQ transmission	5-3-6	Send ERQ PDU from ROUTER B to ROUTER A. Confirm receipt of ERP PDU from ROUTER A.	OK / NG	/ /
Route re-activation from ROUTER A	Router connection re-activation from ROUTER A	5-4-1	At ROUTER A, manually initiate router connection to ROUTER B (VC call: caller, OPEN PDU: send). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	Routing table entries for ROUTER A	5-4-2	Following the exchange of UPDATE PDUs, verify at ROUTER A that route information for ROUTER B is updated, and that the route to ROUTER B is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER B	5-4-3	Following the exchange of UPDATE PDUs, verify at ROUTER B that route information for ROUTER A is updated, and that the route to ROUTER A is one direct hop.	OK / NG	/ /

5. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
Manual router disconnection at ROUTER B of ROUTER B-ROUTER C route	CEASE PDU transmission from ROUTER B	5-5-1	At ROUTER B, manually close the router connection to ROUTER C. Confirm ROUTER B sends a CEASE PDU to ROUTER C.	OK / NG	/ /
	CEASE PDU transmission from ROUTER C and route update	5-5-2	At ROUTER C, confirm receipt of CEASE PDU from ROUTER B. Confirm ROUTER C sends a CEASE PDU to ROUTER B and that route to ROUTER B is now via ROUTER A.	OK / NG	/ /
	Route update at ROUTER B	5-5-3	At ROUTER B, confirm receipt of CEASE PDU from ROUTER C, and that route to ROUTER C is now via ROUTER A.	OK / NG	/ /
	VC disconnection between ROUTER B and ROUTER C	5-5-4	Confirm that the VC between ROUTER B and ROUTER C is closed normally.	OK / NG	/ /
	ERQ transmission	5-5-5	Send ERQ PDU from ROUTER B to ROUTER C. Confirm receipt of ERP PDU from ROUTER C.	OK / NG	/ /
	ERQ transmission	5-5-6	Send ERQ PDU from ROUTER C to ROUTER B. Confirm receipt of ERP PDU from ROUTER B.	OK / NG	/ /
Route re-activation from ROUTER B	Router connection re-activation from ROUTER B	5-6-1	At ROUTER B, manually initiate router connection to ROUTER C (VC call: caller, OPEN PDU: send). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	Routing table entries for ROUTER B	5-6-2	Following the exchange of UPDATE PDUs, verify at ROUTER B that route information for ROUTER C is updated, and that the route to ROUTER C is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER C	5-6-3	Following the exchange of UPDATE PDUs, verify at ROUTER C that route information for ROUTER B is updated, and that the route to ROUTER B is one direct hop.	OK / NG	/ /

5. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
Manual router disconnection at ROUTER C of ROUTER C-ROUTER A route	CEASE PDU transmission from ROUTER C	5-7-1	At ROUTER C, manually close the router connection to ROUTER A. Confirm ROUTER C sends a CEASE PDU to ROUTER A.	OK / NG	/ /
	CEASE PDU transmission from ROUTER A and route update	5-7-2	At ROUTER A, confirm receipt of CEASE PDU from ROUTER C. Confirm ROUTER A sends a CEASE PDU to ROUTER C and that route to ROUTER C is now via ROUTER B.	OK / NG	/ /
	Route update at ROUTER C	5-7-3	At ROUTER C, confirm receipt of CEASE PDU from ROUTER A, and that route to ROUTER A is now via ROUTER B.	OK / NG	/ /
	VC disconnection between ROUTER C and ROUTER A	5-7-4	Confirm that the VC between ROUTER C and ROUTER A is closed normally.	OK / NG	/ /
	ERQ transmission	5-7-5	Send ERQ PDU from ROUTER A to ROUTER C. Confirm receipt of ERP PDU from ROUTER C.	OK / NG	/ /
	ERQ transmission	5-7-6	Send ERQ PDU from ROUTER C to ROUTER A. Confirm receipt of ERP PDU from ROUTER A.	OK / NG	/ /
Route re-activation from ROUTER C	Router connection re-activation from ROUTER C	5-8-1	At ROUTER C, manually initiate router connection to ROUTER A (VC call: caller, OPEN PDU: send). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	Routing table entries for ROUTER C	5-8-2	Following the exchange of UPDATE PDUs, verify at ROUTER C that route information for ROUTER A is updated, and that the route to ROUTER A is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER A	5-8-3	Following the exchange of UPDATE PDUs, verify at ROUTER A that route information for ROUTER C is updated, and that the route to ROUTER C is one direct hop.	OK / NG	/ /

Sequence diagram to be inserted

Table 19 Communication Circuit Failure and Recovery Test Procedure: Routers A, B, C

5. ATN Router Network Test		**Test Item**	**Procedure**	**Result**	**Date/Time**
Carrier media failure of ROUTER A-ROUTER B circuit and route deletion	Data link and VC disconnection	5-9-1	Simulate carrier medium failure between ROUTER A and ROUTER B by disconnecting WAN cable from ROUTER A. Check and confirm data link and VC are disconnected between ROUTER A and ROUTER B.	OK / NG	/ /
	IDRP disconnection and route update	5-9-2	Check and confirm that IDRP connection between ROUTER A and ROUTER B is closed. At ROUTER A, check that route information for ROUTER B via one direct hop is deleted. At ROUTER B, check that route information for ROUTER A via one direct hop is deleted.	OK / NG	/ /
	ERQ transmission	5-9-3	Send ERQ PDU from ROUTER A to each of the other 2 routers (B, C). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /
	ERQ transmission	5-9-4	Send ERQ PDU from ROUTER B to each of the other 2 routers (A, C). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /
Carrier media restoration of ROUTER A-ROUTER B circuit and route addition	Data link, VC, and router connection re-establishment	5-10-1	Restore the ROUTER A-ROUTER B router connection. Confirm router connection is re-established between ROUTER A and ROUTER B.	OK / NG	/ /
	Routing table entries for ROUTER A	5-10-2	Following the exchange of UPDATE PDUs, verify at ROUTER A that route information for ROUTER B and ROUTER C exists, and that the route to ROUTER B is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER B	5-10-3	Following the exchange of UPDATE PDUs, verify at ROUTER B that route information for ROUTER A and ROUTER C exists, and that the route to ROUTER A is one direct hop.	OK / NG	/ /
Carrier media failure of ROUTER B-ROUTER C circuit	Data link and VC disconnection	5-11-1	Simulate carrier medium failure between ROUTER B and ROUTER C by disconnecting WAN cable from ROUTER B. Check and confirm data link and VC are disconnected between ROUTER B and ROUTER C.	OK / NG	/ /

5. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
	IDRP disconnection and route update	5-11-2	Check and confirm that IDRP connection between ROUTER B and ROUTER C is closed. At ROUTER B, check that route information for ROUTER C via one direct hop is deleted. At ROUTER C, check that route information for ROUTER B via one direct hop is deleted.	OK / NG	/ /
	ERQ transmission	5-11-3	Send ERQ PDU from ROUTER B to each of the other 2 routers (A, C). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /
	ERQ transmission	5-11-4	Send ERQ PDU from ROUTER C to each of the other 2 routers (A, B). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /
Carrier media restoration of ROUTER B-ROUTER C circuit and route addition	Data link, VC, and router connection re-establishment	5-12-1	Restore the ROUTER B-ROUTER C router connection. Confirm router connection is re-established between ROUTER B and ROUTER C.	OK / NG	/ /
	Routing table entries for ROUTER A	5-12-2	Following the exchange of UPDATE PDUs, verify at ROUTER B that route information for ROUTER A and ROUTER C exists, and that the route to ROUTER C is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER B	5-12-3	Following the exchange of UPDATE PDUs, verify at ROUTER C that route information for ROUTER A and ROUTER B exists, and that the route to ROUTER B is one direct hop.	OK / NG	/ /
Carrier media failure of ROUTER C-ROUTER A circuit	Data link and VC disconnection	5-13-1	Simulate carrier medium failure between ROUTER C and ROUTER A by disconnecting WAN cable from ROUTER C. Check and confirm data link and VC are disconnected between ROUTER C and ROUTER A.	OK / NG	/ /
	IDRP disconnection and route update	5-13-2	Check and confirm that IDRP connection between ROUTER C and ROUTER A is closed. At ROUTER C, check that route information for ROUTER A via one direct hop is deleted. At ROUTER A, check that route information for ROUTER C via one direct hop is deleted.	OK / NG	/ /

5. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
	ERQ transmission	5-13-3	Send ERQ PDU from ROUTER C to each of the other 2 routers (B, A). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /
	ERQ transmission	5-13-4	Send ERQ PDU from ROUTER A to each of the other 2 routers (B, C). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /
Carrier media restoration of ROUTER C-ROUTER A circuit and route addition	Data link, VC, and router connection re-establishment	5-14-1	Restore the ROUTER C-ROUTER A router connection. Confirm router connection is re-established between ROUTER C and ROUTER A.	OK / NG	/ /
	Routing table entries for ROUTER A	5-14-2	Following the exchange of UPDATE PDUs, verify at ROUTER C that route information for ROUTER B and ROUTER A exists, and that the route to ROUTER A is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER B	5-14-3	Following the exchange of UPDATE PDUs, verify at ROUTER A that route information for ROUTER B and ROUTER C exists, and that the route to ROUTER C is one direct hop.	OK / NG	/ /

Sequence diagram to be inserted

Table 20 Router Failure and Recovery Test Procedure: Routers A, B, C

5. ATN Router Network Test		**Test Item**	**Procedure**	**Result**	**Date/Time**
Failure and recovery of ROUTER A	Failure of ROUTER A	5-15-1	Simulate failure and recovery of ROUTER A by rebooting the router. At failure: ・At ROUTER B, verify that routing information for ROUTER A is deleted, but that routing information for ROUTER C remains. ・At ROUTER C, verify that routing information for ROUTER A is deleted, but that routing information for ROUTER B remains.	OK / NG	/ /
	Recovery of ROUTER A	5-15-2	Check that the ROUTER A-ROUTER B and ROUTER A-ROUTER C router connections are automatically re-established after ROUTER A recovers. After recovery: ・At ROUTER A, check that routing information is added for ROUTER B and ROUTER C. ・At ROUTER B, check that routing information for ROUTER A is added. ・At ROUTER C, check that routing information for ROUTER A is added.	OK / NG	/ /
Failure and recovery of ROUTER B	Failure of ROUTER B	5-16-1	Simulate failure and recovery of ROUTER B by rebooting the router. At failure: ・At ROUTER A, verify that routing information for ROUTER B is deleted, but that routing information for ROUTER C remains. ・At ROUTER C, verify that routing information for ROUTER B is deleted, but that routing information for ROUTER A remains.	OK / NG	/ /

5. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
	Recovery of ROUTER B	5-16-2	Check that the ROUTER A-ROUTER B and ROUTER B-ROUTER C router connections are automatically re-established after ROUTER B recovers. After recovery: ・At ROUTER B, check that routing information is added for ROUTER A and ROUTER C. ・At ROUTER A, check that routing information for ROUTER B is added. ・At ROUTER C, check that routing information for ROUTER B is added..	OK / NG	/ /
Failure and recovery of ROUTER C	Failure of ROUTER C	5-17-1	Simulate failure and recovery of ROUTER C by rebooting the router. At failure: ・At ROUTER A, verify that routing information for ROUTER C is deleted, but that routing information for ROUTER B remains. ・At ROUTER B, verify that routing information for ROUTER C is deleted, but that routing information for ROUTER A remains.	OK / NG	/ /
	Recovery of ROUTER C	5-17-2	Check that the ROUTER A-ROUTER C and ROUTER C-ROUTER B router connections are automatically re-established after ROUTER C recovers. After recovery: ・At ROUTER C, check that routing information is added for ROUTER A and ROUTER B. ・At ROUTER A, check that routing information for ROUTER C is added. ・At ROUTER B, check that routing information for ROUTER C is added.	OK / NG	/ /

Sequence diagram to be inserted

Table 21 Echo Test Procedure: Routers A, B, C

5. ATN Router Network Test		**Test Item**	**Procedure**	**Result**	**Date/Time**
CLNP Echo Test between routers	ERQ transmission	5-18-1	Send ERQ PDU from ROUTER A to each of the other 2 routers (B, C). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /
	ERQ transmission	5-18-2	Send ERQ PDU from ROUTER B to each of the other 2 routers (A, C). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	5-18-3	Send ERQ PDU from ROUTER C to each of the other 2 routers (A, B). Confirm receipt of ERP PDU from each of the 2 routers.	OK / NG	/ /

Sequence diagram to be inserted

6.6. Test Case 6: ATN Router Network Test

a) Objective

Technical trial to verify multiple router addition/deletion, carrier medium failure/restoration and router failure/recovery with routers connected in four-domain configurations i.e. AMHSLAND1, AMHSLAND2, AMHSLAND3 and AMHSLAND4. The test will also verify routing table updates and automatic re-route. The test configurations are as shown below.

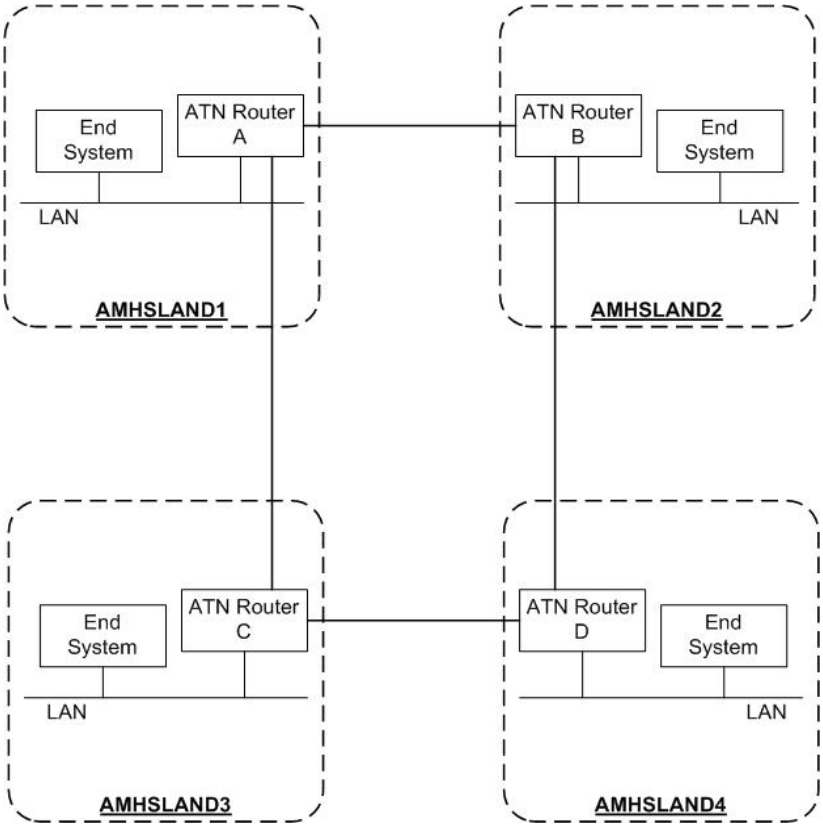


Figure 30 Test Configuration: Routers connected in three-domain configuration

b) Test Overview

(i) Router connected in four-domain configurations

ROUTER CONNECTION AND ECHO REQUEST (TABLE 22)

6-1: Router connection of ROUTER A to ROUTER B (ROUTER A-ROUTER C and ROUTER B-ROUTER D established).

6-2: Router connection of ROUTER C to ROUTER D.

6-3: Echo test between all routers.

ROUTER DISCONNECTION AND RE-ACTIVATION (TABLE 23)

6-4, 6-5: Manual router disconnection at ROUTER A of ROUTER A-ROUTER B route and re-activation.

6-6, 6-7: Manual router disconnection at ROUTER B of ROUTER B-ROUTER D route and re-activation.

6-8, 6-9: Manual router disconnection at ROUTER D of ROUTER D-ROUTER C route and re-activation.

6-10, 6-11: Manual router disconnection at ROUTER C of ROUTER C-ROUTER A route and re-activation.

COMMUNICATION CIRCUIT FAILURE AND RECOVERY (TABLE 24)

6-12, 6-13: Failure and recovery of ROUTER A-ROUTER B circuit.

6-14, 6-15: Failure and recovery of ROUTER B-ROUTER D circuit.

6-16, 6-17: Failure and recovery of ROUTER D-ROUTER C circuit.

6-18, 6-19: Failure and recovery of ROUTER C-ROUTER A circuit.

ROUTER FAILURE AND RECOVERY (TABLE 25)

6-20: Failure and recovery of ROUTER A.

6-21: Failure and recovery of ROUTER B.

6-22: Failure and recovery of ROUTER C.

6-23: Failure and recovery of ROUTER D.

ROUTER CONNECTION AND ECHO REQUEST (TABLE 26)

6-24: Echo test between all routers.

Table 22 Router Connection, Echo Test: Routers A, B, C, D

6. ATN Router Network Test		**Test Item**	**Procedure**	**Result**	**Date/Time**
Router connection of ROUTER A to ROUTER B	Data link establishment between ROUTER A and ROUTER B	6-1-1	With VC and IDRP connections established between ROUTER A and ROUTER C and also ROUTER B and ROUTER D, initiate the router connection between ROUTER A and ROUTER B. Check and confirm data link and VC are established between ROUTER A and ROUTER B.	OK / NG	/ /
	IDRP connection establishment between ROUTER A and ROUTER B	6-1-2	After VC establishment, check and confirm IDRP connection established between ROUTER A and ROUTER B by exchange of OPEN PDUs.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER B	6-1-3	After IDRP connection established, confirm ROUTER A sends UPDATE PDUs to ROUTER B. At ROUTER B, after receiving UPDATE PDUs from ROUTER A, check that route information on ROUTER A and ROUTER C are added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER B to ROUTER A	6-1-4	After IDRP connection established, confirm ROUTER B sends UPDATE PDUs to ROUTER A. At ROUTER A, after receiving UPDATE PDUs from ROUTER B, check that route information on ROUTER B and ROUTER D are added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER A to ROUTER C	6-1-5	At ROUTER A, after receiving UPDATE PDUs from ROUTER B, confirm ROUTER A sends an UPDATE PDU to ROUTER C. At ROUTER C, confirm that UPDATE PDU is received, and that route information of ROUTER B and ROUTER D is added.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER B to ROUTER D	6-1-6	At ROUTER B, after receiving UPDATE PDUs from ROUTER A, confirm ROUTER B sends an UPDATE PDU to ROUTER D. At ROUTER D, confirm that UPDATE PDU is received, and that route information of ROUTER A and ROUTER C is added.	OK / NG	/ /

6. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
Router connection of ROUTER C to ROUTER D	Data link establishment between ROUTER C and ROUTER D	6-2-1	Initiate the router connection between ROUTER C and ROUTER D. Check and confirm data link and VC are established between ROUTER C and ROUTER D.	OK / NG	/ /
	IDRP connection establishment between ROUTER C and ROUTER D	6-2-2	After VC establishment, check and confirm IDRP connection established between ROUTER C and ROUTER D by exchange of OPEN PDUs.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER C to ROUTER D	6-2-3	After IDRP connection established, confirm ROUTER C sends UPDATE PDUs to ROUTER D. At ROUTER D, after receiving UPDATE PDUs from ROUTER C, check that appropriate route information for ROUTER A and ROUTER B are present in routing table.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER D to ROUTER C	6-2-4	After IDRP connection established, confirm ROUTER D sends UPDATE PDUs to ROUTER C. At ROUTER C, after receiving UPDATE PDUs from ROUTER D, check that appropriate route information for ROUTER A and ROUTER B are present in routing table.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER C to ROUTER A	6-2-5	At ROUTER C , after receiving UPDATE PDUs from ROUTER D, confirm ROUTER C sends an UPDATE PDU to ROUTER A. At ROUTER A, confirm that UPDATE PDU is received, check that appropriate route information for ROUTER B and ROUTER D are present in the routing table.	OK / NG	/ /
	UPDATE PDU transmission from ROUTER D to ROUTER B	6-2-6	At ROUTER D, after receiving UPDATE PDUs from ROUTER C, confirm ROUTER D sends an UPDATE PDU to ROUTER B. At ROUTER B, confirm that UPDATE PDU is received, check that appropriate route information for ROUTER A and ROUTER C are present in the routing table.	OK / NG	/ /
CLNP Echo Test between routers	ERQ transmission	6-3-1	Send ERQ PDU from ROUTER A to each of the other 3 routers (B, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /

6. ATN Router Network Test		**Test Item**	**Procedure**	**Result**	**Date/Time**
CLNP Echo Test between routers	ERQ transmission	6-3-1	Send ERQ PDU from ROUTER A to each of the other 3 routers (B, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-3-2	Send ERQ PDU from ROUTER B to each of the other 3 routers (A, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-3-3	Send ERQ PDU from ROUTER C to each of the other 3 routers (A, B, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-3-4	Send ERQ PDU from ROUTER D to each of the other 3 routers (A, B, C). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /

Sequence diagram to be inserted

Table 23 Router Disconnection and Re-activation: Routers A, B, C, D

6. ATN Router Network Test		**Test Item**	**Procedure**	**Result**	**Date/Time**
Manual router disconnection at ROUTER A of ROUTER A-ROUTER B route	CEASE PDU transmission from ROUTER A	6-4-1	At ROUTER A, manually close the router connection to ROUTER B. Confirm ROUTER A sends a CEASE PDU to ROUTER B.	OK / NG	/ /
	CEASE PDU transmission from ROUTER B and route deletion	6-4-2	At ROUTER B, confirm receipt of CEASE PDU from ROUTER A. Confirm ROUTER B sends a CEASE PDU to ROUTER A. However, confirm that route information for all 3 other routers still exists, and that the route to ROUTER A is through ROUTER D and ROUTER C.	OK / NG	/ /
	ERQ transmission	6-4-3	Send ERQ PDU from ROUTER A to each of the other 3 routers (B, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-4-4	Send ERQ PDU from ROUTER B to each of the other 3 routers (A, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
Route re-activation from ROUTER A	Router connection re-activation from ROUTER A	6-5-1	At ROUTER A, manually initiate router connection to ROUTER B (VC call: caller, OPEN PDU: send). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	Routing table entries for ROUTER A	6-5-2	Following the exchange of UPDATE PDUs, verify at ROUTER A that route information for all 3 other routers exists, and that the route to ROUTER B is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER B	6-5-3	Following the exchange of UPDATE PDUs, verify at ROUTER B that route information for all 3 other routers exists, and that the route to ROUTER A is one direct hop.	OK / NG	/ /
Manual router disconnection at ROUTER B of ROUTER B-ROUTER D route	CEASE PDU transmission from ROUTER B	6-6-1	At ROUTER B, manually close the router connection to ROUTER D. Confirm ROUTER B sends a CEASE PDU to ROUTER D.	OK / NG	/ /
	CEASE PDU transmission from ROUTER D and route deletion	6-6-2	At ROUTER D, confirm receipt of CEASE PDU from ROUTER B. Confirm ROUTER D sends a CEASE PDU to ROUTER B. However, confirm that route information for all 3 other routers still exists, and that the route to ROUTER B is through ROUTER C and ROUTER A.	OK / NG	/ /

6. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
	ERQ transmission	6-6-3	Send ERQ PDU from ROUTER B to each of the other 3 routers (A, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-6-4	Send ERQ PDU from ROUTER D to each of the other 3 routers (A, B, C). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
Route re-activation from ROUTER B	Router connection re-activation from ROUTER B	6-7-1	At ROUTER B, manually initiate router connection to ROUTER D (VC call: caller, OPEN PDU: send). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	Routing table entries for ROUTER B	6-7-2	Following the exchange of UPDATE PDUs, verify at ROUTER B that route information for all 3 other routers exists, and that the route to ROUTER D is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER D	6-7-3	Following the exchange of UPDATE PDUs, verify at ROUTER D that route information for all 3 other routers exists, and that the route to ROUTER B is one direct hop.	OK / NG	/ /
Manual router disconnection at ROUTER D of ROUTER D-ROUTER C route	CEASE PDU transmission from ROUTER D	6-8-1	At ROUTER D, manually close the router connection to ROUTER C. Confirm ROUTER D sends a CEASE PDU to ROUTER C.	OK / NG	/ /
	CEASE PDU transmission from ROUTER C and route deletion	6-8-2	At ROUTER C, confirm receipt of CEASE PDU from ROUTER D. Confirm ROUTER C sends a CEASE PDU to ROUTER D. However, confirm that route information for all 3 other routers still exists, and that the route to ROUTER D is through ROUTER A and ROUTER B.	OK / NG	/ /
	ERQ transmission	6-8-3	Send ERQ PDU from ROUTER D to each of the other 3 routers (A, B, C). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-8-4	Send ERQ PDU from ROUTER C to each of the other 3 routers (A, B, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
Route re-activation from ROUTER D	Router connection re-activation from ROUTER D	6-9-1	At ROUTER D, manually initiate router connection to ROUTER C (VC call: caller, OPEN PDU: send). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	Routing table entries for ROUTER D	6-9-2	Following the exchange of UPDATE PDUs, verify at ROUTER D that route information for all 3 other routers exists, and that the route to ROUTER C is one direct hop.	OK / NG	/ /

6. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
	Routing table entries for ROUTER C	6-9-3	Following the exchange of UPDATE PDUs, verify at ROUTER C that route information for all 3 other routers exists, and that the route to ROUTER D is one direct hop.	OK / NG	/ /
Manual router disconnection at ROUTER C of ROUTER C-ROUTER A route	CEASE PDU transmission from ROUTER C	6-10-1	At ROUTER C, manually close the router connection to ROUTER A. Confirm ROUTER C sends a CEASE PDU to ROUTER A.	OK / NG	/ /
	CEASE PDU transmission from ROUTER A and route deletion	6-10-2	At ROUTER A, confirm receipt of CEASE PDU from ROUTER C. Confirm ROUTER A sends a CEASE PDU to ROUTER C. However, confirm that route information for all 3 other routers still exists, and that the route to ROUTER C is through ROUTER B and ROUTER D.	OK / NG	/ /
	ERQ transmission	6-10-3	Send ERQ PDU from ROUTER C to each of the other 3 routers (A, B, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-10-4	Send ERQ PDU from ROUTER A to each of the other 3 routers (B, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
Route re-activation from ROUTER C	Router connection re-activation from ROUTER C	6-11-1	At ROUTER C, manually initiate router connection to ROUTER A (VC call: caller, OPEN PDU: send). Confirm the X.25 VC and IDRP connection are established.	OK / NG	/ /
	Routing table entries for ROUTER C	6-11-2	Following the exchange of UPDATE PDUs, verify at ROUTER C that route information for all 3 other routers exists, and that the route to ROUTER A is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER A	6-11-3	Following the exchange of UPDATE PDUs, verify at ROUTER A that route information for all 3 other routers exists, and that the route to ROUTER C is one direct hop.	OK / NG	/ /

Sequence diagram to be inserted

Table 24 Communication Circuit Failure and Recovery Test Procedure: Routers A, B, C, D

6. ATN Router Network Test		**Test Item**	**Procedure**	**Result**	**Date/Time**
Carrier media failure of ROUTER A-ROUTER B circuit	Data link and VC disconnection	6-12-1	Simulate carrier medium failure between ROUTER A and ROUTER B by disconnecting WAN cable from ROUTER A. Check and confirm data link and VC are disconnected between ROUTER A and ROUTER B.	OK / NG	/ /
	IDRP disconnection and route update	6-12-2	Check and confirm that IDRP connection between ROUTER A and ROUTER B is closed. However, confirm in ROUTER A that route information for all 3 other routers still exists, and that the route to ROUTER B is through ROUTER C and ROUTER D. Also, confirm in ROUTER B that route information for all 3 other routers still exists, and that the route to ROUTER A is through ROUTER D and ROUTER C.	OK / NG	/ /
	ERQ transmission	6-12-3	Send ERQ PDU from ROUTER A to each of the other 3 routers (B, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-12-4	Send ERQ PDU from ROUTER B to each of the other 3 routers (A, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
Carrier media restoration of ROUTER A-ROUTER B circuit and route addition	Data link, VC, and router connection re-establishment	6-13-1	Restore the ROUTER A-ROUTER B router connection. Confirm router connection is re-established between ROUTER A and ROUTER B.	OK / NG	/ /
	Routing table entries for ROUTER A	6-13-2	Following the exchange of UPDATE PDUs, verify at ROUTER A that route information for all 3 other routers exists, and that the route to ROUTER B is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER B	6-13-3	Following the exchange of UPDATE PDUs, verify at ROUTER B that route information for all 3 other routers exists, and that the route to ROUTER A is one direct hop.	OK / NG	/ /
Carrier media failure of ROUTER B-ROUTER D circuit	Data link and VC disconnection	6-14-1	Simulate carrier medium failure between ROUTER B and ROUTER D by disconnecting WAN cable from ROUTER B. Check and confirm data link and VC are disconnected between ROUTER B and ROUTER D.	OK / NG	/ /

6. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
	IDRP disconnection and route update	6-14-2	Check and confirm that IDRP connection between ROUTER B and ROUTER D is closed. However, confirm in ROUTER B that route information for all 3 other routers still exists, and that the route to ROUTER D is through ROUTER A and ROUTER C. Also, confirm in ROUTER D that route information for all 3 other routers still exists, and that the route to ROUTER B is through ROUTER C and ROUTER A.	OK / NG	/ /
	ERQ transmission	6-14-3	Send ERQ PDU from ROUTER B to each of the other 3 routers (A, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-14-4	Send ERQ PDU from ROUTER D to each of the other 3 routers (A, B, C). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
Carrier media restoration of ROUTER B-ROUTER D circuit and route addition	Data link, VC, and router connection re-establishment	6-15-1	Restore the ROUTER B-ROUTER D router connection. Confirm router connection is re-established between ROUTER B and ROUTER D.	OK / NG	/ /
	Routing table entries for ROUTER B	6-15-2	Following the exchange of UPDATE PDUs, verify at ROUTER B that route information for all 3 other routers exists, and that the route to ROUTER D is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER D	6-15-3	Following the exchange of UPDATE PDUs, verify at ROUTER D that route information for all 3 other routers exists, and that the route to ROUTER B is one direct hop.	OK / NG	/ /
Carrier media failure of ROUTER D-ROUTER C circuit	Data link and VC disconnection	6-16-1	Simulate carrier medium failure between ROUTER D and ROUTER C by disconnecting WAN cable from ROUTER D. Check and confirm data link and VC are disconnected between ROUTER D and ROUTER C.	OK / NG	/ /
	IDRP disconnection and route update	6-16-2	Check and confirm that IDRP connection between ROUTER D and ROUTER C is closed. However, confirm in ROUTER D that route information for all 3 other routers still exists, and that the route to ROUTER C is through ROUTER B and ROUTER A. Also, confirm in ROUTER C that route information for all 3 other routers still exists, and that the route to ROUTER D is through ROUTER A and ROUTER B.	OK / NG	/ /

6. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
	ERQ transmission	6-16-3	Send ERQ PDU from ROUTER D to each of the other 3 routers (A, B, C). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-16-4	Send ERQ PDU from ROUTER C to each of the other 3 routers (A, B, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
Carrier media restoration of ROUTER D-ROUTER C circuit and route addition	Data link, VC, and router connection re-establishment	6-17-1	Restore the ROUTER D-ROUTER C router connection. Confirm router connection is re-established between ROUTER D and ROUTER C.	OK / NG	/ /
	Routing table entries for ROUTER D	6-17-2	Following the exchange of UPDATE PDUs, verify at ROUTER D that route information for all 3 other routers exists, and that the route to ROUTER C is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER C	6-17-3	Following the exchange of UPDATE PDUs, verify at ROUTER C that route information for all 3 other routers exists, and that the route to ROUTER D is one direct hop.	OK / NG	/ /
Carrier media failure of ROUTER C-ROUTER A circuit	Data link and VC disconnection	6-18-1	Simulate carrier medium failure between ROUTER C and ROUTER A by disconnecting WAN cable from ROUTER C. Check and confirm data link and VC are disconnected between ROUTER C and ROUTER A.	OK / NG	/ /
	IDRP disconnection and route update	6-18-2	Check and confirm that IDRP connection between ROUTER C and ROUTER A is closed. However, confirm in ROUTER C that route information for all 3 other routers still exists, and that the route to ROUTER A is through ROUTER D and ROUTER B. Also, confirm in ROUTER A that route information for all 3 other routers still exists, and that the route to ROUTER C is through ROUTER B and ROUTER D.	OK / NG	/ /
	ERQ transmission	6-18-3	Send ERQ PDU from ROUTER C to each of the other 3 routers (A, B, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-18-4	Send ERQ PDU from ROUTER A to each of the other 3 routers (B, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /

6. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
Carrier media restoration of ROUTER C-ROUTER A circuit and route addition	Data link, VC, and router connection re-establishment	6-19-1	Restore the ROUTER C-ROUTER A router connection. Confirm router connection is re-established between ROUTER C and ROUTER A.	OK / NG	/ /
	Routing table entries for ROUTER C	6-19-2	Following the exchange of UPDATE PDUs, verify at ROUTER C that route information for all 3 other routers exists, and that the route to ROUTER A is one direct hop.	OK / NG	/ /
	Routing table entries for ROUTER A	6-19-3	Following the exchange of UPDATE PDUs, verify at ROUTER A that route information for all 3 other routers exists, and that the route to ROUTER C is one direct hop.	OK / NG	/ /

Sequence diagram to be inserted

Table 25 Router Failure and Recovery Test Procedure: Routers A, B, C, D

6. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
Failure and recovery of ROUTER A	Failure of ROUTER A	6-20-1	Simulate failure and recovery of ROUTER A by rebooting the router. At failure: ・At ROUTER B, verify that routing information for ROUTER A is deleted, but that routing information for ROUTER C and ROUTER D remains. ・At ROUTER C, verify that routing information for ROUTER A is deleted, but that routing information for ROUTER B and ROUTER D remains. ・At ROUTER D, verify that routing information for ROUTER A is deleted, but that routing information for ROUTER B and ROUTER C remains.	OK / NG	/ /
	Recovery of ROUTER A	6-20-2	Check that the ROUTER A-ROUTER B and ROUTER A-ROUTER C router connections are automatically re-established after ROUTER A recovers. After recovery: ・At ROUTER A, check that routing information is added for ROUTER B, ROUTER C and ROUTER D. ・At ROUTER B, check that routing information for ROUTER A is added. ・At ROUTER C, check that routing information for ROUTER A is added. ・At ROUTER D, check that routing information for ROUTER A is added.	OK / NG	/ /
Failure and recovery of ROUTER B	Failure of ROUTER B	6-21-1	Simulate failure and recovery of ROUTER B by rebooting the router. At failure: ・At ROUTER A, verify that routing information for ROUTER B is deleted, but that routing information for ROUTER C and ROUTER D remains.	OK / NG	/ /

6. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
			・At ROUTER C, verify that routing information for ROUTER B is deleted, but that routing information for ROUTER A and ROUTER D remains. ・At ROUTER D, verify that routing information for ROUTER B is deleted, but that routing information for ROUTER A and ROUTER C remains.	OK / NG	/ /
	Recovery of ROUTER B	6-21-2	Check that the ROUTER A-ROUTER B and ROUTER B-ROUTER D router connections are automatically re-established after ROUTER B recovers. After recovery: ・At ROUTER B, check that routing information is added for ROUTER A, ROUTER C and ROUTER D. ・At ROUTER A, check that routing information for ROUTER B is added. ・At ROUTER C, check that routing information for ROUTER B is added. ・At ROUTER D, check that routing information for ROUTER B is added.	OK / NG	/ /
Failure and recovery of ROUTER C	Failure of ROUTER C	6-22-1	Simulate failure and recovery of ROUTER C by rebooting the router. At failure: ・At ROUTER A, verify that routing information for ROUTER C is deleted, but that routing information for ROUTER B and ROUTER D remains. ・At ROUTER B, verify that routing information for ROUTER C is deleted, but that routing information for ROUTER A and ROUTER D remains. ・At ROUTER D, verify that routing information for ROUTER C is deleted, but that routing information for ROUTER A and ROUTER B remains.	OK / NG	/ /

6. ATN Router Network Test		Test Item	Procedure	Result	Date/Time
	Recovery of ROUTER C	6-22-2	Check that the ROUTER A-ROUTER C and ROUTER C-ROUTER D router connections are automatically re-established after ROUTER C recovers. After recovery: ・At ROUTER C, check that routing information is added for ROUTER A, ROUTER B and ROUTER D. ・At ROUTER A, check that routing information for ROUTER C is added. ・At ROUTER B, check that routing information for ROUTER C is added. ・At ROUTER D, check that routing information for ROUTER C is added.	OK / NG	/ /
Failure and recovery of ROUTER D	Failure of ROUTER D	6-23-1	Simulate failure and recovery of ROUTER D by rebooting the router. At failure: ・At ROUTER A, verify that routing information for ROUTER D is deleted, but that routing information for ROUTER B and ROUTER C remains. ・At ROUTER B, verify that routing information for ROUTER D is deleted, but that routing information for ROUTER A and ROUTER C remains. ・At ROUTER C, verify that routing information for ROUTER D is deleted, but that routing information for ROUTER A and ROUTER B remains.	OK / NG	/ /
	Recovery of ROUTER D	6-23-2	Check that the ROUTER B-ROUTER D and ROUTER C-ROUTER D router connections are automatically re-established after ROUTER D recovers. After recovery: ・At ROUTER D, check that routing information is added for ROUTER A, ROUTER B and ROUTER C. ・At ROUTER A, check that routing information for ROUTER D is added. ・At ROUTER B, check that routing information for ROUTER D is added. ・At ROUTER C, check that routing information for ROUTER D is added.	OK / NG	/ /

Sequence diagram to be inserted

Table 26 Echo Test Procedure: Routers A, B, C, D

6. ATN Router Network Test		**Test Item**	**Procedure**	**Result**	**Date/Time**
CLNP Echo Test between routers	ERQ transmission	6-24-1	Send ERQ PDU from ROUTER A to each of the other 3 routers (B, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-24-2	Send ERQ PDU from ROUTER B to each of the other 3 routers (A, C, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-24-3	Send ERQ PDU from ROUTER C to each of the other 3 routers (A, B, D). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /
	ERQ transmission	6-24-4	Send ERQ PDU from ROUTER D to each of the other 3 routers (A, B, C). Confirm receipt of ERP PDU from each of the 3 routers.	OK / NG	/ /

Sequence diagram to be inserted

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

ASIA/PAC
AERONAUTICAL TELECOMMUNICATION NETWORK
SECURITY GUIDANCE DOCUMENT

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1. INTRODUCTION

This Security Guidance Document for the Asia/Pacific Region provides guidance on the implementation of security for states and organizations operating in the region.

1.1 Background

As noted in the Asia/Pacific System Security Policy [Asia/Pac SSP], the fundamental objectives for system security of the ATN are to:

1. Protect ATN data from unauthorized disclosure, modification, or deletion, and
2. Protect ATN resources from unauthorized use and denial of service.

These objectives are achieved through the application of a set of high-level security services. The Asia/Pacific Security Policy identifies the following services:

(1) Confidentiality. Ensures data is not disclosed to unauthorized entities.

(2) Data Integrity. Ensures data has not been altered or destroyed in an unauthorized manner.

(3) Authenticity. Ensures that the source of data or the identity of an entity is as claimed.

(4) Availability. Ensures resources, services, and data are accessible and usable on demand or in a timely, reliable manner by an authorized entity.

(5) Accountability. Enables activities to be traced to users and processes that may then be held responsible for those actions.

These security services are in turn realized by the implementation of a comprehensive set of management, operational, and technical controls. Controls may be organized into the following control classes:

Management controls are safeguards or countermeasures that focus on the management of risk and the management of system security.

Operational controls are safeguards or countermeasures for a system that are primarily implemented and executed by people.

Technical controls are safeguards or countermeasures for a system that are primarily implemented and executed by the system through mechanisms contained in the components of the system.

Figure 1.1 depicts the relationship between Security Objectives, Services, and Controls.

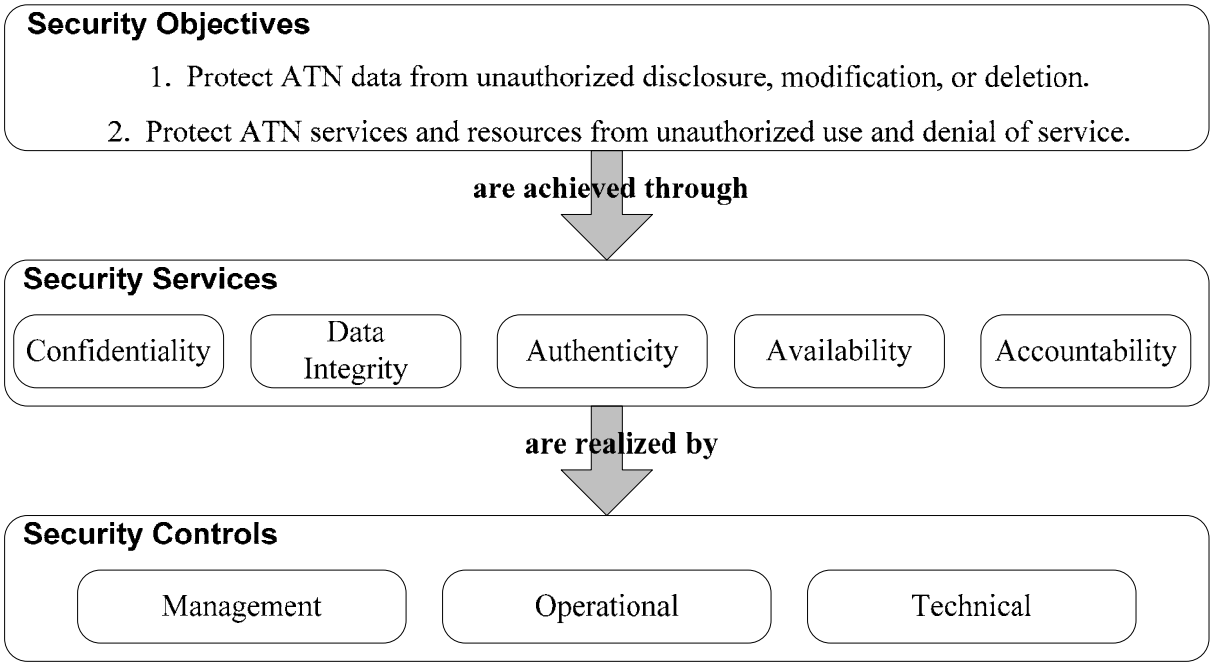

Figure 1-1. Security Objectives, Services, and Controls

1.2 Document Organization

In addition to this introduction, this document contains 4 major sections.

Section 2 provides a description of the 17 control families in the three Management, Operational, and Technical control classes. This section also provides a mapping from the high-level services to the control families.

Section 3 provides guidance on control families in the Management class. This section describes best practices for the management organization in an entity participating in the ATN.

Section 4 provides guidance on control families in the Operational control class. It describes procedures which constitute an effective security operation.

Section 5 provides guidance on control families in the Technical control class. Section 5 describes how technical controls are applied to various components of an ATN system. It gives specific examples of controls applied to each component.

2. SECURITY CONTROL FAMILIES

2.1 Description of Control Families

Access Control (AC) is the capability of the system to limit access to authorized users, processes acting on behalf of authorized users, and devices (including other systems) and to the types of transactions and functions that authorized users are permitted to exercise.

Awareness and Training (AT) ensures that operational personnel are aware of the security risks associated with their activities and the security policies which apply to their systems, and ensures that personnel are adequately trained to carry out their duties and responsibilities.

Audit and Accountability (AU) is the capability of the system to generate audit records that may indicate unauthorized or inappropriate system activity and that may be used to ensure that the actions of individual system users can be uniquely traced to those users so they can be held accountable for their actions.

Certification, Accreditation, and Security Assessments (CA) ensures that the organization's management assesses the security controls in their system and authorize (accredit) the system for operation.

Configuration Management (CM) ensures that operational personnel control changes to their system's configuration.

Contingency Planning (CP) ensures that operational personnel have a plan for continued operation to maintain availability of critical user and system-level information in emergency situations.

Identification and Authentication (IA) is the capability of the system to identify and verify (i.e., authenticate) system users, processes acting on behalf of users, or devices.

Incident Response (IR) ensures that operational personnel handle security incidents and promptly report incidents to appropriate authorities.

Maintenance (MA) ensures that operational personnel perform preventative and regular maintenance on their system.

Media Protection (MP) ensures that operational personnel restrict access to system media to authorized personnel and physically control system media in controlled areas.

Physical and Environmental Protection (PE) ensures that operational personnel limit physical access to systems and protect systems against environmental hazards.

Planning (PL) ensures that the organization's management develops and implements a security plan for the system.

Personnel Security (PS) ensures that operational personnel are trustworthy and meet security criteria for their positions.

Risk Assessment (RA) ensures that the organization's management assesses the risk and magnitude of harm that may result from security attacks on the system.

System and Services Acquisition (SA) ensures that the organization's management allocates the resources required to adequately protect their system.

System and Communications Protection (SC) is the capability of the system to monitor, control, and protect communications and includes architectural controls, confidentiality, data integrity and interoperability.

System and Information Integrity (SI) ensures that operational personnel remediate system flaws, provide protection from malicious code and other attacks on the system's integrity, and monitor alerts and advisories and take appropriate action in response.

2. 2 Realization of Security Services through Controls

Table 2-1 depicts a mapping from the Asia/Pacific System Security Policy to the controls identified in section 2.1.

Table 2-1. Mapping of Controls onto Asia/Pac System Security Policy

Asia/Pac System Security Policy	Technical Controls	Operational Controls	Management Controls
Confidentiality			
(a) ATN data shall be protected from unauthorized disclosure during processing, transmission, and storage commensurate with the designated sensitivity of the data.	System and Communications Protection (SC)	System and Information Integrity (SI) Physical and Environmental Protection (PE)	System and Services Acquisition (SA)
Data Integrity			
(a) ATN data shall be protected from unauthorized or undetected modification during transmission, storage, and processing.	System and Communications Protection (SC)	System and Information Integrity (SI) Physical and Environmental Protection (PE) Configuration Management (CM)	System and Services Acquisition (SA)
Authenticity			
(a) ATN users and processes shall be uniquely identified.	Identification and Authentication (IA)	Personnel Security (PS)	
(b) ATN users and processes shall be authenticated before being granted access to ATN data, services, and resources.	Identification and Authentication (IA) Access Control (AC)	Personnel Security (PS)	
(c) ATN data, services, and resources shall be protected from unauthorized use or tampering.	Access Control (AC)		
(d) ATN users and processes shall have access only to those ATN data, services, and resources for which they have authorization.	Access Control (AC)		
Availability			

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Asia/Pac System Security Policy	Technical Controls	Operational Controls	Management Controls
(a) ATN data, services, and resources shall be available for use by authorized users and processes.	System and Communications Protection (SC)	System and Information Integrity (SI) Contingency Planning (CP) Incident Response (IR) Physical and Environmental Protection (PE) Personnel Security (PS)	System and Services Acquisition (SA)
Accountability			
(a) An audit trail of use of ATN data, services, and resources by ATN users and processes shall be maintained.	Audit and Accountability (AU)	Personnel Security (PS)	
Verification			
a. ATN systems shall be verified to have system security commensurate with the risk and magnitude of harm resulting from unauthorized disclosure, modification, or deletion of ATN data, or unauthorized use and denial of service of ATN services and resources.			Planning (PL) Risk Assessment (RA)
Authorization			
a. ATN systems shall be formally approved for operation by the cognizant Designated Approving Authority (DAA).			Certification, Accreditation, and Security Assessments (CA)
b. Significant changes to ATN systems shall require another formal approval (or re-authorization).			Certification, Accreditation, and Security Assessments (CA)

3. MANAGEMENT CONTROL GUIDANCE

As defined in section 1.1, Management Controls are safeguards or countermeasures that focus on the management of risk and the management of system security.

3.1 Certification, Accreditation, and Security Assessments (CA)

The Asia/Pacific System Security Policy requires that ATN systems be verified to have system security commensurate with the risk and magnitude of harm resulting from unauthorized disclosure, modification, or deletion of ATN data, or unauthorized use and denial of service of ATN services and resources. This requirement essentially says that a system should have controls in place to meet the fundamental objectives for system security as noted in section 1.1. Verification of system security is more generally termed certification. This is where an organization conducts a risk assessment (see 3.3) and an assessment of the security controls to determine the extent to which the controls are implemented correctly, operating as intended, and producing the desired outcome in terms of meeting the fundamental system security objectives. Management may use the Asia/Pacific System Security Checklist [Asia/Pac SSC]as a general guide in assessing security controls.

The Asia/Pacific System Security Policy also requires that ATN systems be formally approved (i.e., accredited) for operation by an individual responsible for security in the organization. This individual is called the Designated Approving Authority (DAA). The DAA is a senior organizational official that signs and approves the security accreditation thereby authorizing operation of the system.

3.2 Planning (PL)

A system may be authorized for operation by the organization's management even though there are controls not in place or controls which could be enhanced as determined by the security verification process. In this situation the organization would develop and implements a security plan for adding or enhancing controls in the system.

3.3 Risk Assessment (RA)

A formal risk assessment is the process by which an organization determines the risk and magnitude of harm resulting from unauthorized. The general process of risk assessment is depicted in Figure 3-1 from [NIST 800-100]. The process begins (1) with a characterization of the system. This involves identifying the data, resources, and services, that constitute the system and determining the importance of these items to the organization. The next steps are to identify threats to (2) and vulnerabilities of (3) the data, resources, and services. Identifiable threats (e.g., disclosure, modification, or loss of data) will have some probability of occurring and causing loss or damage to a system. An analysis (4) of the threats and vulnerabilities should

be conducted following a structured approach to analyze controls, estimate likelihood of threat occurrence, and assess the potential impact of the threats to arrive at a general risk determination. Risk analysis are generally and qualitative (e.g., high, medium, low). For each identifiable threat one or more controls should be recommended (5). The nominal controls in the Asia/Pacific System Security Checklist [Asia/Pac SSC] may be used as a general guide; however, additional system specific controls may also be necessary. The overall results of the risk assessment should be formally documented (6).

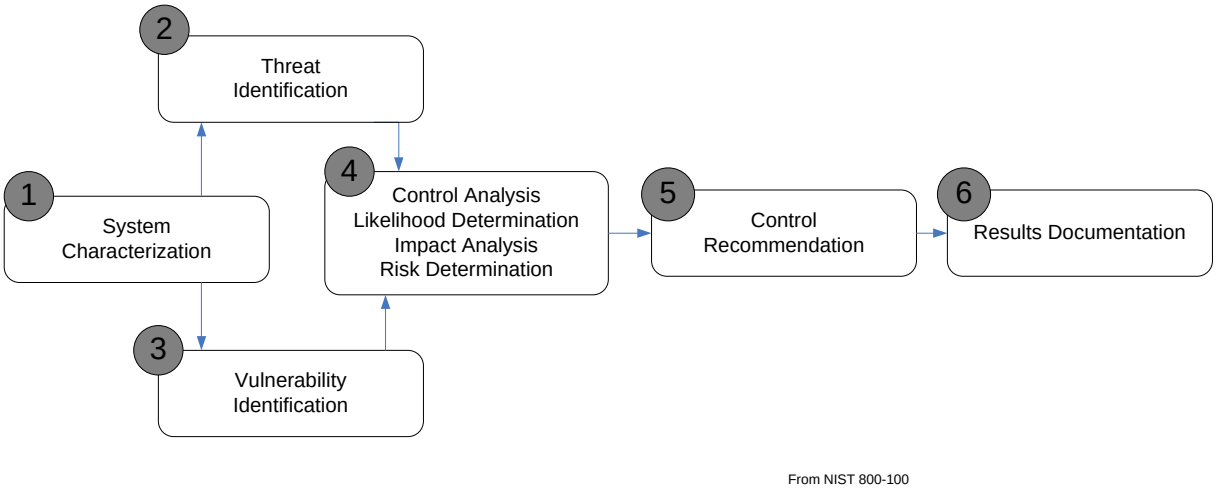


Figure 3-1. Risk Assessment Process

3.4 System and Services Acquisition (SA)

System and Services Acquisition (SA) is the control whereby an organization's management allocates the resources required to protect the system to level commensurate with the risks to the system. This activity should be applied as part of an on-going security policy for the organization. Specific resources should be allocated as a result of the CA and RA activities.

4. OPERATIONAL CONTROL GUIDANCE

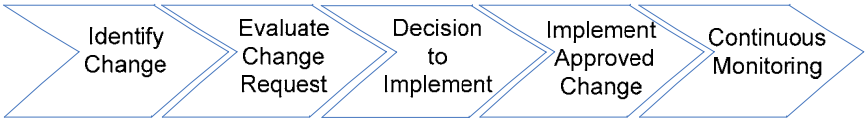
As defined in section 1.1, Operational Controls are safeguards or countermeasures for a system that are primarily implemented and executed by people.

4.1 Awareness and Training (AT)

Awareness and Training (AT) is the control for disseminating security information that management and operational personnel need to do their jobs. Awareness and Training ensures that management and operational personnel understand their security responsibilities and therefore are able to properly use and protect the system data, resources, and services.

4.2 Configuration Management (CM)

Configuration Management (CM) is the control that ensures that operational personnel control changes to their system's hardware components, software components and system adaptation parameters. Figure 4-1 depicts the Configuration Management process.



From NIST 800-100

Figure 4-1. Configuration Management Process

The first step in the process is to identify the need for the change. There can be various reasons for change such as the need to support more bandwidth on a communication channel, the need to upgrade to a new Operating System if the current is no longer supported, and general functional enhancements or corrections to the system. The change should be submitted to a decision-making body in the organization, e.g., to a Configuration Control Board (CCB).

The next step is to evaluate the change request. An impact assessment should be conducted to determine the effect of the change to the system under change or to other interrelated systems. For example a change in the routing policy could affect all systems in the network. Thus a change needs to be evaluated to determine if it is technically correct and if the gains (performance, new functionality, etc) are cost effective.

Next the CCM must make a decision to implement. The CCB may approve, deny, or otherwise defer implementation of the change.

If a decision to implement the change is made, then it should first be tested in an off-line or test environment. Once tested, the change may be placed into the operational system and the associated configuration control documentation is updated.

Configuration Management does not actually start and stop with incremental changes. Rather it is an on-going process that requires continuous monitoring. Configuration Management requires that operational personnel are always aware of their current baseline (for example a specific software release) and that the system is observed in operation to determine if there is any degradation in functional or performance capabilities as the system baseline is changed. In addition to managing software releases, application of fixes (i.e. "patches") to the system and changes in adaptation parameters must also be managed and continuously monitored.

4.3 Contingency Planning (CP)

Contingency Planning (CP) is the control that ensures that operational personnel have a plan for continued operation to maintain availability of critical user and system-level information in emergency situations. Figure 4-2 from [NIST 800-34] depicts the Contingency Planning Process.

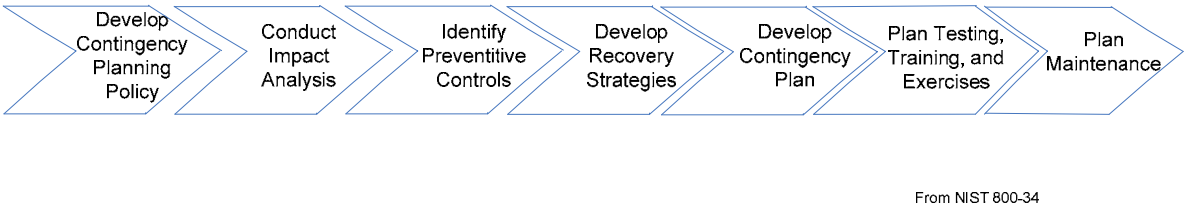


Figure 4-2. Contingency Planning Process

The organization should firstly have a policy for contingency planning that establishes the overall contingency objectives. There should be an impact analysis that evaluates the potential loss of a system or service. This may be the same as the system characterization in the Risk Assessment. The Preventive Controls are a subset of the overall CA controls which address the specific loss of systems and services. A recovery strategy should exist for each potential system/service loss. All the previous steps go into developing a formal Contingency Plan. Attachment A contains an outline for a Contingency Plan. Operational personnel should plan to test the Contingency Plan. Training should be conducted as necessary and actual exercises such as operation of backup systems should be conducted. As the system changes the contingency plan must be updated as part of a Plan Maintenance program.

4.4 Incident Response (IR)

Incident Response (IR) is the control that ensures that operational personnel handle security incidents and promptly report incidents to appropriate authorities. Figure 4-3 from [NIST 800-61] depicts the Incident Response Life Cycle.

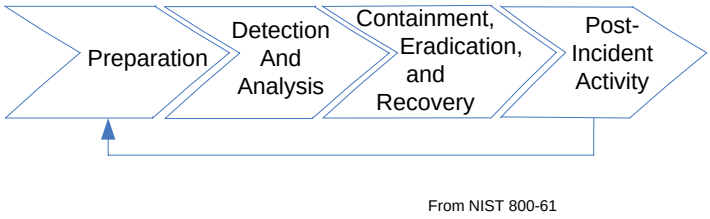


Figure 4-3. Incident Response Life Cycle

As depicted in Figure 4-3, Incident Response has several phases ranging from initial preparation through post-incident analysis which feeds back into the preparation phase. During preparation the organization selects and implements controls based on their risk assessment. The controls however cannot guarantee absolute protection and there will always be some residual risk. Therefore detection is required to alert the organization that an incident has occurred. Detection is primary through the technical controls described in section 5. When detected appropriate personnel within and external to the organization must be promptly notified. When an incident does occur, operational personnel can minimize the impact by firstly containing it before it spreads and does further damage. Measures should be taken to eradicate it as soon as possible so that recovery to normal services can be achieved. The post-incident analysis should attempt to identify the source of the incident as well as determine what additional controls can be implemented to prevent future occurrences, i.e., to apply “lessons learned” from the incident.

Attachment B contains an outline for an Incident Response Plan.

4.5 Maintenance (MA)

Maintenance (MA) is the control ensures that operational personnel perform preventative and regular maintenance on their system.

4.6 Media Protection (MP)

Media Protection (MP) is the control ensures that operational personnel restrict access to system media to authorized personnel and physically control system media in controlled areas.

4.7 Physical and Environmental Protection (PE)

Physical and Environmental Protection (PE) is the control ensures that operational personnel limit physical access to systems and protect systems against environmental hazards.

4.8 Personnel Security (PS)

Personnel Security (PS) is the control that ensures that operational personnel are trustworthy and meet security criteria for their positions.

4.9 System and Information Integrity (SI)

System and Information Integrity (SI) is the control that ensures that operational personnel remediate system flaws, provide protection from malicious code and other attacks on the system's integrity, and monitor alerts and advisories and take appropriate action in response.

5. TECHNICAL CONTROL GUIDANCE

5.1 Technical Controls

As defined in section 1.1, Technical Controls are safeguards or countermeasures that a system executes through mechanisms in the hardware or software components of the system itself. The technical controls addressed in this section are:

- AC - Access Control
- AU - Audit and Accountability
- IA - Identification and Authentication
- SC - System and Communications Protection

For the Management and Operational controls, general guidance was provided for each control. In this section Technical Controls are described in terms of the hardware or software components of the system to which they apply.

5.2 Technical Controls Applied to Information System Components

Technical Controls are best applied following a *Defense-in-Depth* strategy whereby multiple overlapping protection approaches are implemented. For the Asia/Pac ATN, this section provides guidance on the application of controls to the network, equipment, operating system, applications, and data. Figure 5-1 depicts the concept of Defense-in-Depth.

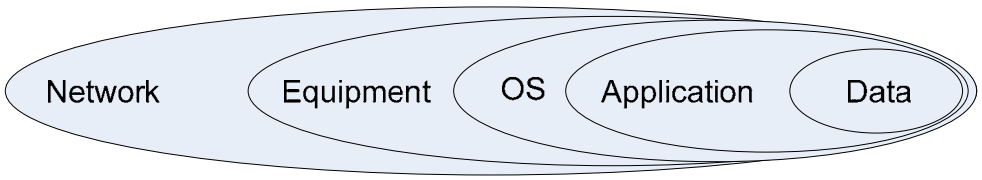


Figure 5-1: Defense-in-Depth

Figure 5-2 depicts the general technical controls applied to information system components.

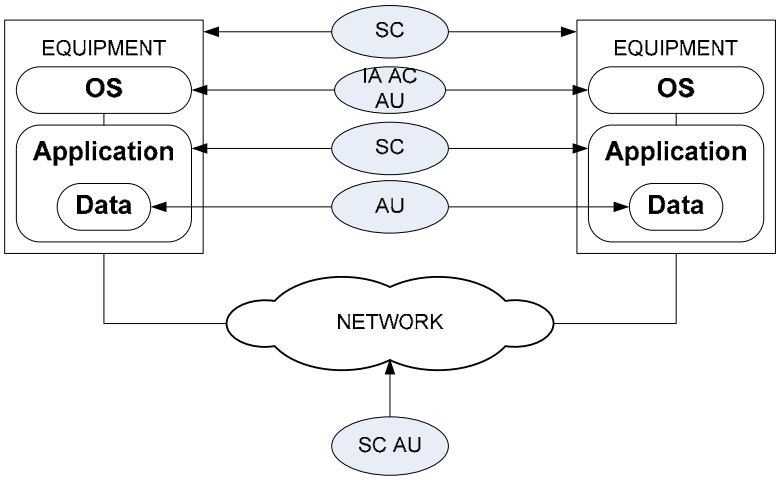


Figure 5-2: Technical Controls to ATN Component Mapping

As is depicted in Figure 5-2, the System and Communications Protection (SC) and Audit and Accountability (AU) control families apply to the Network. Note that network is used in a logical sense here so that protocol software in host systems is part of the network.

The System and Communications Protection (SC) control family also applies to equipment. This generally refers to architectural controls.

The Access Control (AC), Audit and Accountability (AU), and Identification and Authentication (IA) control families apply to the Operating System.

The Systems and Communications Protection (SC) control family applies to Applications.

The Audit and Accountability (AU) applies to Application Data.

5.2.1 Controls Applied to the Network

This section identifies network controls which may be applied in the Asia/Pac ATN in support of AMHS. Figure 5-3 provides an overview of the controls.

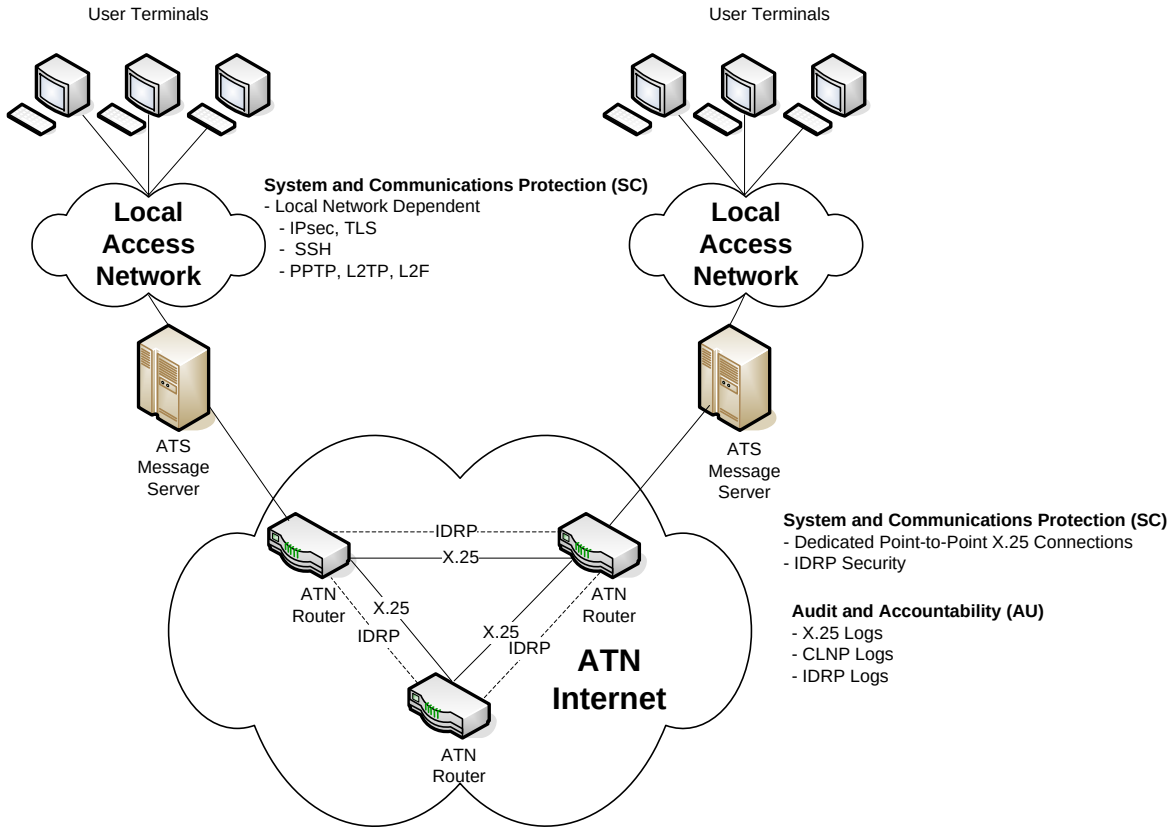


Figure 5-3: Network Controls

5.2.1.1 System and Communications Protection (SC)

5.2.1.1.1 Dedicated Point-to-Point X.25 Links

Currently interconnectivity in the Asia/Pac ATN Internet is through the use of dedicated point-to-point X.25 circuits. This limits access since X.25 circuits are associated with a specific physical port.

5.2.1.1.2 Inter-domain Routing Protocol Security

The Inter-domain Routing Protocol (IDRP) has defined options for authentication of routing data. Edition 3 of Doc 9705 defined a method of authentication using the HMAC keyed message authentication code. Edition 3 allows for two ATN routers to exchange public keys in public key certificates during the IDRP open exchange.

Rather than exchange certificates and implement a supporting Public Key Infrastructure (PKI) it is recommended that the routers derive a shared session key from a pre-shared value.

5.2.1.1.3 Local Access Network Security

The connection of User Terminal to the AMHS switching systems is a local matter. These connections may be secured in a number of ways.

One common method is to use the Secure Shell (SSH) protocol. SSH contains secure replacements for several unencrypted application protocols such as telnet, rcp, and FTP.

An alternative to SSH for HTTP type applications is to use Transport Layer Security (TLS). All major web-browsers support TLS. TLS authentication is typically one way, authenticating the client to a server.

If the local access network is an IP network then an IPsec Virtual Private Network may be used to secure Terminal to AMHS communications.

If the local access method is not a layer 3 network, then various Level 2 protocols may be used. Options include the Point-to-Point Tunneling Protocol (PPTP), the Layer 2 Tunneling Protocol (L2TP), and Layer 2 Forwarding (L2F).

5.2.1.1.4 IPsec with the IP SNDCF

In the ATN Internet of the future the Internet Protocol Subnetwork Dependent Convergence Function (IP SNDCF) may be used to interconnect ATN routers in place of X.25 links. In this case, it is recommended that the IP Security (IPsec) protocols be used. This may be with manual key establishment or dynamically using the Internet Key Exchange (IKE) protocol. IKE may be used with pre-shared keys or using public key certificates.

5.2.1.2 Audit and Accountability (AU)

5.2.1.2.1 System Logs

It is recommended that the communication logs of Asia/Pac ATN Routers be reviewed for anomalous activity. Specifically the following logs should be reviewed:

- X.25 Logs
- IDRP Logs
- Connectionless Network Protocol (CLNP) Logs

5.2.2 Controls Applied to Equipment

5.2.2.1 System and Communications Protection (SC)

5.2.2.1.1 Redundancy

Equipment may be configured redundantly to limit the effects of many attacks on systems including Denial-of-Service attacks.

5.2.3 Controls Applied to the Operating System

5.2.3.1 Identification and Authentication (IA)

5.2.3.1.1 User IDs and Passwords

System Administrators may configure the allowed users of the system. There are at least two classes of accounts which may be configured: normal system users and super-users.

5.2.3.2 Access Control (AC)

5.2.3.2.1 User Access

Once users have been identified and authenticated using IA controls, the system administrator may limit their operating environment, that is, an administrator may limit the types of transactions and functions that authorized users are permitted to exercise.

5.2.3.2.2 OS Checklists

The National Institute of Standards and Technology (NIST) maintains a Security Configuration Checklist Repository for various products and systems including all major Operating Systems. (http://checklists.nist.gov/repository/category.html)

5.2.3.3 Audit and Accountability (AU)

5.2.3.3.1 OS System Logs

The operating system logs should be reviewed on a regular basis for abnormal activity. This may be done manually or using automated tools such as TRIPWIRE.

5.2.4 Controls Applied to Applications

5.2.4.1 System and Communications Protection (SC)

5.2.4.1.1 AMHS Security

Figure 5-4 depicts AMHS Security which is applied from an originating ATS Message User Agent to a destination ATS Message User Agent.

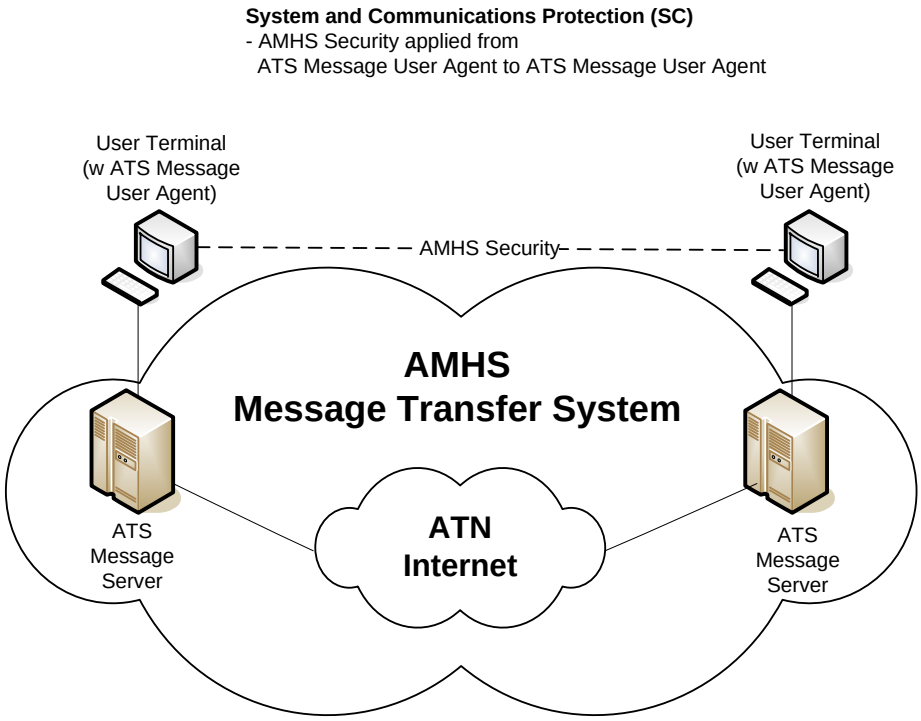


Figure 5-4: AMHS Security

AMHS security begins with the originating ATS Message User Agent digitally signing an Interpersonal Message using its Private Key. The message is sent through the ATS Message Transfer System to the recipient ATS Message User Agent. The recipient UA retrieves the Public Key of the originating UA from a public key certificate using a supporting directory service. With the originators public key the recipient UA can verity the signed message.

5.2.5 Controls Applied to Data

5.2.5.1 Audit and Accountability (AU)

5.2.5.1.1 AMHS Traffic Logging

Traffic Logging is required as part of the basic AMHS service. Specifically, Doc 9705 requires that "an AMHS Management Domain shall be responsible for long-term logging of all messages in their entirety which are originated by its direct AMHS users, for a period of at least thirty days."

6. References

[Asia/Pac SSP] ASIA/PAC Aeronautical Telecommunication Network System Security Policy, Second Edition, September 2008

[Asia/Pac SSC] ASIA/PAC Aeronautical Telecommunication Network System Security Checklist, First Edition, May 2009

[NIST 800-34] National Institute of Standards and Technology (NIST) Special Publication (SP) 800-34, “Contingency Planning Guide for Information Technology Systems”

[NIST 800-53] National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53, “Recommended Security Controls for Federal Information Systems”

[NIST 800-61] National Institute of Standards and Technology (NIST) Special Publication (SP) 800-61, “Computer Security Incident Handling Guide”

[NIST 800-100] National Institute of Standards and Technology (NIST) Special Publication (SP) 800-100, “Information Security Handbook: A Guide for Managers”

ATTACHMENT A
CONTINGENCY PLAN OUTLINE

1. INTRODUCTION

1.1 Purpose

1.2 Applicability

1.3 Scope

1.4 References

[NIST 800-34]	National Institute of Standards and Technology (NIST) Special Publication (SP) 800-34, "Contingency Planning Guide for Information Technology Systems", June 2002

2. CONCEPT OF OPERATION

2.1 System Description

2.2 Line of Succession

2.3 Responsibilities

3. NOTIFICATION/ACTIVATION

3.1 Notification Procedures

3.2 Damage Assessment

3.3 Plan Activation

4. RECOVERY

4.1 Sequence of Recovery Activities

4.2 Recovery Procedures

5. RECONSTITUTION

ATTACHMENT B
INCIDENT RESPONSE PLAN OUTLINE

1. INTRODUCTION

1.1 Purpose

1.2 Applicability

1.3 Scope

1.4 References

[CSIRT] Carnegie Mellon Software Engineering Institute “Handbook for Computer Security Incident Response Teams (CSIRTs)”, April 2003

[NIST 800-61] National Institute of Standards and Technology (NIST) Special Publication (SP) 800-61, “Computer Security Incident Handling Guide”, January 2004

[RFC 2196] Fraser, B. Ed., “Site Security Handbook”, September 1997

[RFC 2350] Brownlee, N., and E. Guttman, “Expectations for Computer Security Incident Response”, June 1998

2. Contact Information

2.1 Name of the Team 1

2.1.1 Team Member 1

Address

Time Zone

Telephone Number

Facsimile Number

Other Telecommunication

Electronic Mail Address

Public Keys and Encryption Information

Other Information

2.1.n Team Member n

2.x Name of the Team x

3. Charter

3.1 Mission Statement

3.2 Constituency

3.3 Sponsorship and/or Affiliation

PHASED APPROACH TESTING AND IMPLEMENTATION

To ensure an orderly test arrangement and coordinated implementation, the following phased approach is recommended:

Phase I (Initial stage: AFTN routing at MTA)

(a) MTAs of BBIS, BIS and EBIS to conduct interoperability test using the CITP with direct connected MTAs. (e.g. Hong Kong – Japan, Hong Kong – Macao);

(b) Cutover from AFTN to AMHS after successful completion of the interoperability test; and

(c) The MTA routing should follow the AFTN Routing Directory

Phase II (Intermediate stage – MTA direct routing to end BBIS)

(a) MTAs of BBIS, BIS and EBIS to conduct interoperability test with MTAs of BBIS without direct connection. The AITP is to be used. (e.g. Hong Kong – Singapore, Hong Kong –Australia, Hong Kong – India etc); and

(b) When all BBIS are up and running and interoperability test between each and every oneof them is completed, the MTAs should change from AFTN routing to direct BBIS routing. This has to be executed by changing the static routing table of AMHS and ICAO should be informed of the change so that the progress can be monitored.

Note: The following prerequisites should be ready before cutover to direct BBIS routing:

1) All States registered as an AMC user at Eurocontrol to follow AMHS address update procedures before AMC database for the Asia/Pacific Region is established;

2) Each BBIS has at least two BBIS links up and running and every BBIS is able to connect directly or indirectly with other BBIS in the region; and

3) For BBIS with inter-regional connections, alternate links should be available to cater for inter-regional link interruptions.

Phase III (Final Stage: direct MTA-to-any MTA routing within the region)

(a) Subject to traffic pattern and resources available, MTA of BIS and EBIS should schedule to conduct interoperability test among themselves using the AITP; and

(b) After successful completion of the interoperability test, the corresponding MTA pairs under test can be enhanced to direct MTA-to-any MTA routing instead of relaying through the end BBIS.

Note: Completion of Phase III would be subject to the resources available at each State. The target date may be decided by ATNICG depending on the progress.

Phase IV

(a) When IPS is ready and the AMHS within the region are able to support IPS, repeat the aforesaid interoperability tests using the IPS ATN.

(b) Transition the OSI router at BBIS to IPS first, then followed by BIS and EBIS.

4.2 A sample routing table showing the corresponding changes from AFTN routing in Phase I to direct MTA-to-any MTA routing in Phase III is given at Appendix A.

– – – – – – – – – – – –

TERMS OF REFERENCE OF
THE ICAO INTER-REGIONAL SATCOM VOICE TASK FORCE
(paragraph 4.3.8 of NAT SPG/46 refers)

Deliverable(s)

a) A globally applicable Guidance Material for the use of AMS(R)S voice for ATS communications.

Scope of work

The following are the broad principles describing the scope of work:

a) Take into account the NAT and any other existing guidance material related to the use of SATCOM voice for ATS communications;
b) In the spirit of the NAT SPG Conclusion 44/11 and NAT SPG/45, paragraph 2.2.4, the guidance material would be developed within the global ICAO RCP framework to provide States with some flexibility to apply different standards for different uses, without implication to seamless operations;
c) Take into account the FAA PARC CWG work on developing a performance based specification to evaluate third party SATCOM voice as an approved long range communication system (LRCS).
d) Take account of the ongoing revision of the aircraft equipment approval guidance material, e.g. by EASA and FAA; and
e) Accommodate any ICAO AMS(R)S compliant system.

The following items/scenarios should be considered in the scope of work:

a) Use of AMS(R)S voice for ATS communications via third party radio operator (No MEL relief considerations);
b) Minimum Equipment List (MEL) relief 1 HF + 1 SATCOM;
c) Use of portable SATCOM phones;
d) 1 or 2 portables or installed satellite phones and no HF radio at all; and
e) Use of SATCOM voice direct to controller communications.

Composition

Additional membership should be invited including aircraft operators, aircraft and equipment manufacturers, and satellite communications service providers.

Conduct of the work and schedule

The completion of this task requires more availability of resources than it was foreseen for the first 2 steps by the state letter EUR/NAT 10-0165.TEC. It would require a series of direct meetings among task force members in addition to teleconferences and other electronic means of communications. The ICAO Secretariat is ready to continue supporting this work but more involvement from the States will be required. The tentative completion date for this task, provided that this ToR is approved by the NAT SPG and APANPIRG and resources are made available, would be December 2011.

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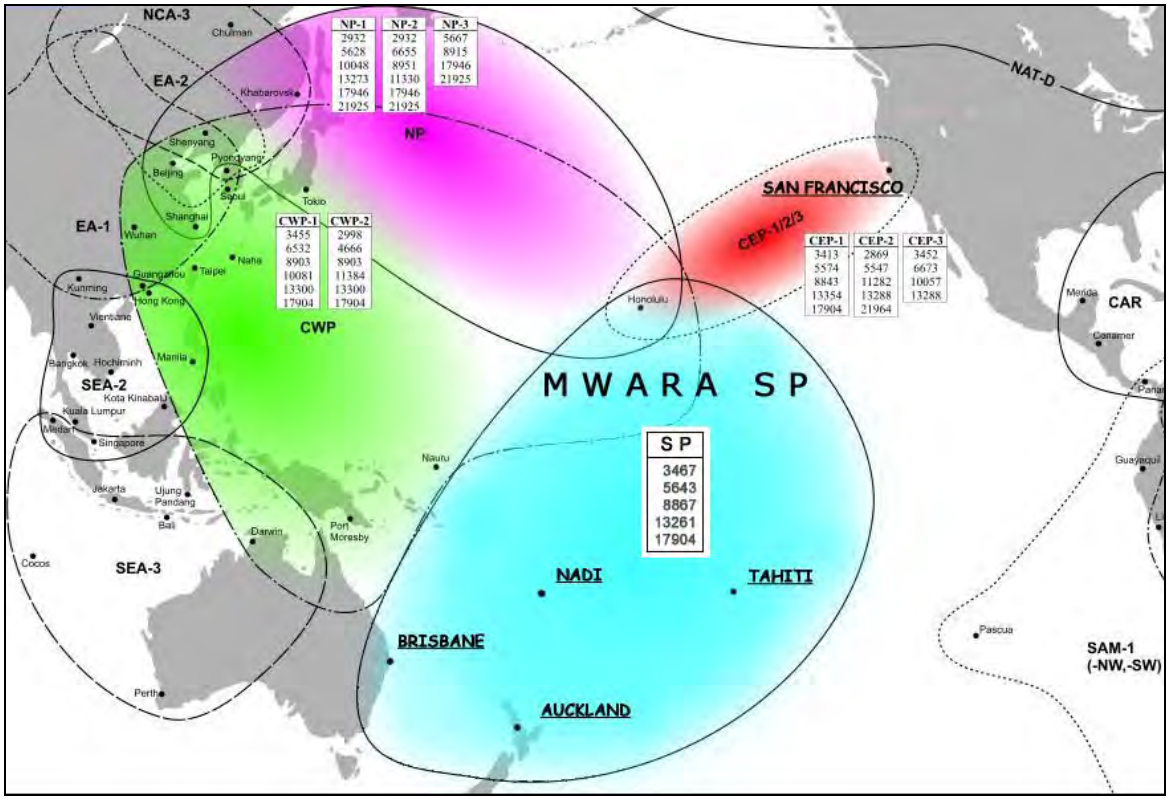
ISPACG Informal South Pacific Air Traffic Services Coordinating Group		***Reference:*** ***ICAO APAC Regional Guidance Material*** ***GM-AMS001-Part 1***

ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP

September 2010



High Frequency Management Guidance Material For the South Pacific Region

Version 1.0 April 2010

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Table of Contents

Change Record

This chart provides records of changes to Version 0.1 and forward.

	Paragraph(s)	**Explanation**
.Version 0.2	Document identification	Callahan instead of Callaha
	Document identification	HF Frequency Management Guidance Materiel for the South Pacific Region instead of HF Frequency Management Guidance Materiel
	Acknowled-gements	Acknowledgement instead of thank you
	1.1.1	South Pacific instead of North Atlantic
	2.3.2	SP 6 instead of SP
	3.1.4.1.1 figure 2	Appendix instead of appendic
	3.1.4.3.1 figure 4	New map of the sectors in the NZZO FIR
	3.1.4.6.1	Selected instead of choose
	3.1.4.4.1	HF frequencies datas move to paragraph 3.1.4.3.1
	4.2.1 figure 7	New map of New Zealand FIR
	4.3.1 figure 8	New map of Nadi FIR
	5.5.1	Web link from www.ips.gov.au for SFO station
	Appendix B1	Datas from Airservices Australia Added the SATCOM SHORT CODE Nr. : 45 03 02
	Appendix B.2	Country code for New Zealand Added the SATCOM SHORT CODE Nr. : 45 12 01
	Appendix B.5	Added the SATCOM SHORT CODE Nr. : 42 27 90
.Version 0.3	3.1.4.4.1	Added RDARA **9B**
	3.1.4.51	Changed “there is no RDARA activity in the KZAK FIR”, instead of “There isn’t a RDARA network in activity in the KZAK FIR”
	Appendix B.2	Changed shift managers Robin Lee instead of Julie Wagner
.Version 0.4	Appendix B.5	Tahiti Control instead of Tahiti Radio
.Version 0.5	3.1.5	Added Brisbane Volmet station
.Version 1.0	Appendix B.4	Corrections on frequencies , stations and duty manager

Acknowledgements

The HF working group would like to acknowledge the OACI bureau of Paris and M. Cabral from the North Atlantic Systems Planning Group - Aeronautical Communications Group which accept that we re use part of the HF propagation theory published in the ICAO document NAT Doc 003 "*High Frequency Management Guidance Material For the North Atlantic Region*" and Mr. Hristo Hirvonen who autorize them to use his map of the SP MWARA in the first page of the document.

Preface

This Document is published by the Informal South Pacific ATS Co-ordination Group, and managed by the High Frequency Working Group, and is for guidance. Regulatory material relating to South Pacific communications procedures is contained in relevant ICAO Documents and Annexes. Annex 10 – Volume II, ITU Radio Regulations, Regional Supplementary Procedures (Doc. 7030), FASID, NAT OPS Manual, State AIP and current NOTAM's, which should be read in conjunction with the guidance material contained in this document.

To assist with the editing of this document and to ensure the currency and accuracy of future editions, comments and suggestions for possible amendments should be sent to the editor, to the contact information included in the document identification section.

List of Acronyms

ACARS	Aircraft Communication Addressing and Reporting System
ACC	Area Control Centre
ACG	Aeronautical Communications Group
ACID	Aircraft Identification
AIP	Aeronautical Information Publication
AFTN	Aeronautical Fixed Telecommunication Network
AMS	Aeronautical Mobile Service
ARINC	Aeronautical Radio INC.
ARP	Air Report Message
ATC	Air Traffic Control
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
ATS	Air Traffic Services
ATSMP	Air Traffic Services Message Processor
ATSU	Air Traffic Services Unit
CAA	Civil Aviation Authority
CNS	Communications, Navigation and Surveillance
EMG	Emergency Message
FAP	Frequency Allotment Plan
FDPS	Flight Data Processing System
FIR	Flight Information Region
FMC	Flight Management Computer
FMS	Flight Management System
GP	General Purpose
GPS	Global Positioning System
HF	High Frequency (3 to 30 MHz)
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
ISPACG	Informal South Pacific ATS Coordinating Group
ITU	International Telecommunications Union
LDOC	Long Distance Operations Control
kHz	Kilohertz
LF	Low Frequency (30 to 300 kHz)
LUF	Lowest Usable Frequency
MET	Meteorological
MF	Medium Frequency (300 to 3000 kHz)
MHz	Megahertz
MUF	Maximum Usable Frequency
MWAR	Major World Air Route
MWARA	Major World Air Route Area
NAT	North Atlantic
NAT SPG	North Atlantic Systems Planning Group
NOTAM	Notice to Airmen
OCA	Oceanic Control Area
POS	ICAO Position Report Message
RDAR	Regional and Domestic Air Routes

RDARA	Regional and Domestic Air Route Area
R/T	Radio-Telephony
SARPS	Standards and Recommended Practices
SEAC - PF	Service d'Etat de l'Aviation Civile en Polynésie Française
SELCAL	Selective Calling System
SP	South Pacific
VHF	Very High Frequency (30 to 300 MHz)
VLF	Very Low Frequency (3 to 30 kHz)
WP	Waypoint Position
WPR	Waypoint Position Reporting

1 Introduction

1.1 Purpose of the document

1.1.1 The purpose of this document is to provide a guidance methodology for the utilisation of the Families and Frequencies employed by the Aeronautical Communication Stations on the South Pacific, to support a better management plan of the available families, frequencies and human resources, in order to increase the efficiency and capacity of the Communications Network.

1.1.2 It will also include information about HF frequencies for air-ground communications. In addition, it will contain contact information for Aeronautical Stations.

2 Operational concept

2.1 Overview

2.1.1 The Aeronautical Mobile Service is a service reserved for air-ground communications related with the safety and regularity of flights, flying primarily along national or international civil air routes.

2.1.2 In areas like the South Pacific, where VHF coverage is insufficient due to range limitation to cover all portions of the routes flown, the use of HF frequencies are necessary because they provide long range communications coverage, not only for air-ground voice communications, but also for the broadcast of ATS or Meteo information.

2.1.3 For various reasons, some technical, others economical, environmental, physical, natural, etc., coverage of a wide area by a single station with equipment located in a single place are impractical.

2.1.4 Taking these factors into account, the most practical option is to employ a number of stations sharing a range of frequencies and working as a network to provide the facilities and services required for the AMS.

2.1.5 To work as a network the AMS should follow appropriate principles of operation, in order to achieve the highest possible level of capacity and efficiency, otherwise, its purpose will not be achieved and the safety and regularity of flights will be affected.

2.2 HF medium characteristics

2.2.1 This section presents only a short description on the HF medium characteristics, a more detail description can be found in Appendix A.

2.2.2 As a general rule, radio signals travel in straight lines, that is, they follow great circle paths over the surface of the earth. Under certain circumstances, however, the path of a signal may change direction; this change of direction is called refraction. Refraction examples are coastal, atmospheric and ionospheric, and the amount of refraction varies considerably, depending on certain conditions. Those conditions could be a change in direction when a signal crosses a coastline (coastal refraction), a change in direction due to a variation in temperature, pressure and humidity, particularly at low altitude (atmospheric refraction), or a change in direction when the radio wave passes through an ionised layer (ionospheric refraction).

2.2.3 The ionosphere is still under investigation but it is known that several definite ionised layers exist within it. During daytime hours there are four main ionisation layers designated D, E, F_1 and F_2 in ascending order of height. At night, when the sun's radiation is absent, ionisation still persists but it is less intense, and fewer layers are found (D and F layers). Factors that affect the ionosphere layers is strength of the sun's radiation, since it varies with latitude causing that the structure of the ionosphere varies widely over the earth's surface, and the state of the sun, since sunspots affect the amount of ultra-violet radiation.

2.2.3.1 Maximum Usable Frequency (MUF) at night is much less than by day, because the intensity of ionisation in the layer is less so than lower frequencies have to be used to produce the same amount of refractive bending and give the same critical angle and skip distance as by day. However, the signal attenuation in the ionosphere is also much less at night so the lower frequency needed is still usable. Hence the night frequency for a given path is about half of the day frequency, and shorter distances can be worked at night than by day while still using a single reflection from the F layer.

2.2.3.2 The MUF not only varies with path length and between day and night, but also with season, meteor trails, sunspot state, and sudden ionospheric disturbances produced by eruptions on the sun. Because of the variations of MUF, HF transmitting stations have to use frequencies varying widely between about 2 and 20 MHz.

2.2.4 As consequence of this conditions, frequency band usage can be viewed in the following table:

Areas	Bands between: (MHz)	Sharing conditions
MWARA area	3 and 6.6	Night propagation
	9 and 11.3	Day propagation
	Higher than 13	Day propagation

Table 1: Frequency band usage (ref. ITU Appendix 27 Aer2)

2.3 Radiotelephony Network

2.3.1 Definition

2.3.1.1 A radiotelephony network is defined as a group of radiotelephony aeronautical stations which operate on and guard frequencies from the same family and which support each other in a defined manner to ensure maximum dependability of air-ground communications and dissemination of air-ground traffic

2.3.2 SP 6 Radiotelephony Network Composition

2.3.2.1 In the South Pacific 6 network there are five aeronautical stations, one per each of the Oceanic FIR's, responsible for the provision of air-ground communications as part of the Aeronautical Mobile Service.
They are:

Brisbane Radio (Australia, Brisbane ACC),
Auckland Radio (New Zealand, Auckland OACC),
Nadi Radio (Fiji, Nadi ACC),
San Francisco Radio (USA, Oackland OACC) and
Tahiti Radio (French Polynesia, Tahiti OACC).

2.3.2.2 To support the air-ground communications of the AMS in the South Pacific 6 network, five frequencies were allocated by the ITU (Appendix 27 Aer2), in different bands to ensure SP MWARA, continuous coverage.

2.3.2.3 To separate International and Domestics (Regionals) flights some states use their own RDARA network. (defined in paragraph 3.1.4)

2.3.3 Principles of Network Operation

2.3.3.1 The aeronautical stations of a radiotelephony network should assist each other in order to provide the air-ground communication service required of the network by aircraft flying on the air routes for which the network is responsible.

2.3.3.2 When the network comprises a large number of stations, network communications for flights on any individual route segment should be provided by selected stations, termed “regular stations” for that segment. In principle, the regular station will be those serving the locations immediately concerned with flights on that route segment, i.e. points of take-off and landing and appropriate flight information centres or area control centres.

2.3.3.3 In areas or on routes where radio conditions, length of flights or distance between aeronautical stations require additional measures to ensure continuity of air-ground communications throughout the route segment, the regular stations should share between them a responsibility of primary guard whereby each station will provide the primary guard for that portion of the flight during which the messages from the aircraft can be handled most effectively by that station.

2.3.3.4 During its tenure of primary guard, each regular station should, among other things:

a) be responsible for designating suitable primary and secondary frequencies for its communications with the aircraft;
b) receive all position reports and handle other messages from and to the aircraft essential to the safe conduct of the flight;
c) be responsible for the action required in case of failure of communication.

2.3.4 Frequencies to be used

2.3.4.1 Aircraft stations shall operate on the appropriate radio frequencies.

2.3.4.2 The air-ground radio station shall designate the frequency(ies) to be used under normal conditions by aircraft stations operating under its control.

2.3.4.3 In network operation, the initial designation of primary and secondary frequencies should be made by the network station with which the aircraft makes pre-flight check or its initial contact after take-off. This station should also ensure that other network stations are advised, as required, of the frequency(ies) designated.

2.3.4.4 An aeronautical station when designating frequencies, should take into account the appropriate propagation data and distance over which communications are required.

2.3.4.5 If a frequency designated by an aeronautical station proves to be unsuitable, the aircraft station should suggest an alternative frequency.

2.3.5 Establishment of communications

2.3.5.1 Aircraft stations shall, if possible, communicate directly with the air-ground control radio station appropriate to the area in which the aircraft are flying. If unable to do so, aircraft stations shall use any relay means available and appropriate to transmit messages to the air-ground control radio station.

2.3.5.2 When normal communications from an aeronautical station to an aircraft station cannot be established, the aeronautical station shall use any relay means available and appropriate to transmit messages to the aircraft station. If these efforts fail, the originator shall be advised.

2.3.5.3 When, in network operation, communication between an aircraft station and a regular station has not been established after calls on the primary and secondary frequencies, aid should be rendered by one of the other regular stations for that flight, either by calling the attention of the station first called or, in case of a call made by an aircraft station, by answering the call and taking the traffic.

2.3.5.4 Other stations of the network should render assistance by taking similar action only if attempts to establish communication by the regular stations have proved unsuccessful.

2.3.6 Transfer of communications

2.3.6.1 The transfer of primary guard from one station to the next will normally take place at the time of the traversing of flight information region or control area boundaries, this guard being provided at any time, as far as possible, by the station serving the flight information centre or area control centre in whose area the aircraft is flying.

2.3.6.2 An aircraft station should be advised by the appropriate aeronautical station to transfer from one radio frequency or network to another. In the absence of such advice, the aircraft station should notify the appropriate aeronautical station before such transfer takes place.

2.3.6.3 In the case of transfer from one network to another, the transfer should preferably take place while the aircraft is in communication with a station operating in both networks to ensure continuity of communications. If, however, the change of network must take place concurrently with the transfer of communication to another network station, the transfer should be co-ordinated by the two network stations prior to advising or authorizing the frequency change. The aircraft should also be advised of the primary and secondary frequencies to be used after the transfer.

2.3.7 Communications failure

2.3.7.1 When an aircraft station fails to establish contact with the aeronautical station on the designated frequency, it shall attempt to establish contact on another frequency appropriate to the route. If this attempt fails, the aircraft station shall attempt to establish communication with other aircraft or other aeronautical stations on frequencies appropriate to the route. In addition, an aircraft operating within a network shall monitor the appropriate VHF frequency for calls from nearby aircraft.

2.3.7.2 When an aeronautical station has been unable to establish contact with an aircraft station after calls on the frequencies on which the aircraft is believed to be listening, it shall:

a) Request other aeronautical stations to render assistance by calling the aircraft and relaying traffic, if necessary;
b) Request aircraft on the route to attempt to establish communication with the aircraft and relay traffic, if necessary.

2.3.7.3 The air-ground control radio station shall notify the appropriate air traffic services unit and the aircraft operating agency, as soon as possible, of any failure in air-ground communications.

2.4 SELCAL operation

2.4.1 With the selective calling system known as SELCAL, the voice call is replaced by the transmission of coded tones to the aircraft over the radiotelephony channels. A single selective call consists of a combination of four pre-selected audio tones whose transmission requires approximately two seconds. The tones are generated in the aeronautical station coder and are received by a decoder connected to the audio output of the airborne receiver. Receipt of the assigned tone code activates a cockpit call system in the form of light and/or chime signals.

3 SP6 Frequencies Allotment Plan

3.1 Frequency Allotment Plan for the Aeronautical Mobile Service (AMS)

3.1.1 The frequencies allocated for use in the South Pacific, are based on the Frequency Allotment Plan, for the MWARA - SP as defined on the "Appendix 27 Aer2 to the Radio Regulations – Frequency Allotment Plan for the Aeronautical Mobile (R) Service and Related Information".

3.1.2 Major World Air Route Area – South Pacific (MWARA - SP)

3.1.2.1 The MWARA - SP is an area defined as the area from the from the South Pole through the points 38° S 145° E, 00° 167° E, 00° 175° W, 22° N 158° W, 22° N 156° W, 00° 120° W to the South Pole, and can be viewed on Figure **1** (Ref. ITU Appendix 27 Aer2).

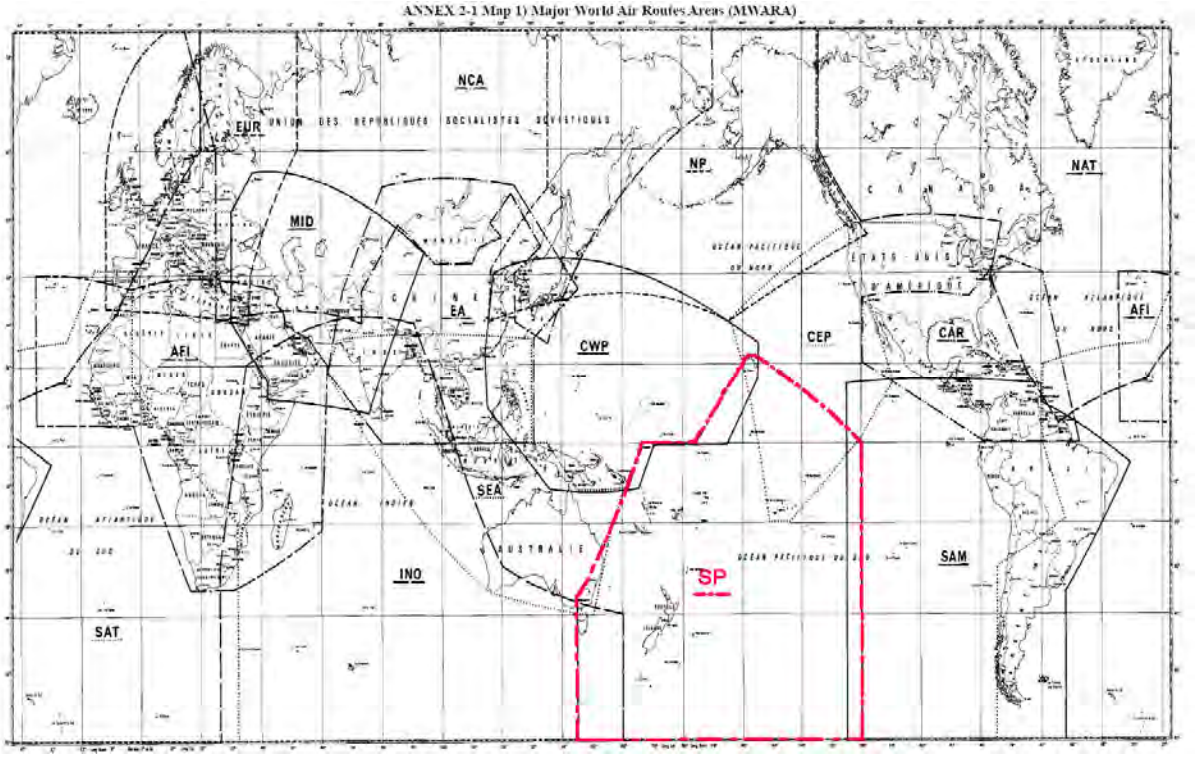

Figure 1 : MWARA – SP (Ref. ITU Appendix 27 Aer2)

3.1.3 MWARA – SP Frequencies

3.1.3.1 The frequencies allocated to the MWARA – SP includes a number of frequencies in a range of bands designed to provide twenty-four hour area coverage and are contained in Table **2**.

Area	Frequency Bands								
	3.5	**4.7**	**5.6**	**6.6**	**9**	**10**	**11.3**	**13.3**	**18**
	kHz	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**
SP	3467		5559 5643		8867	10084	11327	13300	17904

- Frequency 3467 shared with MWARAs AFI, MID ,RDARAs 10B and 13D
- Frequency 5559 shared with RDARAs 2A, 4A, 6G, 10E, 12G and 13J
- Frequency 5643 shared with RDARA 3C
- Frequency 8867 shared with RDARAs 6G, 10C, 13D and 13M
- Frequency 10084 shared with MWARA EUR , RDARAs 6E and 13D
- Frequency 11327 shared with RDARA 3B , 5 and 13C
- Frequency 13300 shared with MWARAs CEP, CWP, NP and RDARA 4
- Frequency 17904 shared with MWARAs CEP, CWP, NP and RDARA 4

Table 2 : Frequency bands of the MWARA – SP (Ref. ITU Appendix 27 Aer2)

3.1.3.2 The **SP 6 NETWORK** uses **13261 kHz** instead of **13300 kHz**. This change was endorsed by ICAO in 1987 (refer ASIA/PAC FASID Doc 9673, 2001 Appendix Chart CNS4). The ITU-R Radio Regulations AP27/213 (WRC 2000) will be updated to reflect this change.

3.1.3.3 The **SP 6 NETWORK** use the following frequencies in kHz :

3467	**5643**	**8867**	**13261**	**17904**

Table 3 : HF Frequencies SP6 NETWORK (in KHz)

3.1.4 RDARA networks in the South Pacific area

3.1.4.1 THE APPENDIX 27 (REV. WRC-03) FROM THE ITU RR :

3.1.4.1.1 The ITU gives the definition of the South Pacific's RDARA 9.

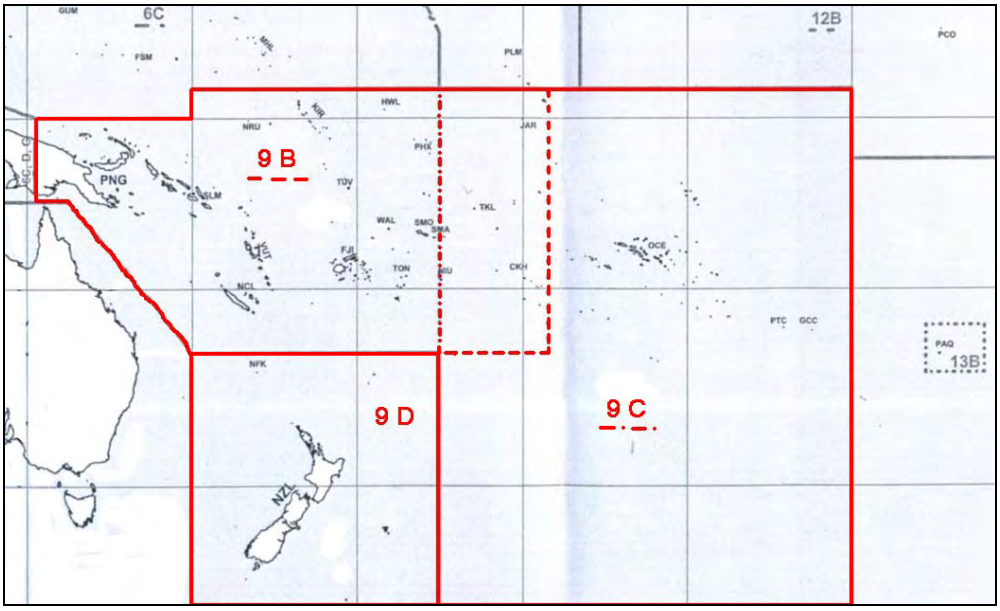

Figure 2 : RDARA Map - South Pacific (Appendix S27 ITU RR)

3.1.4.1.2 Regional and Domestic Air Route Area – 9 (RDARA-9)

From the South Pole along the 160° E meridian to 27° S. Then through the points 19° S 153° E, 10° S 145° E, 10° S 141° E, 00° 141° E, 00° 160° E, 03° 30' N 160° E, 03° 30' N 120° W. Then along the 120° W meridian to the South Pole.

3.1.4.1.3 Sub-Area 9B

From the point 00° 141° E through points 10° S 141° E, 10° S 145° E, 27° S 160° E, 27° S 157° W, 03° 30' N 157° W, 03° 30' N 160° E, 00° 160° E to the point 00° 141° E.

3.1.4.1.4 Sub-Area 9C

From the South Pole along the 170° W meridian to 03° 30' N. Then through the point 03° 30' N 120° W and along the 120° W meridian to the South Pole.

3.1.4.1.5 Sub-Area 9D

From the South Pole along the 160° E meridian to 27° S. Then through the point 27° S 170° W and along the 170° W meridian to the South Pole.

3.1.4.2 BRISBANE FIR (YBBB) :

3.1.4.2.1 The Australian RDARA network area n°14 is divided in three sub-area with 3 frequencies (in KHz) in use for each.

Sub-area 14C: NORTHWEST

coordinates: From the South Pole along the 110° E meridian to 19° S. Then through the points 19° S 118° E, 24° S 120° E, 24° S 137° E, 34° S 151° E, 34° S 160° E . Then along the 160° E meridian to the South Pole

3452	**6541**	**8843**

Sub-area 14B: NORTHEAST

coordinates: From the point 19° S 110° E to the point 10° S 110° E, 10° S 139° E, 16° S 139° E, 16° S 137° E, 24° S 137° E, , 24° S 120° E, 19° S 118° E to the point 19° S 110° E.

3452	**6610**	**8831**

Sub-area 14A: SOUTHERN

coordinates :From the point 24° S 137° E, 16° S 137° E, 16° S 139° E, 10° S 139° E, 10° S 145° E to the point 27° S 160° E, 34° S 160° E to the point 24° S 137° E.

3461	**6565**	**8822**

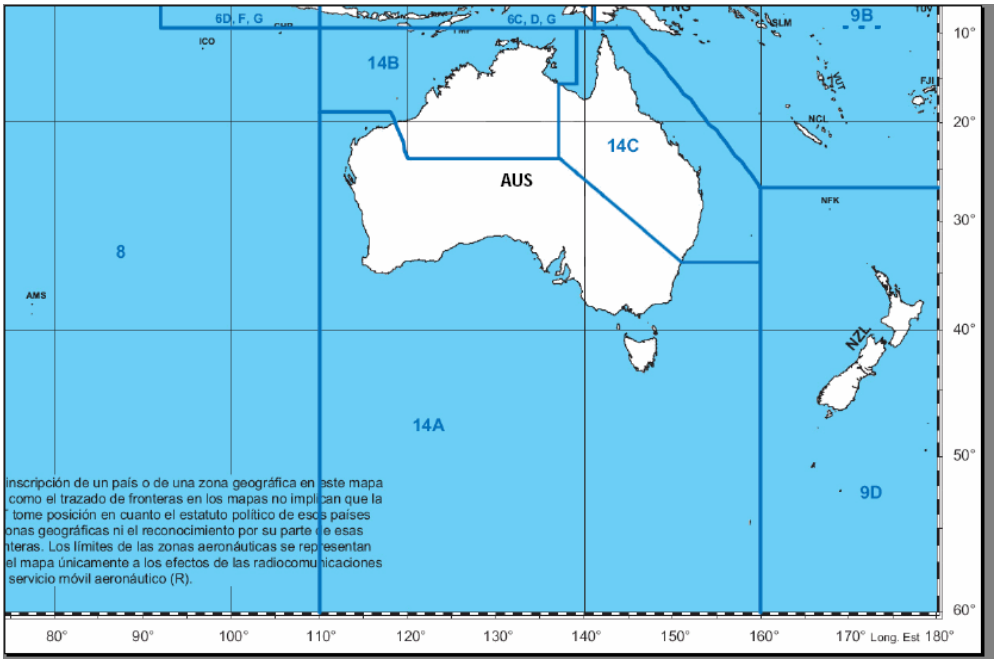

Figure 3 : Australian RDARA network

3.1.4.3 AUCKLAND FIR (NZZO):

3.1.4.3.1 New Zealand authorities don't implement a RDARA network in the NZZO FIR. However the following airports use HF frequencies from the RDARA 9B:

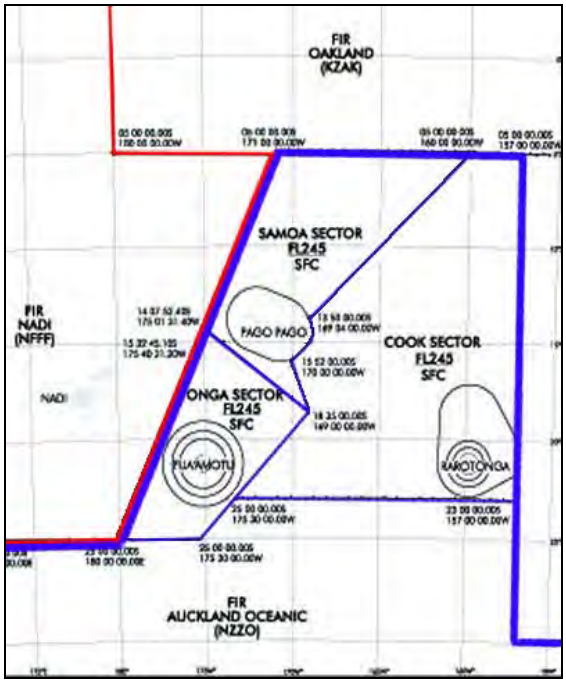

Figure 4 : Sectors in the NZZO FIR

- **Rarotonga (Cook sector) :**

3425	**6553**	**8846**	**11339**

- **Niue :**

6553	**8846**

- **Faleolo (Samoa sector):**

3425	**6553**	**8846**	**11339**

- **Fua'amotu (Tonga sector):**

3425	**6553**	**8846**	**11339**

3.1.4.4 NADI FIR (NFFF):

3.1.4.4.1 The following RDARA network (9B) is operational in the Nadi FIR.(see map chap 4.3.1)

- **Nadi :**

3425	**6553**	**8846**	**11339**

- **Funafuti:**

6553	**8846**	**11339**

3.1.4.5 OACKLAND FIR (KZAK):

3.1.4.5.1 There is no RDARA activity in the KZAK FIR.

3.1.4.6 TAHITI FIR (NTTT):

3.1.4.6.1 The French civil Aviation in the French Polynesia (SEAC-PF) will create a RDARA network with 3 HF frequencies in 2009. The frequencies are selected in RDARA 9C network from the ITU.

This future network will use the following frequencies (in KHz):

5481	**8873**	**11312 or 11279**

3.1.5 VOLMET Stations in the South Pacific.

VOLMET Stations broadcast meteorological bulletins in following HF frequencies (kHz):

3.1.5.1 Auckland VOLMET Station :

6679	**8828**	**13282**

3.1.5.2 Brisbane VOLMET Station :

6676	**11387**

3.2 Frequency allocation principles

3.2.1 Taking into account the characteristics of the HF medium, the general principles for frequency assignment used by radio station personnel is as outlined in 2.2.4 and contained in Table **4**.

Bands between: (MHz)	Sharing conditions
3 and 6.6	Night propagation
9 and 11.3	Day propagation
Higher than 13	Day propagation

Table 4 : General principes for frequency assigment

3.2.2 As a general rule, when assigning primary and secondary frequencies, radio station personnel should assign lower frequencies as primary and higher frequencies as secondary for aircraft flying away from the Station. Conversely, for aircraft routing towards the station, the higher frequencies should be assigned as primary and lower frequencies as secondary.

3.2.3 In circumstances were sunspot or solar flare activity is expected to affect propagation conditions, the radio station personnel should always inform the flight crews and in addition to assigning the primary and secondary frequencies, they should advise the highest frequencies in use at the station as a precautionary measure.

3.2.4 In accordance with the principles governing transfer of communications as defined in paragraph 2.3.6, stations sharing a common boundary should, whenever possible, assign common frequencies for the transfer of communications.

3.2.5 Aircraft routing along common boundaries, or flying a route or portion of a route within 60 NM of a common boundary, should be assigned frequencies common to the stations sharing those boundaries.

4 FIR coordinates and maps

4.1 BRISBANE FIR

.

4.1.1 The Brisbane FIR is an area from the South Pole through the points 38° S 145° E, 25°S 155° E 21° 163° E 00° 167° E, 00° 175° W, 22° N 158° W, 22° N 156° W, 00° 120° W to the South Pole.

Figure 5 : Map of Australian's FIR

4.1.2 The SP6 Network area is a part of the Brisbane FIR. The coordinates of this area are :

Lateral limits : 44 33 57S - 150 00 00E ; 45 00 00S -150 00 00E
45 00 00S - 163 00 00E ; 21 22 50S -163 00 00E
24 49 40S - 153 56 22E ; 24 59 04S -154 00 31E
then along the minor arc of a circle of 150.00 NM radius centred on
27 21 57S -153 08 21E (BN/DME) to 29 49 13S -153 42 58E
30 40 20S -153 08 21E ; 32 53 01S -152 26 31E
33 30 06S -151 54 31E;
then along the minor arc of a circle of 45.00 NM radius centred on
33 56 34S -151 10 51E (SY/DME) to 34 28 18S -151 49 23E
35 18 59S -152 55 50E;
then along the minor arc of a circle of 120.00 NM radius centred on
34 57 00S -150 32 00E (NWA/TAC) to 36 56 43S -150 45 03E
38 11 19S -150 19 14E ; 43 00 00S -151 00 00E
43 51 03S -150 39 53E ; 44 33 57S -150 00 00E

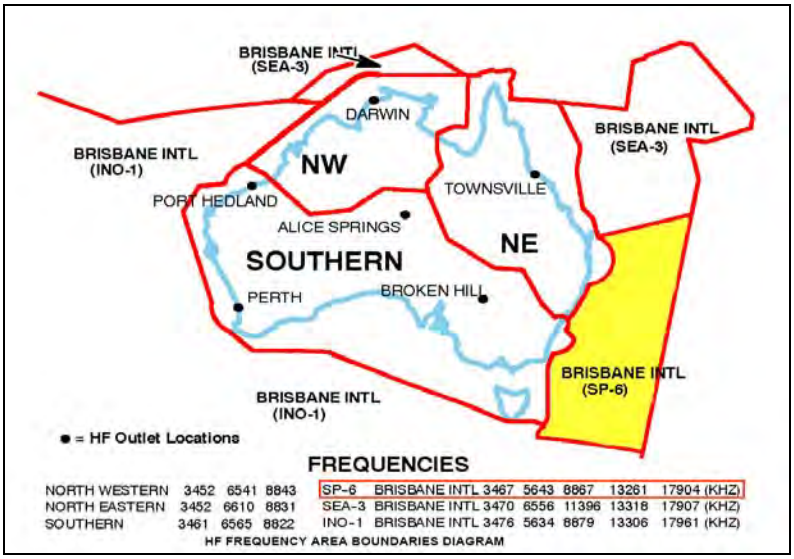

Figure 6 : Map of Australia - HF Frequencies Areas

4.2 AUCKLAND FIR

4.2.1 The Auckland Oceanic FIR is that airspace bounded on the west by meridian 16300E, on the east by meridian 13100W, and extending south to the South Pole, and on the north by a line joining 3000S 16300E, 2800S 16800E, 2500S 17125E, 2500S 18000E, 153245.1S 1754031.2W, 0500S 17100W, 0500S 15700W, 3000S 15700W, 3000S 13100W from surface to FL999 and excluding the New Zealand (Domestic) FIR

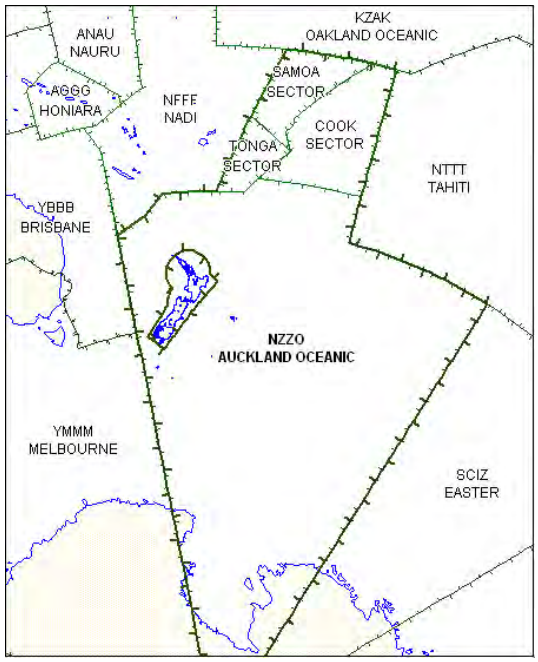

Figure 7 : map of the Auckland Oceancic FIR

4.3 NADI FIR

4.3.1 The coordinates of the Nadi FIR are shown in the table 5 :

Name	Horizontal imits	Vertical limits
Nadi Flight Information Region	N 03 30.0 - E 170 00.0 – N 03 30.0 - E 180 00.0 – S 05 00.0 - W 180 00.0 – S 05 00.0 - W 171 00.0 – S 25 00.0 - E 180 00.0 – S 25 00.0 - E 171 25.0 – S 28 00.0 - E 168 00.0 – S 30 00.0 - E 163 00.0 – S 17 40.0 - E 163 00.0 – S 14 00.0 - E 161 15.0 – S 14 00.0 - E 163 00.0 – S 10 00.0 - E 170 00.0 – N 03 30.0 - E 170 00.0	Surface to 9500 ft and above FL460
New Caledonia Sector	S 14 00.0 - E 165 15.0 – S 14 00.0 - E 163 00.0 – S 21 00.0 - E 170 30.0 – S 24 00.0 - E 170 30.0 – S 24 00.0 - E 163 00.0 – S 17 40.0 - E 163 00.0 – S 14 00.0 – E 163 00.0	Surface to FL245
Xport Vila Sector	S 14 00.0 - E 163 00.0 – S 13 00.0 - E 164 50.0 – S 13 00.0 - E 170 30.0 – S 21 00.0 - E 170 30.0 – S 14 00.0 - E 163 00.0	Surface to FL245
Vanua Sector	S 16 00.0 - E 176 40.0 – S 16 00.0 - E 178 10.0 – S 16 00.0 - W 178 00.0 – S19 20.0 - W 178 00.0 – S 19 20.0 - E 178 10.0 – S 19 20.0 - E 176 40.0 – S 16 00.0 - E 176 40.0	West pf E 178 10.0 outside Nadi CTR Surface to 5500ft East of E 178 10.0 outside Naurosi CTR Surface to 9500ft

Table 5 : Nadi FIR coordinates

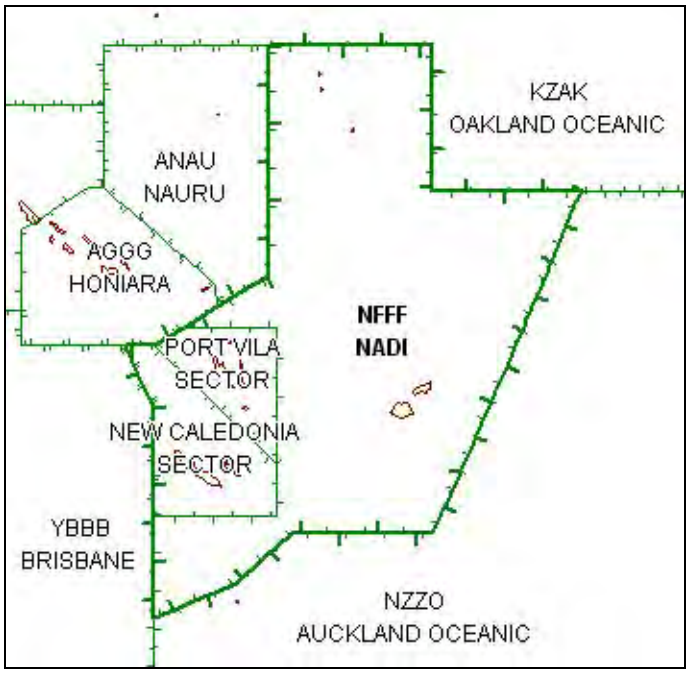

Figure 8 : Map of the NADI FIR

4.4 OAKLAND FIR

4.4.1 The coordinates of the OAKLAND FIR are:

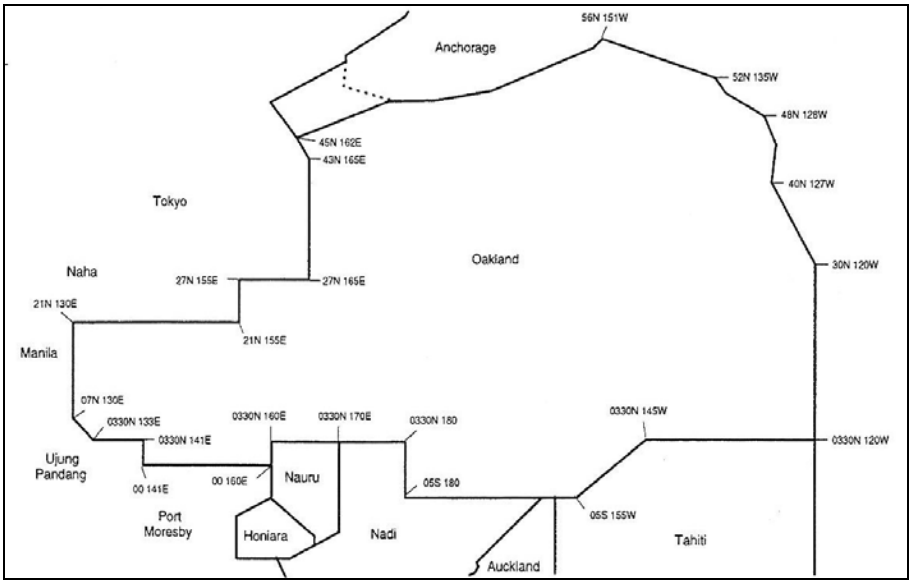

Figure 9 : Oakland FIR map with coordinates

4.4.2 The HF SP6 network is use in the sectors OC3 and OC4 from the Oakland FIR

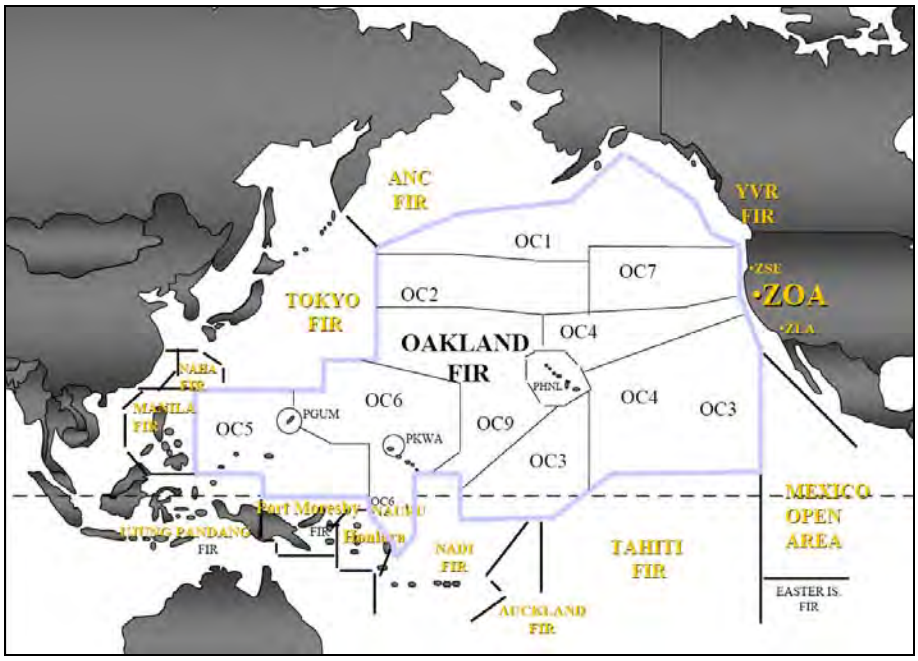

Figure 10 : Map of the OAKLAND FIR

4.5 TAHITI FIR

4.5.1 The TAHITI FIR's coordinates are:

03 30 00 N . 120 00 00 W – 30 00 00 S .120 00 00 W – 30 00 00 S . 157 00 00 W – 5 00 00 S . 157 00 00 W – 5 00 00 S . 155 00 00 W – 03 30 00 N . 145 00 00 W .

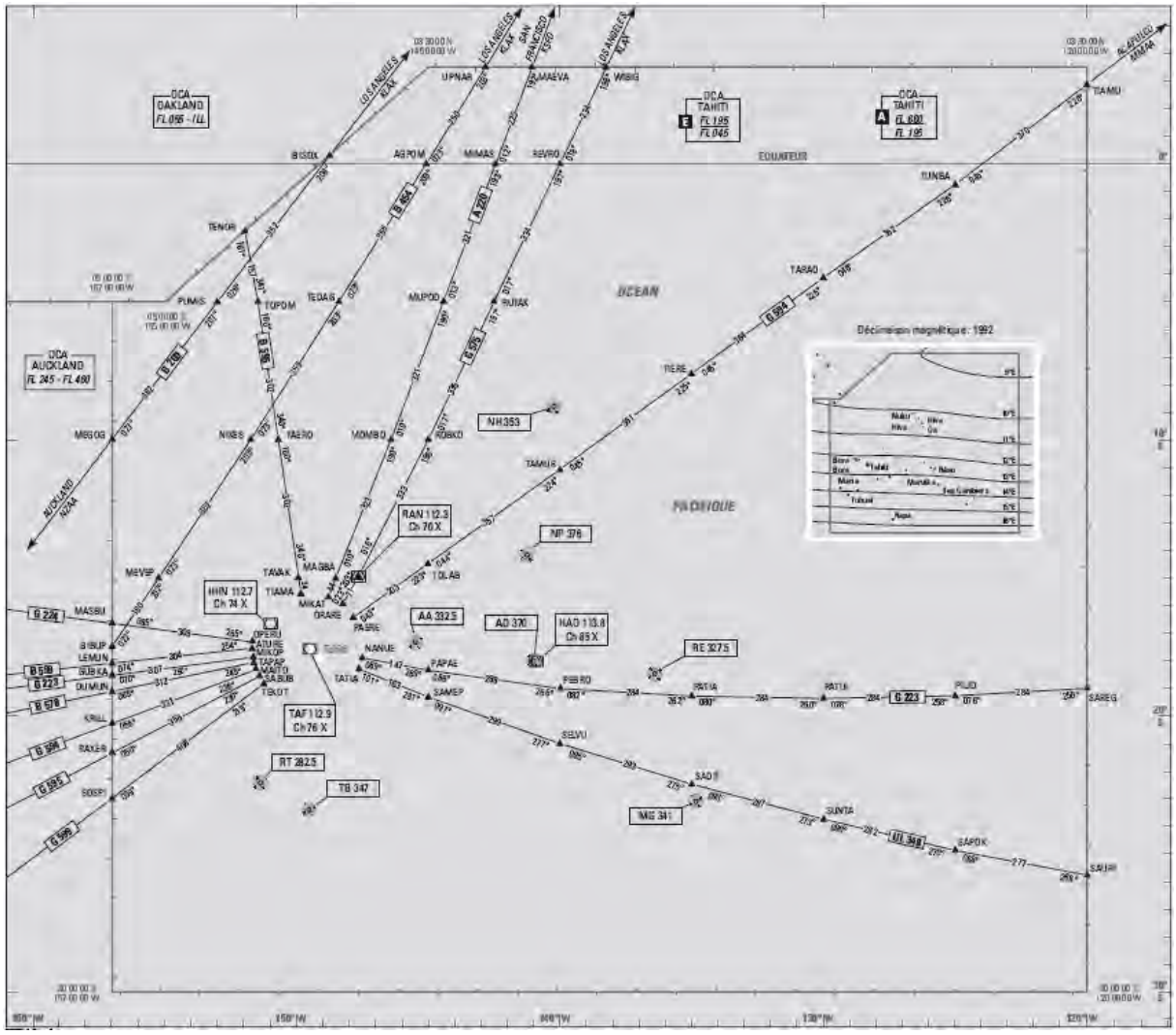

Figure 11 : Map of the TAHITI FIR

5 HF propagation prediction

5.1 AUSTRALIAN SPACE WEATHER AGENCY

5.1.1 The Australian Space Weather Agency provides in his Website : http://www.ips.gov.au predictions of HF propagation.

5.2 BRISBANE FIR

5.2.1 A special webpage was created for Airservices Australia: http://www.ips.gov.au/Products_and_Services/5/1

5.3 AUCKLAND FIR

5.3.1 After reaching this webpage http://www.ips.gov.au/HF_Systems/1/1/1 select the city of Auckland to get the map of the propagation conditions in the FIR.

5.4 NADI FIR

5.4.1 From this webpage http://www.ips.gov.au/HF_Systems/1/1/1 select the city of Nadi to get the map of the propagation conditions in the FIR.

5.5 OAKLAND FIR

5.5.1 The daily and hourly prediction of propagation are available on the IPS website : http://www.ips.gov.au/Products_and_Services/5/12

5.6 TAHITI FIR

5.6.1 The IPS Web site provide for the FIR of Tahiti this link : http://www.ips.gov.au/HF_Systems/1/1/2

5.6.2 Using theses informations the SEAC-PF has developped this website used by the ATC controllers daily.

http://pro.hilaire.org/hf/
login: prophf
passwd: 2M3H0Z

6 General notes

6.1 Hours of service

6.1.1 Each station of the SP 6 network works 24/24 and 7/7.

6.2 Points of contact

6.2.1 Contact details of the station managers and watch supervisors for each radio station are contained in the Annexes section as follows: Appendix B-1 (Brisbane), Appendix B-2 (Auckland), Appendix B-3 (Nadi), Appendix B-4 (San Francisco) and Appendix B-5 (Tahiti)

6.3 Coordination principles

6.3.1 For routine day-to-day operations such as inter-station tactical co-ordination of frequency assignments, network co-operation and support, etc., contact should be made with the duty supervisor/watch manager using the contact means specified in Appendixes B-1, 2, 3, 4 and 5.

6.3.2 When the coordination between stations involves subjects such as procedures, institutional issues, or issues affecting the Network as a whole, etc., the contact to the station or stations should be made to the station manager through the points of contact defined in Appendixes B-1, 2, 3, 4 and 5.

6.4 Poor HF propagation conditions

6.4.1 Whenever a radio station duty supervisor/watch manager have access to information or warnings regarding poor HF propagation conditions or high levels of solar activities, that will affect the normal HF operations, he should notify the on duty Supervisor of the ATC unit in which the station provide the service.

6.5 HF operator

6.5.1 The FIR of Nadi, Brisbane, Auckland and Oakland use an Air Ground Operator.

6.5.2 In the FIR of Tahiti, the Air Traffic Controler is also the Air Ground Operator.

Appendices

Appendix A - HF medium characteristics

1.1 The term frequency is used to state the number of cycles occurring in one second, taking into account that cycle means a complete oscillation of the alternating current. The distance travelled by a radio signal during the transmission of one cycle is called wavelength. Wavelength is inversely proportional to frequency, so that if frequency is increased the wavelength will decrease.

1.2 If an alternating current of suitably high frequency is fed to a transmitting aerial, the energy is not confined to the metal of the aerial but radiates out into space in the form of electro-magnetic waves (radio waves). This radiation of energy through space comprises alternating and magnetic fields at right angles to each other.

1.3 As a general rule, radio signals travel in straight lines, that is, they follow great circle paths over the surface of the earth. Under certain circumstances, however, the path of a signal may change direction, this change of direction is called refraction. Refraction examples are coastal, atmospheric and ionospheric, and the amount of refraction varies considerably, depending on certain conditions. Those conditions could be a change in direction when a signal crosses a coastline (coastal refraction), a change in direction due to a variation in temperature, pressure and humidity, particularly at low altitude (atmospheric refraction), or a change in direction when the radio wave passes through an ionised layer (ionospheric refraction).

1.4 The path of a radio wave from a transmitter to a receiver many miles away is not necessarily direct, and in many cases, the signal may be reaching the receiver by more than one path at the same time. Because of the different path lengths there will be phase differences between the signals, and this fact will affect the resultant signal strength, phenomenon known as fading.

1.5 The main propagation paths between a transmitter and a receiver are, direct wave, ground-reflected wave, space wave, surface wave, ground wave and sky wave.

1.5.1 When a signal travels in a straight line between the transmitter and receiver it is called direct wave and its use is limited because of the earth curvature. If the radio wave arrive to the receiver after reflection at the earth's surface it is called ground-reflected wave. These two waves are jointly known as the space wave and under normal conditions it's the only propagation path for frequencies above 30 Mhz.

1.5.2 When a signal follows the curvature of the earth, this path is called surface wave, and is normally caused by a phenomenon called diffraction. Diffraction occurs for all types of wave motion, and allows the wave to pass round earth obstacles and depends on the wavelength in relation to the radius of the earth. The range of surface wave depends on the wavelengths, with longer wavelengths (lower frequencies) the diffraction effect becomes more pronounced with consequently improved surface wave range, the type of surface, because different surfaces absorb different amounts of radio energy resulting in different rates of attenuation, being higher over land than over sea, and the frequency used, with lower frequencies suffering less attenuation along the surface and therefore providing better surface wave range.

1.5.3 The combination of direct, ground-reflected and surface waves can be described has the ground wave. However, not all of those types of waves have to be necessarily present together.

1.5.4 When signals are reflected or refracted down from ionised layers above the earth the path is called sky waves, also sometimes called ionosphere waves.

1.6 Electron density Ultra-violet light from the sun can cause electrons to become separated from their parent atoms of the gases in the atmosphere. The atoms are left with resultant positive charges and are then known as ions. The intensity of the ionisation depends on the strength of the ultra-violet radiation and the density of the air.

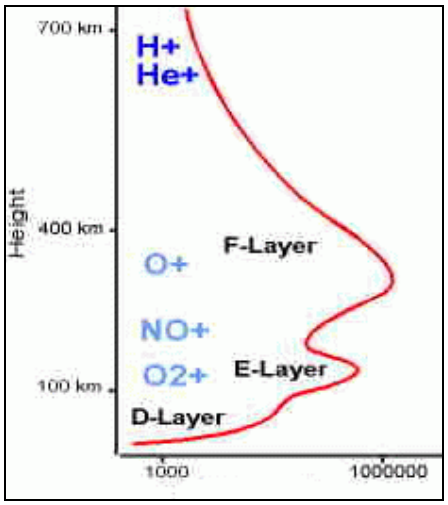

Figure 12 : Electron density (El/m^3)

The part of the atmosphere in which this process occurs is called the ionosphere, extending from about 50 Km to as high as 500 Km above the earth's surface. When a radio wave enters such a layer, refraction occurs causing the wave to be bent away from its straight path. The amount of refraction depends on the frequency, the angle at which the wave enters the layer, and the intensity of ionisation.

1.7 The ionosphere is still under investigation but is known that several definite ionised layers exist within it. During daytime hours there are four main ionisation layers designated D, E, F_1 and F_2 in ascending order of height. At night, when the sun's radiation is absent, ionisation still persists but it is less intense, and fewer layers are found (D and F layers). Factors that affect the ionosphere layers is strength of the sun's radiation, since it varies with latitude causing that the structure of the ionosphere varies widely over the earth's surface, and the state of the sun, since sunspots affect the amount of ultra-violet radiation.

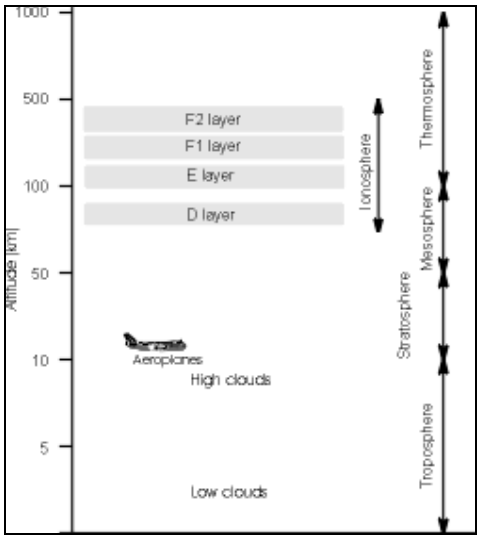

Figure 13 : Description of the Atmosphere

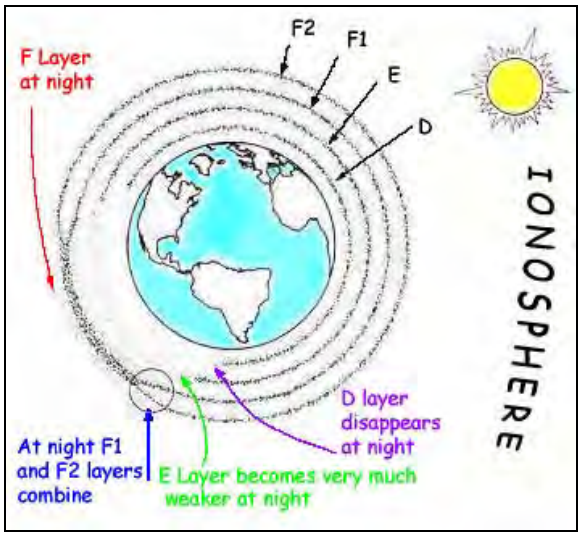

Figure 14 : Layers around the Earth

1.7.1 The D layer is only significant during daylight hours, dispersing soon after sunset. It is the lowest layer and its intensity of ionisation is not great, in which VLF waves are reflected from the base of the layer, LF and MF waves enter the layer and are severely attenuated without being appreciably refracted, and higher frequency signals pass through the layer with less attenuation.

1.7.2 The E layer is strong ionised by day and remains weakly ionised by night, producing strong sky waves in the LF and MF bands by night, but during the daytime due to the attenuation caused by the D layer the sky waves produced are too weak to used in these bands. Usable HF sky waves may be produced by this layer during nigh and day, and VHF signals usually pass through this layer, and if refraction exist it is insufficient to generate sky waves, unless under “freak” conditions, duct (or super-refraction) and scatter (or sporadic-E reflections) propagation. Ionospheric refraction is negligible with UHF, SHF and EHF signals and sky waves do not occur in these bands.

1.7.3 The F layer is the highest and more intensely ionised layer. At night there is only one F layer, but during the daytime is divided into two layers, the F_1 and F_2. Strong sky waves are produced in the LF, MF and HF bands at night but only the HF band has usable F layer sky waves by day. Signals in the VHF and higher bands escape through the F layer into space with, normally, no sky waves produced.

1.8 Sky wave propagation in the HF band (3 to 30 MHz) is complicated, because there are many variable factors, which decide whether or not there is a propagation path open between transmitter and receiver for long-range radiotelephony.

1.8.1 For a given frequency and state of the ionosphere, the amount of refractive "bending" of the wave will depend on the angle at which the wave penetrates the layer. Waves travelling nearly vertically may escape through a layer, but may be returned to earth if a higher more intensely ionised layer exists.

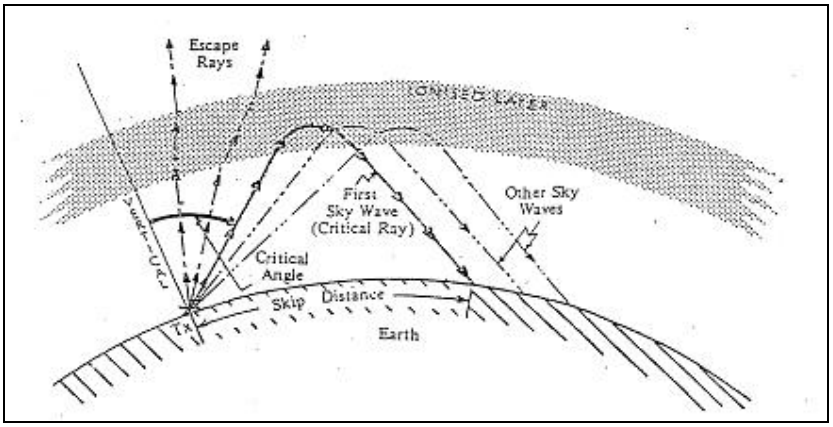

Figure 15 : Critical angle (HF band)

1.8.2 As can be seen on Figure **15**, waves ascending with an increased angle with the vertical, the amount of bending is greater and when the angle with the vertical is increased to the critical angle, the path is bent enough for the wave to return to earth as the first sky wave. Waves making an angle with the vertical greater than the critical angle will also produce sky waves, coming down to earth at greater ranges than that of the first sky wave. The range from the transmitter and the first sky wave for a given frequency and set of conditions is called the skip distance. If the surface wave from a HF transmitter become completely attenuated at a shorter range than that at which the first sky wave returns to earth, leaves an area in which neither ground wave nor sky waves are received and which is none as dead space (Figure **16**).

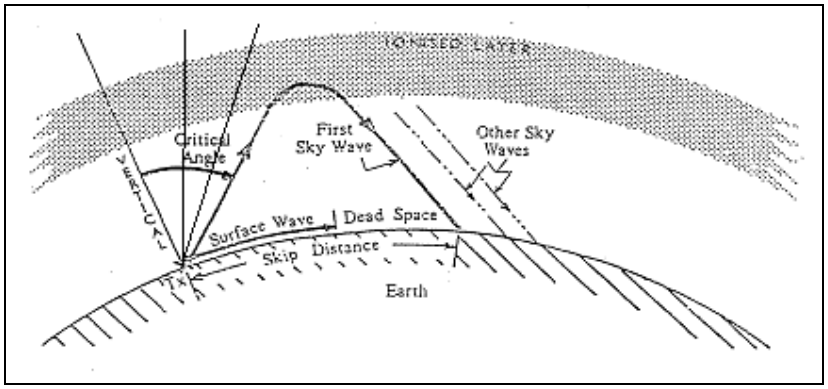

Figure 16 : Dead space (HF band)

1.8.3 Critical angle depends largely on the frequency, the higher the frequency the greater the critical angle, therefore, if skip distance is to be reduced, a lower frequency has to be used. This is most significant when choosing the optimum frequencies for HF communications and ensuring that the skip distance is less than the range of the distant receiver.

1.8.4 For good long-range HF R/T reception a frequency must be chosen which will not suffer too much attenuation. If a relatively high frequency is used, for example 29 MHz, most of the energy will pass through the E layer and be reflected from the more intensely ionised F layer. The higher the frequency, the greater degree of ionisation is required to give reflection. As frequency is reduced and attenuation of the E layer reflections increases, a limit is reached called the “Lowest Usable Frequency (LUF)”, and bellow this frequency the attenuation is too great for the signal to be usable.

1.8.5 Thus for least attenuation, and so the highest received signal strength for a given transmitter power, a frequency is chosen which is as high as possible without exceeding the MUF (Maximum Usable Frequency) for the path between the transmitter and distant receiver. The MUF is that frequency, for the prevailing conditions, which produces a skip zone extending just short of the distant receiver. Any higher frequency would give a higher critical angle and a greater skip distance exceeding beyond the receiver, which would then loose that sky wave contact with the transmitter.

1.8.6 MUF at night is much less than by day, because the intensity of ionisation in the layer is less so than lower frequencies have to be used to produce the same amount of refractive bending and give the same critical angle and skip distance as by day. However, the signal attenuation in the ionosphere in the ionosphere is also much less at night so the lower frequency needed is still usable. Hence the night frequency for a given path is about half of the day frequency, and shorter distances can be worked at night than by day while still using a single reflection from the F layer.

1.8.7 The MUF not only varies with path length and between day and night, but also with season, meteor trails, sunspot state, and sudden ionospheric disturbances produced by eruptions on the sun. Because of the variations of MUF, HF transmitting stations have to use frequencies varying widely between about 2 and 20 MHz.

1.9 The theoretical range for HF frequencies varies, depending on the propagation path used, ground or sky waves. Ground waves usually can reach up to 100 nm and sky waves longer distances, however, sky waves will not be received within the skip distance (probably several hundred miles from the transmitter). The theoretical maximum range obtained by means of a single reflection from the E layer is about 1 300 nm, and from the F layer about 2 500 nm. This theoretical maximum range is achieved with the transmitted signal leaving the earth’s surface tangentially. Ranges of 8 000 nm or more may be achieved by means of multiple reflections, mainly from the F layer, being the signal alternately refracted down from the layer and reflected up again from the earth’s surface until it becomes too weak to use.

Appendix B-1 - Brisbane Radio Station Information

Station Name:	**Brisbane Radio**
Country: Australia	**State: Queensland**
City: Brisbane	**Geographic Location: S27.23.0 E153.07.1**
AFTN Address: YBBBYINTL	**Aircraft in Flight Address: YBBB**
SATCOM SHORT CODE Nr. : 450 302	

Facilities

Transmitter site(s)	**Receiver site(s)**
Location and equipment:	**Location and equipment:**
Cape Pallarenda (Townsville) – 19.12.05.8S 146.46.05.3E 4 X Cubic T-4180/COM1000 1kW HF transmitters, comprising 2 X SP6 & 2 X SEA3 2 X Andrew Model 3005 Triple Mode Low Profile Spira-Cone HF antenna	**Cape Clevedon (Townsville)** – 19.21.03.8S 147.01.06.5E 18 X Cubic LCR-2000 HF receivers, comprising 9 X SP6 & 9 X SEA3 1 X Andrew Model 3005 Dual Mode Low Profile Spira-Cone HF antenna
Broken Hill – 31.55.38.7S 141.28.57.4E 2 X Cubic T-4180/COM1000 1kW HF transmitters, comprising 2 X SP6 2 X Andrew Model 3005 Triple Mode Low Profile Spira-Cone HF antenna	**Broken Hill** – 32.00.22.4S 141.28.26.1E 9 X Cubic LCR-2000 HF receivers, comprising 9 X SP6 1 X Andrew Model 3005 Dual Low Profile Spira-Cone HF antenna
Knuckeys Lagoon (Darwin) – 12.25.52.0S 130.57.51.5E 2 X Cubic T-4180/COM1000 1kW HF transmitters, comprising 2 X SEA3 2 X Andrew Model 3005 Triple Mode Low Profile Spira-Cone HF antenna	**Shoal Bay (Darwin)** – 12.22.49.5S 130.58.26.2E 9 X Cubic LCR-2000 HF receivers, comprising 9 X SEA3 1 X Andrew Model 3005 Dual Low Profile Spira-Cone HF antenna
Class of Emission: J3E	**SELCAL:** selcal-coder

Frequencies

Family	**Frequency bands**								
	3 MHz	**3.5 MHz**	**4 MHz**	**5 MHz**	**6 MHz**	**8 MHz**	**11 MHz**	**13 MHz**	**17 MHz**
SP6	3.467			5.643		8.867		13.261	17.904
SEA-3	3.470				6.556		11.396	13.318	17.907
Volmet					6.676		11.387		

Station Manager *	Supervisor
Name: Mr Ian Harding	**Name: Duty Operations Supervisor**
Post Address: Locked Bag 747 Eagle Farm Brisbane Australia 4009 **Phone: + 61 7 38663544 Fax: + 61 7 38663742 Email: ian.harding @airservicesaustralia.com**	**Post Address: The Australian Flight Information Centre Locked Bag 747 Eagle Farm Brisbane Australia 4009** **Phone: + 61 7 38663429 Fax: + 61 7 38663553 Email: ausfic@airservicesaustralia.com**

Remarks:

Brisbane Radio also provides international HF communications for Australian Air Traffic Control within the contracted airspace of the Honiara and Naru FIR's

Brisbane Radio provides communication services from Perth and Port Hedland sites that cover the INO-1 MWARA

Appendix B-2 - Auckland Radio Station Information

Station Name:	**Auckland Radio**

Country: New Zealand	**State**
City: Auckland	**Geog. Location: 370017S1744849E**
AFTN Address: NZAAYSYX	**Aircraft in Flight Address:** NZZO
SATCOM SHORT CODE Nr. : 451 201	

Facilities

Transmitter site	**Receiver site**
Location: Wiroa Island	**Location:** Seagrove
Equipment	**Equipment**
Transmitters 8 x Marconi ST-5000/NZ 5 KW HF Transmitters comprising 2 x Air Ground 3 x VOLMET 1 x METFAX 1 x Air New Zealand 1 x Spare Aerials 5 x Civil Aviation (NZ) RM 88 Wideband 2–30 MHz 1 x Marconi R7070 wideband 2–30 MHz (Air New Zealand only) 4 x Marconi R7080 wideband 2-30 MHz	Receivers 16 x Eddystone 6100 HF receivers comprising:- 5 x MWARA 3 x ODF 2 x Spare 6 x OCC (Air New Zealand only) 2 x Eddystone 1771 receiver remote controllers Aerials 3 x Civil Aviation (NZ) RM 88 Wideband 2–30 MHz 1 x Creative Design sector coverage log-periodic dipole antenna Type 230HF-2D (Air New Zealand only)
Class of Emission: USB/AM	**SELCAL:**

Frequencies

Family	**Frequency bands**								
	3 MHz	**3.5 MHz**	**4.7 MHz**	**5.6 MHz**	**6.6 MHz**	**9 MHz**	**11.3 MHz**	**13.3 MHz**	**18 MHz**
A	3467			5643		8867		13261	17904
LDOCC	3007				6637		10072	1333	17940
SAR									
VOLMET					6679	8828		13282	

Station Manager	On Duty Supervisor
Name: Mark Goodall	**Post Address:**
Post Address: Airways New Zealand Limited. Fred Ladd Way. Auckland International Airport.	Airways New Zealand Limited. Fred Ladd Way. Auckland International Airport.
Phone: + 64 9 2753109 **Fax:** + 64 9 2753106 **Email:** Goodallm@airways.co.nz **AFTN/SITA Address:** NZZOZQZF	**Phone:** + 64 9 2568071 **Fax:** + 64 9 2753627 **Email:** tim.halpin@airways.co.nz **AFTN/SITA Address:** NZAAYSYX
Remarks: By international agreement Auckland Radio provides communications services for the Auckland OCA. The associated OACC is located at Auckland, New Zealand.	

Appendix B-3 - Nadi Radio Station Information

Station Name:	**Nadi Radio**

Country: Fiji	**State**
City: Nadi	**Geog. Location:** 17° 45′ 19″ S, 177° 26′ 36″ E
AFTN Address: NFFNYFYX	**Aircraft in Flight Address:** NFFNZZZX
SATCOM SHORT CODE Nr. : + 679 6724174	

Facilities	
Transmitter site	**Receiver site**
Location: Enamanu Transmission station	**Location:** Nadi Airport
Equipment (see below)	**Equipment** (see below)
Transmitters JRC JRS-714 10 KW x4 JRC JRS-753 5 KW x2 JRC JRS-752 500 W x2 Antenna Patch §unit NKZ – 93 x1 Modems : NHH 62 modems frames x2 CNM 199 TV x6 Aerials Conifans – 600 Ohms 2-30 MHz x1 Mono pole – 75 Ohms 2-30 MHz x1 Marconipoles – 50 Ohms 2-30 MHz x5 VoiceSwitch: GAREX VCSS 220	Receivers : JRC NRD 840A All wave receiver x 36 JRC NRD 302A Tunable receiver x 9 Antenna Multicoupleurs NAJ -110B x3 Receiver Controller Unit NJC-536B x8 Modems NMC – 207 x16 Antenna System: TFD – Terminated folded dipole x3 2-30 Mhz Range
Class of Emission: J3E	**SELCAL: Baumberger Electronics** **BEW 783 -200 X 3 units**

Frequencies									
Family	Frequency bands								
	3 MHz	3.5 MHz	4.7 MHz	5.6 MHz	6.6 MHz	9 MHz	11.3 MHz	13.3 MHz	18 MHz
A	3467			5643		8867		13261	17904
RDARA	3425					8846	11339		
SAR	3023			5680					

Station Manager	**On Duty Supervisor**
Name: MR Vula SERU	**Post Address:**
Post Address: . Airport Fiji Limited. Private Mail Bag. Nadi Airport. Fiji **Phone:** + 679 6725777 Ext 4514 **Fax:** + 679 6725161 **Email:** vulas@afl.com.fj **AFTN/SITA Address:** NANCDYA	Airport Fiji Limited. Private Mail Bag. Nadi Airport. Fiji **Phone:** **Fax:** **Email** **AFTN/SITA Address:**
Remarks:.	

Appendix B-4 - San Francisco Radio Station Information

Station Name:	**SAN FRANCISCO Radio Station Information**
Country: United States of America	**State:** California
City: Livermore	**Geographic Location:** 37.70 N 121.72 W
AFTN Address: KSFOXAAG	**Aircraft in Flight Address:** KSFOZZZX
SATCOM SHORT CODE Nr. : 436625	
Facilities	
Transmitter site See below	**Receiver site See below**

Transmitters **Dixon (38. 22.46.7 N 121.45. 50.9 W)** **(D)** 2 TCI 532-N Log-Periodic (3-30 MHz) 2 TCI 530 log-periodic OMNI (3-30 MHz) 4 AERCOM 1330 (5KW) 1 Cubic CTX-1000 (1KW) standby **Moloka'i, Hawaii** **(21.10.33.5N 157.10.38.9 W)** **(M)** 3 TCI 527-B Log-Periodic (6.2-30 MHz) -NP2 Direction: 346 deg., 6.2-30 MHz -NP3 Direction: 346 deg., 6.2-30 MHz 2 TCI 527-3-28 Log-periodic (6.2-30 MHz) -CWP2 275 deg., 6.2-30 MHz -CWP1 183.5 deg., 6.2-30 MHz 3 TCI 532-4-28 Log-Periodic. (3-30 MHz) -CEP Direction: N - 51 deg., 3-30 MHz -CEP Direction: S - 57 deg., 3-30 MHz -SP Direction: 188 deg., 3-30 MHz 2 TCI 530-4-28 Log-Periodic OMNI (3-30 MHz) 7 CUBIC CTX-5000 (5KW) **Standby transmitter** 1 Cubic CTX-5000 (5KW) **Oahu, Hawaii (21.22.30.6 N 158.5.5.1 W)** Auxiliary transceiver 1 TCI 530 Log-Periodic (3-30 MHz) 1 Cubic CTX-1000 (1KW) **Barrow, Alaska** **(71.15.30.9 N 156. 34.38.9 W** **(B)** 1 TCI 530 Omni (3-30 MHz) 1 CTX-1000 (1KW) **Mt. Barragada, Guam** **13.19.17 N 144.49.30 E** 1 Fan Dipole Antenna 7 TenTec transmitters **Hat Yai, Thailand** **06.56.10.84N 100.23.18.12E** Antenna 06.56.12.79N100.23.19.41E 1 TCI 530-05 (2.8-30MHz) 1 Cubic TCX 1000	**Receivers** **Half Moon Bay (37.39. 00 N 122. 41. 00 W)** 2 TCI 532-B log-periodic (3-30 MHz) -North Direction W 278 degrees -West Direction SW 222 degrees 1 TCI 530 log-periodic OMNI (3-30 MHz) 1 TCI 527B log-periodic (3-30 MHz) -Direction S – 135 degrees 5 TenTec RX331 (CEP2) 14 TenTec RX330 **Moloka'i, Hawaii (21.12.23 N 157.12.30 W)** 1 TCI 532-4 Log-Periodic (3-30 MHz) -CEP Direction: 051 deg. 1 TCI 527-3 Log-Periodic (6.2-30 MHz) -WP Direction: 283.5 deg. 2 TCI 527-B Log-Periodic (6.2-30 MHz) NP Direction: 346 deg. SP Direction: 188 deg. 38 LCR-2000 **Moloka'I standby receiver** 7 Cubic LCR-2000 **Oahu, Hawaii 21.22.30.6 N 158.5.5.1 W** Oahu Auxiliary transceivers 7 TenTec RX330B **Barrow, Alaska 71.15.30.9 N 156.34.38.9 W** TCI 530-6 7 Cubic LCR-2000 **Pulantat, Guam 13.25.00 N 144.44.47 E** 1 HF Braodband dipole (2 MHz-30 MHz) TCI-535 (3-30 MHz) 1 TCI Conical Monopole Antenna (LDOC) 4 CDR-3250 6 TenTec RX331 (LDOCF) 7 TenTec RX331 (CWP) **Hat Yai, Thailand** **06.56.24.71N 100.24.47.28E** Antenna 06.56.25.03N 100.24.49.84E TCI 530-05 (2.8-30MHz) 7 Cubic LCR 2000 1 Cubic LCR 2000 (Spare)
Class of Emission: 1K40H2B/2K80J3E	**SELCAL: 17 FREQUENTIS Units**

Frequencies

Family	Frequency bands								
	2-3 MHz	4 MHz	5 MHz	6 MHz	8 MHz	10-11 MHz	13 MHz	17 MHz	21 MHz
(D)CEP1	3413		5574		8843		13354		
(D)CEP2	2869		5547			11282	13288		21964
(D)CEP3	3452			6673		10057	13288		
(M) SP	3467		5643		8867		13261	17904	
(M)CWP1	2998 / 3455	4666		6532		11384	13300	17904	
(M)CWP2	2998		5652	6532	8903	11384		17904	21985
Guam CWP	2998 / 3455	4666	5652	6532	8903	11384			
(M) NP1			5628	6655	8915	10048	13339	17946	21925
(M) NP2	2932		5667	6655	8951	11330	13273	17946	
(B) NP			5628	6655	8915	10048	13339	17946	21925
(M) CEP1	3413		5574		8843		13354		
(M) CEP2	2869		5547		8867	11282	13288		
(M) SP	3467		5643		8867		13261	17904	
(G/M/D/B) LDOCF	3494			6640	8933	11342	13348	17925	21964
(HDY) LDOCF	3494			6640		11342	13348	17925	21964

Station Operations Manager:

On Duty Manager: Andrew Colombana, Robin Lee, Lynn Sallady, Leigh-Lu Prasse or Swami Nand (Shift Managers)

Name: Tammy J. Callahan

Post Address:
6011 Industrial Way
Livermore, California, USA
94550

Phone: + 1 925-519-0792
Fax: + 1 925-294-9597
Email: tcallaha@arinc.com
AFTN/SITA Address: KSFOTCXA

Post Address:
6011 Industrial Way
Livermore, California, USA
94550

Phone: + 1 800-799-7847
Fax: + 1 925-294-9597
Email: sfomgr@arinc.com
AFTN/SITA Address: KSFOSMXA

Remarks: : PHNL-PMKK VHF 131.95 (HA)
PGUM VHF 191.95 (GA)

Appendix B-5 - TAHITI Control Station Information

Station Name:	**TAHITI Control**
Country: France	**State:** French Polynesia
City: FAAA	**Geographic Location:** 17° 33 20S 148° 36 60W
AFTN Address: NTTTZQZX	**Aircraft in Flight Address:** NTTTZZZX
SATCOM SHORT CODE Nr. : 42 27 90	

Facilities

Transmitter site	**Receiver site**
Location: FAAA (17° 33 20S 148° 36 60W)	**Location:** FAAA (LA HUNA) (17° 33 20S 148° 36 60W)
Equipment	**Equipment**
Antennas 2 Biconics (Fuseau) 1 Spiracone Andrew 3002 Transmitters **2* Nardeux T166 1KW** **Backup station:** Antennas 1 Volubilis 1 Hormi (THX) 1 Spiracone Andrew 3002 Transmitters 1 * Rhode &Schwarz XK 2900 1 KW	20 I2E receivers 1 Biconic antenna BCI3-30 1 Spiracone Andrew 3002 (1 low angle (long-medium range)) (1 high angle (short- range)) Backup station 6 * I2E receivers 1 * ASD 2-30 semi delta
Class of Emission: 2K80J3E /	**SELCAL:** 5 DANKS RADIO SC9100

Frequencies

Family	**Frequency bands**								
	3 MHz	**3.5 MHz**	**4.7 MHz**	**5.6 MHz**	**6.6 MHz**	**9 MHz**	**11.3 MHz**	**13.3 MHz**	**18 MHz**
SP		3467		5643		8867		13261	17904
9C*(project)*									
Fix				5066.5	6801	9116		12166.5	
SAR				5680					

Station Manager	On Duty Supervisor
Name: Eric LIEUTAUD **Post Address:** Service Navigation Aerienne Division technique BP 6011 FAAA 98702 FAAA TAHITI – French Polynesia **Phone:** + 689 86 10 30 **Fax:** + 689 86 10 39 **Email:** Lieutaud_Eric@seac.pf **AFTN/SITA Address:** NTAA	**Post Address:** Service Navigation Aerienne Division technique BP 6011 FAAA 98702 FAAA TAHITI – French Polynesia **Phone:** + 689 86 11 33 **Fax:** + 689 86 10 39 **Email:** na.tec@seac.pf **AFTN/SITA Address:** NTAAYSYX
Remarks: TAHITI radio is collocated and is a department within TAHITI OACC Backup receiver site is also located in the vicinity of TAHITI OACC	

LIST OF FIGURES

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TASKS LIST – PBN Task Force

No.	Tasks/Strategy	Category	Status
C4/1	The APAC PBN TF encourages States to consider the GO Team visit.	Implementation	**On-going.** States are encouraged to consider the GO Team visit as required.
C4/2	The APAC PBN TF requests the Global PBN Task Force to consider providing assistance to States which currently are at the early stage of PBN implementation.	-	**Closed.**
C4/3	The APAC PBN TF agrees to provide progress report of PBN implementation in the Asia-Pacific to the Global PBN Task Force	-	**Closed.** The PBN TF has provided progress report to the Global PBN Task Force.
C4/4	The APAC PBN Task Force requested that the Interim Edition (V '0.2') of the Regional PBN Implementation Plan be presented at theATM/AIS/SAR/SG/19 Meeting (June 22-26, 2009) for review as required by APANPIRG/19.	-	**Closed.**
C4/5	The APAC PBN TF agrees to continue an annual review of the Asia-Pacific Regional PBN Implementation Plan	Reporting	**Routine**
A4/6	Develop an up-to-date archive of all relevant guidance materials for each PBN implementation step as outlined in the PBN manual	-	**Closed.** Information on relevant guidance materials is currently available and can be downloaded from ICAO PBN web site. (http://www.icao.int/pbn) The Secretariat also provides a comprehensive CD containing important PBN guidance and resource materials.

No.	Tasks/Strategy	Category	Status
A4/7	Arrange future annual PBN implementation seminars to serve as a forum for exchanging expertise and implementation experiences and invite interested States who would like to host future seminar to make a formal proposal at the next PBN TF meeting and to invite industry representatives to attend the seminar	Education	**On-going.** The PBN TF/5 accepted Hong Kong's offer to host the second PBN Seminar, planned for Feb 2010, subjected to APANPIRG approval. Vietnam and Thailand also offer to host future PBN seminars.
C4/8	In respect to the request by COSCAPs regarding the development of guidance material for APV, the APAC PBN TF recognized the work currently being conducted by the Global PBN TF to develop and review materials on the issues of APV and Non-Precision Approach as related to PBN	-	**Closed.**
C4/9	The ICAO APAC PBN TF recommends that the PBNSG continue to review and revise the PBN Manual to achieve a more hierarchical and easily used structure to minimize the number and complexity of the airworthiness approvals required for PBN operations. The GPBNTF is considered to be an organization well placed to advise ICAO Regions on harmonization and the development of common standards	-	**Closed.** PBNSG noted the request from the APAC PBN TF. Materials and suggestions on structure of the PBN manual have been forwarded to PBN SG. Updated version of the PBN manual would be available in the second quarter of 2010.
C4/10	The APAC PBN TF agrees to continue coordination with other regional PBN task forces and the Global PBN Task Force to ensure harmonization of PBN implementation	Planning	**On-going.** Report on Global PBN Task Force activities are presented and noted by PBN TF/5.
A4/11	States are requested to provide progress report regarding PBN implementation at each Task Force meeting	-	**Closed.** Transferred to Action Item 5/08

No.	Tasks/Strategy	Category	Status
A4/12	Mandate States to present their PBN Implementation Plan and to provide progress reports on the development of the State Plan at the next PBN TF meeting	Planning	**Routine.** States are requested to provide report on the developments of State PBN Implementation Plans.
A4/13	Request the Task Force Chairperson and Rapporteurs to develop a common template for State PBN Implementation Progress Report to be reviewed by the next PBN TF meeting	-	**Closed**. The TF/5 agreed on the report template.
C4/14	The APAC PBN TF agreed to develop a regional PBN progress report to be reported annually to CNS/MET and APANPIRG and to be posted on ICAO APAC and ICAO Global PBN web site	Reporting	**Routine.**
A4/15	Request ICAO Headquarter to provide a presentation on the requirement for safety assessment for PBN implementation and overview of how to conduct proper safety assessment at future PBN TF meetings	Education	**On-going**. The TF referred to the PBN SG for the development of safety assessment criteria.
C4/16	The APAC PBN Task Force considers itself a suitable forum to facilitate and harmonize terminal and en-route PBN implementation in the Asia Pacific Region. Therefore, the Task Force requests APANPIRG to consider adding the following task into the Task Force's TOR. "*Facilitate and coordinate the harmonized implementation of PBN for terminal and en-route applications in the Asia Pacific Region*"	-	**Closed.** APANPIRG/20 has a decision to establish a Route Review Task Force.
A4/17	Recognizing that the PBN planning activities for the Asia-Pacific are nearing completion and acknowledging the Task Force's willingness to support actual PBN implementation, the APAC PBN Task Force request working papers regarding revision of the Task Force's work structure to be submitted for consideration at PBN TF/5. Members of the PBN TF are encouraged to coordinate intersessionally to prepare the working papers.	Implementation	**On-going.**
A4/18	Request ICAO to provide status report of the work by PBNSG, SASP and IFPP	-	**Closed.**
C5/01	Confirmed the likely inability of many APAC states to meet the APV implementation goals of Assembly Resolution A 36-23 within the required timeframe. The PBN/TF/5 meeting requested that, APANPIRG while taking note of the limitation of many of the APAC States, consider conveying the same to ICAO with the recommendation that the Resolution be reviewed.	Planning	**On-going.**

No.	Tasks/Strategy	Category	Status
C5/02	As the authorized GNSS Service Areas, in which SBAS based APVs may be implemented are very limited in coverage, the PBN/TF/5 meeting requests that APANPIRG consider the feasibility of establishing a regional SBAS capability to support all aircraft types.	-	**Closed.** CNS/MET will consider the feasibility of establishing a regional SBAS capability.
C5/03	That, the concern raised by the US GAO report was noted; and this concern be forwarded to APANPIRG and ICAO HQs.	-	**Closed**. US Government has guaranteed availability of minimum GPS constellation in writing to ICAO HQ.
C5/04	The PBN/TF/5 meeting recommends that the PBN Study Group review the current PBN GNSS reporting and prediction requirements with a view to establishing common implementation rules and technical standards for such requirements.	Implementation	**On-going.** APANPIRG Conclusion 20/37invites ICAO to develop the guidance materials.
C5/05	That, APANPIRG consider tasking the PBN TF with examining the feasibility of establishing a regional RAIM prediction system.	-	**Closed.** APANPIRG Conclusion 20/38 tasks the PBN TF with examining the feasibility of establishing a regional RAIM prediction system.
C5/06	That, the PBNSG consider the proposal to develop Guidance Material that provides a means to assign PBN capability to GPS IFR aircraft in the first instance without the need for recertification.	Education	**On-going.** APANPIRG Conclusion 20/37invites ICAO to develop the guidance materials.
C5/07	That, States distribute the RNAV safety message and emphasize on all operators involved in RNAV to apply the lessons learnt on Human Factor issues, as discussed in the paper presented by New Zealand on RNAV Human Factors and System Safety.	-	**Closed.** APANPIRD Conclusion20/39 distributes the Report to the States for further distribution to all operators.
C5/08	That, States / Administrations be requested to use the PBN Implementation Progress Report Template for all future reporting on their status of PBN implementation. The Report should be submitted at each of the future PBN Task Force Meeting.	Reporting	**Routine.**

No.	Tasks/Strategy	Category	Status
C5/09	That, States / Administrations be requested to submit their PBN Implementation Progress Report by 15 August 2009 for onward submission to APANPIRG/20 Meeting scheduled to be held from 7 – 11 September 2009.	-	**Closed.**
C5/10	That, the APAC Regional PBN Implementation Plan (Interim Edition Version 0.3) be presented at the APANPIRG/20 for approval.	-	**Closed.** APANPIRG Conclusion 20/41 adopted the APAC Regional PBN Implementation Plan (Interim Edition Version 0.3) as Version 1.0
C5/11	That, APANPIRG consider in conjunction with the proposal to establish a SEA RR/TF, acquiring the necessary resources to establish a Regional PBN Office or a dedicated Project to design PBN based regional air routes and facilitate their adoption by the States in the APAC region.	-	**Closed.**
C5/12	That, the PBNSG be requested to provide guidance on any PBN-specific aspects of en route safety assessment.	Education	**On-going.**
C5/13	That, presentation(s) on Safety Assessment be included in the Agenda for the PBN Implementation Seminar to be held in Hong Kong in February 2010.	-	**Closed.**
C5/14	That, ICAO kindly assist with addressing the PBN safety assessment training needs in the region.	Education	**On-going**
C5/15	Urged States to give detailed considerations to the operational need, safety and cost benefits prior to deciding on RNP AR Approach implementation.	-	**Closed.**
C5/16	That, APANPIRG agree to the PBN Task Force activities continuing for two additional meetings in the first half of 2010 using the Task Force's current TORs.	-	**Closed.**
C5/17	That, ICAO be requested to consider providing an annual summary of panel and working group activities to allow proper coordination amongst different groups (PBN/TF/4 Action Item 4/18)	Reporting	**Routine.**

No.	Tasks/Strategy	Category	Status
A6/1	States are encouraged to consider implementing CDO in accordance with ICAO CDO Manual Doc 9331 on as many STARs as practicable to enhance fuel efficiency, ease pilot and ATC workloads, and reduce emission and noise.	Implementation	
A6/2	States are encouraged to attend to ICAO PBN Airspace Design Workshop in 19-22 April 2010 to enhance their expertise with airspace design relating to implementation of PBN	Education	
A6/3	States are encouraged to attend CDO workshop to be hold in Bangkok on the week of March 15 in conjunction with IFPP meeting.	Education	
A6/4	IATA is requested to provide the progress on the development of global database for PBN approval at the PBN TF/7 Meeting.	Implementation	
A6/5	States are requested to list the challenges and impediments for PBN implementations to be reported at the PBN TF/7 Meeting.	Implementation	**Routine**
A6/6	A harmonization analysis report on State PBN Implementation Plans to be developed by IATA and volunteering States (Australia, Hong Kong, New Zealand and Thailand) and reported to the PBN TF/7 Meeting.	Planning	
A6/7	States are requested to review the draft PBN Operational Approval Handbook and provide feedback at future PBN TF meetings. States are also invited to contribute relevant material to be integrated into the Handbook.	Implementation	
A6/8	States are encouraged to participate in the PBN Operational Approval Training to be conducted under the auspices of COSCAPs in Singapore on during 26-30 April 2010. Invitation will be issued to select States by COSCAPs.	Education	

No.	Tasks/Strategy	Category	Status
A6/9	ICAO Regional Office to inform IFPP, PBNSG and APANPIRG limitation of older FMS in inputting procedure identification within 6-digit alphanumeric. This limitation occurs when pilots attempt to select specific approach for an airport that has multiple runways and each of runways has multiple approach procedures of the same type of navigation system. ICAO is requested to provide guidance and standardized solution to the issue.	Implementation	
DC6/10	The proposed revision to the APAC Regional PBN Implementation Plan as shown in Appendix 'F' of the PBN TF/6 Meeting report be adopted.	Planning	
DC6/11	ICAO provides guidance on aircraft that do not have a lateral and vertical readout on the navigation display, but do display the lateral and vertical profile on the navigation equipment, could be considered as alternate means of compliance if supplemented by appropriate flight crew training for RNP value of 0.3 RNP or greater.	Implementation	
DC6/12	Request CNS/MET SG, ATM/AIS/SAR SG, and APANPIRG to review and consider amending the APAC Performance Monitoring and Measurement Metrics 2 and 3 for PBN to include specific measurements that capture operational benefits in terms of PBN's ability to help fulfill strategic objectives (safety, efficiency, capacity, access, and the environment).	Planning	
A6/13	ICAO Secretariat to identify the appropriate office or forum that would be best suited to develop a standardized calculation and reporting method for States. This would include a mathematical model to ensure environmental benefit calculations are standardized.	Reporting	

No.	Tasks/Strategy	Category	Status
D6/14	The PBN TF agrees to integrate its Implementation Task List into the PBN Task Force Task List and updates the PBN Task Force Task List as shown in an Appendix of the Meeting Report.	-	**Closed.**
A6/15	ICAO Secretariat to provide an update report on PBN TF activities to ICAO Route Review TF. The PBN TF also requested that activities of the RR TF to be reported to the PBN TF.	Coordination	
A6/16	States / Administrations to submit their PBN Implementation Progress Report by 20 February 2010 for onward submission to APANPIRG/21 Meeting.	Reporting	
D6/17	The PBNTF agrees in principle to the establishment of a regional RAIM prediction system and cooperation between the ICAO PBN TF and the APEC GIT. Australia, India, Japan and USA also agreed to be part of the project team.	Implementation	
A6/18	The PBN TF requests AEROTHAI in conjunction with the project team to develop more detailed technical architecture, operational concepts, and administrative arrangements to be reviewed by the Task Force at the PBN TF/7.	Implementation	
A6/19	States are requested to develop Working Papers on back up requirements for PBN to be discussed at the PBN TF/7 Meeting.	Planning	
A6/20	Working Paper PBN/TF/6 – W/7 be forwarded to the Flight Plan and ATS Messages Implementation Task Force (meeting now to be held in July 2010).	Coordination	

No.	Tasks/Strategy	Category	Status
A6/21	States be requested to review the requirements of the State Letter on the implementation of the interim 2012 flight plan format in the context of PBN implementation and report to the PBN TF 7 meeting issues noted.	Implementation	

— END —

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

ASIA/PACIFIC REGIONAL PERFORMANCE-BASED NAVIGATION IMPLEMENTATION PLAN

VERSION 2.0

September 2010

RECORD OF AMENDMENT

Version	Activity	Date
0	Adopted by APANPIRG/19 as Interim Edition	September 2008
0.1	RASMAG Proposal	December 2008
0.2	Amended/Finalized by PBN/TF/4	March 2009
0.3	Amended/Finalized by PBN/TF/5	July 2009
1.0	Adopted by APANPIRG/20	September 2009
1.x	PBN/TF/6 Proposal for Amendment	February 2010
2.0	To be adopted by APANPIRG/21	September 2010

Proposed Revision to Summary Table & Implementation Targets

Medium Term (2013-2016)*		
Airspace	**Preferred Nav. Specification**	**Acceptable Nav. Specification**
Route – Oceanic	RNP 2**, RNP 4	RNAV 10
Route – Remote continental	RNP 2	RNAV 2, RNP 4, RNAV 10
Route – Continental en-route	RNAV 1, RNP 2	RNAV 2, RNAV 5
TMA – Arrival	Expand RNAV 1 or RNP 1 application Mandate RNAV 1 or RNP 1 approval for aircraft operating in higher air traffic density TMAs	
TMA – Departure	Expand RNAV 1 or RNP 1 application Mandate RNAV 1 or RNP 1 approval for aircraft operating in higher air traffic density TMAs	
Approach	Expansion of RNP APCH (with Baro-VNAV) and APV Expansion of RNP AR APCH where there are operational benefits Introduction of landing capability using GNSS and its augmentations	
Implementation Targets • RNP APCH with Baro-VNAV or APV in 100% of instrument runways by 2016 • RNAV 1 or RNP 1 SID/STAR for 100% of international airports by 2016 • RNAV 1 or RNP 1 SID/STAR for 70% of busy domestic airports where there are operational benefits • Implementation of additional RNAV/RNP routes		

*** Note 1:** In circumstances where affected States are agreeable to completing an implementation in advance of the timeline, early implementation is encouraged on the basis of coordination between affected States and airspace users.

** **Note 2:** Related CNS requirements and operational procedures for RNP 2 application in Oceanic Airspace are yet to be determined.

Proposed Revision Note 3

*** **Note 3:** When establishing the implementation targets in accordance with Assembly Resolution A36/23, the States should first conduct an analysis of the instrument RWY eligibility for APV approach. This analysis should include the feasibility of the APV at a particular location, the presence of regular commercial operations and the current or projected user fleet capability for APV. Locations where APV approach is either not feasible or where the regular operators cannot realize the benefit of APV within the set implementation timeline, need not be included. Where APV is not implemented, States should consider implementation of RNP APCH with LNAV minima instead of APV to provide the safety benefits of straight-in approach procedures.

UPDATED ADS-B SUBJECT/TASKS LIST

No.	Subject/Tasks List	Associated with Strategic Objective	Associated GPI	Deliverables	Target Date	Action to be taken and led by
1	Conduct study and present a paper on a study for the use of ADS-B technology in airspace in the North Asia.	D. Efficiency	GPI01/02/05/06/07/09/ 14/16/17/21/22	Report of study for the use of ADS-B in North Asia area	Completed (04/2008)	IATA
2	Report Organizational Policy on ADS-B data sharing with neighbors.	A. Safety D. Efficiency	GPI01/02/05/06/07/09/ 10/11/14/16/17/21/22	Status report	Completed (04/2008)	All Members
3	Each member State report on the number of airframes fitted and transmitting with good NUC/NIC.	D. Efficiency	GPI01/05/06/09/14/16/ 17/21/22	Report on statistics conducted	4/2011	All Members with Ground Stations
4	Develop draft comparison of surveillance technologies document including required site and network architecture, expected surveillance coverage, cost of system.	D. Efficiency	GPI01/02/05/06/07/09/ 14/16/17/21/22	A regional guidance material for implementation	Completed (4/2007)	Greg Dunstone
5	Develop draft update to AIGD to incorporate multilateration.	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	The second amendment to the AIGD	Completed (4/2007)	Nick King, Chainan Chaisompong & Howard Anderson
6	Provide a paper with an update on available equipment standards: (ARINC, Eurocae, RTCA, ICAO, TSO)	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	An information document for implementation	Closed (08/2010)	Information proviided to ADS-B workshop
7	Develop a table detailing readiness of Airspace users & ATS providers.	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Report of a survey conducted	Completed (4/2007)	Singapore
8	Provide details of potential areas (FIRs) that where there is a positive cost/benefit for near term implementation of ADS-B Out	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Report of result of studies	Completed (4/2008)	All -Corner meetings

No.	Subject/Tasks List	Associated with Strategic Objective	Associated GPI	Deliverables	Target Date	Action to be taken and led by
9	Develop a paper on how Probability of detection should be reported for ADS-B so that it can be compared to radar probability of detection	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Guidance material for implementation	Completed (4/2008)	
10	Develop guidelines on how ADS-B equipage should be reported in future, especially the definition of "equipped".	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Guidelines for implementation	Completed (4/2008)	Greg Dunstone
11	Develop outline of the performance criteria and identify issues to be considered when introducing ADS-B into an Air Traffic Control multi-sensor fusion process	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Guidance material for implementation	Completed (4/2008)	Rick Castaldo, Greg Dunstone Michel G. Procoudine
12	Deveop brief guidance paper on security issues associated with ADS-B	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Guidance material for implementation	Completed (4/2008)	Patrick Souchu, Greg Dunstone, Mike Gahan
13	Exam the feasibiity of the use of ADS-B for height monitoring	A. Safety	GPI01/05/06/09/ 14/16/17/21/22	Result of feasibility study - Advice on ADS-B capability to RVSM Groups.	Completed the advice material (4/2008)	TBD
14	Guidance material on how to build safety case for delivery of separation services.	Safety	GPI01/05/06/09/ 14/16/17/21/22	Guidance material for implementation	Apr-11	Australia
15	Guidance material on display of ADS_B tracks on displays.	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Guidelines for implementation	Completed (/8/2010)	Australia
16	Sample mandate material defining ADS-B avionics including the positional data source including task by 45th DGCA Conference.	A. Safety	GPI01/05/06/09/ 14/16/17/21/22	Guidance material for implementation	Completed (/8/2010)	Australia + Regulators Workshop
17	Guidance on legal liability issues for ADS-B data sharing.	A.Safety	GPI01/05/06/09/ 14/16/17/21/22	Guidance material for implementation	Aug-10	U.S.A.
18	Develop and implement regional collaboration project for ADS-B Out operational use including data sharing in SEA and report on implementation progress	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Sub-regional ADS-B collaboration project has been .	Jul-08/ Apr-11	SEA WG

No.	Subject/Tasks List	Associated with Strategic Objective	Associated GPI	Deliverables	Target Date	Action to be taken and led by
19	Develop and implement regional collaboration project for ADS-B out operational use including data sharing in South Pacific and report on implementation progress	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Develop and implement sub-regional ADS-B collaboration project.	Apr-09/ Dec-11	South Pacific States
20	Develop common compliance procedures for regulatory surveillance of ADS-B avionics installations and operation.	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Sample document	Completed (5/2009)	Australia
21	Study application of ADS-B and multilat for precision runway monitoring.	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Guidance material for implementation	Apr-11	All Members
22	Perform data collection and data analyis of ADS-B messages to examine GPS performance in different geographic areas.	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Report of data collected and analyzied - continous	Apr-11	All Members
23	Develop and implement regional collaboration project for ADS-B out operational use including data sharing in Bay of Bengal area and report on implementation progress	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Develop and implement sub-regional ADS-B collaboration project.	Apr-09/ Dec-11	Bay of Bengal States
24	Working Paper for CNS/MET/SG/13 on the need for global harmonized equipage requirements for ADS-B surveillance service in NRA	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Working Paper	Closed 9/2009	member from US Workshop on this conducted
25	Provide feedback to the proposed amendment and template for datasharing based on experience gained by Indonesia and Signapore	D. Efficiency	GPI01/05/06/09/ 14/16/17/21/22	Comments	April-10	All Members

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

GUIDANCE MATERIAL ON

PROCESSING AND DISPLAY OF ADS-B DATA

AT AIR TRAFFIC CONTROLLER POSITIONS

Version 1.0

September 2010

GUIDANCE MATERIAL ON
PROCESSING AND DISPLAY OF ADS-B DATA

1 Introduction

A wide variety of ATC systems will process and display ADS-B data. The displays can be simple PC based standalone systems or sophisticated automation systems. The displays could support enroute, terminal, tower ATC.

This document considers the ATC display component of the ATC system only – and will ignore the sensor capabilities.

2 The need for ATC Surveillance

Surveillance plays an important role in Air Traffic Control (ATC). The ability to accurately and reliably determine the location of aircraft has a direct influence on the separation distances required between aircraft (i.e. separation standards), and therefore on how efficiently a given airspace may be utilised.

In areas without electronic surveillance, where ATC is reliant on pilots to report their position (either by voice or CPDLC),, aircraft have to be separated by relatively large distances to account for the uncertainty in the estimated position of aircraft and the timeliness of the information.

Conversely in terminal areas where accurate and reliable surveillance systems are used and aircraft positions are updated more frequently, the airspace or airport surface can be used more efficiently to safely accommodate a higher density of aircraft. It also allows aircraft vectoring for efficiency, capacity and safety reasons.

ATC surveillance serves to close the gap between ATC expectations of aircraft movements based on clearances or instructions issued to pilots, and the actual trajectories of these aircraft. In this way it indicates to ATC when expectations are not matched, providing an important safety function. Surveillance provides “blunder” detection.

The demand for increased flexibility to airspace users by reducing restrictions associated with flying along fixed routes requires improved navigation capability on board the aircraft. Equally, accurate surveillance is required to assist in the detection and resolution of any potential conflicts associated with the flexible use of the airspace which is likely to result in a more dynamic environment.

Accurate surveillance can be used as the basis of automated alerting systems. The ability to actively track aircraft enables ATC to be alerted when an aircraft is detected to deviate from its assigned altitude or route, or when the predicted future positions of two or more aircraft conflict. It also supports minimum safe altitude warnings, danger area warnings and other similar alerts.

Surveillance is used to update flight plans, improving estimates at future waypoints and also removing the workload for pilots in providing voice reports on reaching waypoints.

3 General Requirements of an Air - Ground Surveillance System

The most basic function of a surveillance system is to periodically provide an accurate estimate of the position, altitude and identity of aircraft. PANS ATM Section 8.2 SITUATION DISPLAY provides further details.

Depending on the ATC application that a surveillance system is intended to support, there will be other requirements of the system.

A surveillance system may be characterised in terms of the parameters listed below:

1. Coverage volume – the volume of airspace in which the system operates to specification.
2. Accuracy – a measure of the difference between the estimated and true position of an aircraft.
3. Integrity – an indication that the aircraft's estimated position is within a stated containment volume of its true position. Integrity includes the concept of an alarm being generated if this ceases to be the case, within a defined time to alarm. Integrity can be used to indicate whether the system is operating normally.
4. Update rate – the rate at which the aircraft's position on the ATC display is updated.
5. Reliability – the probability that the system will continue operating to specification within a defined period. Sometimes this is called continuity.
6. Availability – the percentage of the total operating time during which the system is performing to specification.

Other issues which need to be considered when designing a surveillance system for ATC are:

1. The ability to uniquely identify targets.
2. The impact of the loss of surveillance of individual aircraft both in the short (few seconds) and long term
3. The impact of the loss of surveillance over an extended area.
4. Backup or emergency procedures to be applied in the event of aircraft or ground system failure.
5. The ability to operate to specification with the expected traffic density.
6. The ability to operate in harmony with other systems such as the Airborne Collision Avoidance Systems (ACAS) and Airborne Separation Assistance Systems (ASAS).
7. The ability to obtain Aircraft Derived Data (ADD).
8. The interaction between communication, navigation, and surveillance functions.

4 The ADS-B display is One Part of a Surveillance System

Whilst this paper concentrates on ADS-B display, this is just one part of an overall system that provides data for use in ATC. A complete system includes:

- Position and altitude sensors. Some of these sensors may be ground based (e.g. radars) or may be airborne (e.g. altitude sensors). Datalinks are used to transmit data from airborne sensors to the ground,
    - The Fundamental Data provided to the air traffic controller is aircraft position, aircraft identity and altitude. Further information such as aircraft direction, speed, the rate of climb may also be provided.
- A system to transmit the data from the reception point on the ground to the ATC centre,
- A display system or ATC automation system
    - Data from a sensor system may be presented on a standalone display or combined with data from other sensor(s) and/or other data in an automation system and then presented on a plan view situation display.
    - The situation display provides Air Traffic Controllers with plan view of the position of aircraft relative to each other and to routes, waypoints and geographic features. Suitable maps are required on ATC displays. Such displays support controllers in providing Separation and other services to aircraft.
    - Automation systems may use surveillance data to implement automated safety net functions such as Route Adherence Monitoring, Cleared Level Alarm, Conflict Alert, Lowest Safe Altitude and Danger Area Infringement Warning. These facilities increase overall safety.
    - Appropriate Surveillance system monitoring /alerting – eg parrots & site monitors
- Suitably trained air traffic controllers, aircrew and
- Suitable standards and procedures to use the system including separation minima
    - ICAO PANS-ATM (Doc.4444, Chapter 8) details radar separation minima of five 5 NM and 3 NM. These minima allow for a considerable increase in airspace utilisation compared to procedural control. Changes to ICAO documents were published in 2007 recognising ADS-B use to support 5 NM separation standards. ICAO's Separation & Airspace Safety Panel (SASP) is working on proposals to allow 3 NM separation standards using ADS-B.
    - Due to the low update rate, ACARS based ADS-C surveillance is unlikely to ever support 3 NM and 5 NM separation standards. However it is used to support 30/30 and 50/50 NM procedures used in some regions. ATN and VDL2 based ADS-C may reduce the achievable separation standards in some regions.

5 Essential Display System Requirements

The following display system processing is considered the minimum necessary for any display to ATC :

5.1 Filtering data which has inadequate positional quality.

It is essential that data which does not meet the required quality standards be filtered so that misleading data is not displayed to ATC. Typically this will involve testing the Figure of Merit (FOM) in Asterix Cat 21 [1]messages.

5.2 Filtering data from aircraft known to have poor avionics.

ADS-B data transmitted from some avionics is not suitable for operational use[2]. Usually there are State regulations that prohibit ADS-B data transmissions not complying with the standards. However, sometimes such aircraft are still detected. The overall system needs to have a mechanism to protect ATC from misleading data from such aircraft. A database and/or ATC supervisor function could also be used to temporarily or permanently disable ADS-B data from particular aircraft with defined 24 bit codes.

5.3 Process multiple reports from same aircraft

ADS-B data is derived in the aircraft. Therefore messages received at separate ground stations will (assuming no signal loss) be identical. No fusion, merging or weighting of positional data is needed because the most recent data is the most valuable. As a result it is necessary to ignore ADS-B positional data which is received with a time stamp earlier than other positional data from the same aircraft. A single position symbol should be presented to the controller. Other data associated with report from ground station may or may not be useful.

5.4 Display of positional data

Positional data provided by ADS-B is expressed in latitude and longitude, referenced to WGS84. This data must be accurately mapped onto the display system so that it registers correctly with maps and other sensor data.

5.5 Adjustment of positional data based on time of applicability

The processing of positional data must also correct the positional data to allow for aircraft movement between the time of applicability of the data and the display time. The system should ignore data

[1] Asterix Category 21 messages are the internationally accepted means of transmission of data from ADS-B systems to ATC automation systems. The FOM data in the Asterix messages is usually derived from ADS-B quality parameters including NUC or NIC,NAC,SIL.

[2] Eg: Some transponder models can transmit intermittent or incorrect data, some transmit integrity data based on HFOM, some avionics have faults.

when the time of applicability is too far in the past[3]. Typically the ADS-B velocity vector is used, however the velocity vector can be calculated by the ATC system. Additionally, the system must allow for 'coasting' of the track in the event of missed reports to minimise occurrences of 'dropped' or 'jumping' tracks.

5.6 Positional data reasonableness checking

Reasonableness checking of ADS-B position data to detect and reject invalid position jumps is also required. Some avionics occasionally transmit incorrect (~300 NM in error) positional data for one or two reports. These misleading reports should be discarded.

5.7 Display of altitude data

Barometric altitude data must be processed in the same way as SSR mode C data. It can be displayed as a flight level or, when below the transition level/altitude, it should be QNH corrected.

5.8 Display of Flight ID

Flight ID should be unambiguously displayed to ATC. This may be based upon the received Flight ID or may be based upon Flight Plan data that has been appropriately correlated with the ADS-B data.. FlightID is received less frequently by the ground station and the ATC system may need to implement a timeout system to "coast" FlightID for a parameter time.

5.9 Emergency alerts

The display system should appropriately alert ATC when emergency situations are flagged in ADS-B messages.

5.10 ADS-B failure indication

The display system should appropriately alert ATC when ADS-B data is not available.

5.11 Velocity vector

It is highly desirable that the display system is able to use and display ADS-B velocity vectors graphically. These can be derived from the ADS-B messages (preferred) or calculated by the display system itself.

6 Display of ADS-B and radar/multilat.

When ADS-B is to be displayed with radar or multilateration[4], a number of issues need to be considered as follows : An example of one State's display of ADS-B data is shown in Appendix B.

A	Is ATC to be made aware that a particular position report is ADS-B	It is useful for ATC to know that data is based on ADS-B. This allows ATC to be aware of susceptibility to failure modes

[3] This can protect against ADS-B ground stations incorrectly time tagging data : eg : using GPS time instead of UTC time at GPS engine startup.

[4] Multilateration can be considered to be "radar like" because the positional data is not dependent on aircraft position determination.

	based?	relevant to the technology (such as RAIM outage) or airborne avionics failure. Eg: The aircraft crew can be asked to switch to an alternate GPS if the failure is due to GPS avionics failure.
B	Is ATC to be made aware that ADS-B data is being received from an aircraft under radar/multilat surveillance?	It is useful for ATC to know that ADS-B data is being received from an individual aircraft before it leaves radar coverage. Unexpected loss of surveillance data at edge of radar coverage could result in a separation breakdown. Confirmation of continued surveillance allows the use of more efficient separation standards.
C	When ADS-B and radar/multilat data is received from the one aircraft, is the positional data from radar and ADS-B to be "fused" (eg: using a Kalman filter) or does radar/multilat or ADS-B have priority?	Some states have used a priority system whereby ADS-B is only displayed to controllers when there is no radar detection. This has been useful for a gradual transition to ADS-B. A "fusion" system takes value from high quality ADS-B position, velocity data and update rate. Fusion allows the positional and other "aircraft state" data to be presented to controllers as truly merged/ fused data taking into account the relative strengths and weaknesses of the various surveillance technologies. "Fusion" needs to use a number of criteria to ensure that the items being fused relate to the same aircraft. These criteria could include position, velocity, 24 bit ICAO code, FlightID (transmitted callsign), altitude, Mode A code if available, whether the tracks are coupled to the same flight plan.
D	If displayed separately, is the radar/multilat data and ADS-B time synchronized for display	ADS-B data can be extrapolated to the time of display of nearby aircraft detected by radar or multilateration. Equally radar/multilat data can be extrapolated to the time of display of nearby aircraft supported by ADS-B data, or both can be extrapolated till time of display (asynchronous from either radar/multilat or ADS-B reports)
E	Do the safety alerts work appropriately for ADS-B only, radar/multilat only and targets with both radar/multilat and ADS-B?	It is desirable that safety nets work in all situations.
F	Is a Flight Plan indicator for ADS-B equipage used.	It is desirable for ATC to know whether the aircraft is ADS-B capable before the aircraft enters ADS-B coverage. This assists with strategic planning performed by the controller.

7 Other Display System Requirements

A large number of optional ADS-B processing capabilities/functions can be deployed. These are listed in Appendix A. States should consider whether the listed functionality is required in their environment.

8 Processing ADS-B like radar data

ADS-B has several characteristics that make it desirable for it to be treated differently from radar:

However, in some cases, States may wish to minimize ATC system modification and prefer to feed ADS-B to the display system as if it were a radar. This is possible but has some disadvantages shown below that need to be considered and managed. In most cases performance can be expected to be no worse than existing radars. Rather, such a system will simply fail to take full advantage of all the ADS-B performance benefits available.

A	ADS-B accuracy and update rate may be degraded if treated as a radar	Existing ATC systems may quantize the data in relatively coarse steps degrading the data. Extrapolation of ADS-B so that it is reported in a radar azimuth order may also degrade performance. Existing ATC systems may not support high update rate “radar feeds” containing ADS-B data.
B	ADS-B has very different error characteristics compared to radar.	This may have an impact on tracking, but probably no worse than existing radar.
C	ADS-B has different failure modes and the controller needs to be aware that the data is ADS-B derived – and hence susceptible to GPS outage effects. Existing ATC system may display ADS-B using same symbology as a radar.	If there is a predicted GPS RAIM[5] outage, the controller will need to know which targets may be affected. Equally, ADS-B is likely to be available during a period of radar down-time.
D	ADS-B data transmission usually begins whilst the aircraft is on the airport surface, whereas radar transmission usually start after takeoff.	Processing may be required to remove aircraft on airport surface. This can be done in the ground station or the ATC system.
E	Different emergency alert flags are	If radar message formats are used, it may not be

[5] Receiver Autonomous Integrity Monitoring (RAIM) confirms the ongoing integrity of ADS-B data derived from GPS. In some circumstances the integrity may not be able to be confirmed to the desired level. RAIM prediction systems can predict when such loss of integrity may occur, based on GPS geometry and GPS maintenance notifications (NANUs).

	possible compared to radar	possible to convey all desired emergency alerts to the controller
F	Flight ID and 24 bit code are available for matching report-to-report and report-to-flight plan. These fields are available from ADS-B and Mode S radars for Mode S transponders, but are otherwise not available.	Some radar processing systems are unable to manage the processing and display of FlightID or 24 bit code received from the “radar”.
G	4 digit SSR octal code may not be available from ADS-B transmissions. In this case, consideration is required of how the ATC system will match ADS-B data to the flight plan	Some radar processing systems rely on Mode A code for tracking or for matching the target to a flight plan. Mode A code may not be available from DO260 ADS-B avionics.

APPENDIX A

POSSIBLE ATC AUTOMATION ADS-B FEATURES

	Feature	Description	Comment
DISPLAY	Allow "coasting" so that low quality ADS-B data is useable for a limited time.	Technique to allow "coasting" through short GPS geometry ADS-B outages	Increased reliability/continuity
	Display different position symbol when ADS-B comes from a source without adequate communications reliability for 5 NM separation.	Indicate to controller that ATC separation is not possible with this lower quality ADS-B data	Optional use of lower quality symbol
	RAIM display	Consider if a RAIM prediction system is required to indicate to controllers or supervisor possible GPS outages in particular airspace	Optional warning to ATC regarding GPS constellation status
	Indicate failure of ADS-B receiver to technical or operational staff		Typically this will involve site monitor processing
	Delete reports for aircraft "on ground"	If ATC does not desire to "see" traffic still on airport surface	
	Option to display 24 bit code	Eg: if no flight ID is available or to resolve matching problems. Possibly display mode A code if available.	
	Update ATC simulator to support ADS-B	ADS-B training must include ability to manage ADS-B events such as loss of GPS	
	Indicate to a controller that an aircraft is being detected by ADS-B whilst inside radar coverage	Advise controller that if the displayed aircraft leaves radar coverage, surveillance will continue with ADS-B (whereas non equipped aircraft will leave surveillance coverage)	Aircraft could be non ADS-B because it is not equipped, or because it is not within the ADS-B coverage area. This processing could be considered unnecessary by some states especially if an ADS-B mandate exists.

	Feature	Description	Comment
	Decide if and how to use geometric altitude	Possible use of geometric altitude if baro is not available. Possible use for checking QNH value is correct?	
	Decide if and how to use barometric altitude in geographic areas without QNH sensors	Possible altitude filtering in these areas to prevent display of misleading altitude	
PROCESS	Ability to process all appropriate fields of ADS-B Asterix Cat 21 V0.23	Process appropriately position, velocity, Flight ID, 24 bit code, geo and baro altitude, SPI, emergency indicators, FOM etc	
	Protect or warn against Duplicate 24 bit codes within airspace. Eg: From different ground stations		Possibility exists of 2 aircraft on same 24 bit code
	Protect and manage against invalid 24 bit codes		Possibility exists of receiving invalid 24 bit codes
	Black list processing :Remove selected aircraft (24 bit codes) if these airframes are known to transmit inadequate ADS-B data.		Can be used in environments where the regulatory process required all transmitters to be compliant to the standards
	White list processing :Remove all aircraft except selected aircraft (24 bit codes) which are known to transmit adequate ADS-B data.		Useful when there is uncertainty about the ADS-B avionics in the fleet.
	Allow manual uncoupling of ADS-B report and flight plan	In case of erroneous coupling allow controller to detach so that ADS-B data does not update flight plan	
	Allow manual coupling if ADS-B report and flight plan	In cases where for various reasons automatic coupling does not occur.	
	Allow for QNH correction of ADS-B data below transition level/altitude	Normal QNH processing but applied to ADS-B	

	Feature	Description	Comment
	Vertical rate smoothing	Vertical rate data from ADS-B can be “noisy” and may need smoothing for some applications, especially for vertical velocity prediction for safety alerts. Need to consider geo and baro vertical rates.	
	ADS-B data to update flight plan		
	ADS-B data to match to flight plan using Flight ID in ADS-B message to Flight ID of flight plan. May also use 24 bit code if the 24 bit code is in the flight plan.	Direct matching to FlightID, perhaps using other criteria to reduce risk of false matching.	
	Support appropriate safety nets	STCA, RAM, CLAM, DAIW,….	
	Support flight plan indicators that advise of ADS-B equipage	Advises equipage but does not confirm that it is working!	
	Ensure playing area accounts for new coverage	New coverage may be provided by ADS-B	
	ADS-B bypass processing	Provide for ADS-B bypass channel if required	Consider flight plan matching, QNH correction, extrapolation, FOM filtering etc
	Recording and replay of ADS-B data	Same as for radar but processing required for ADS-B	
	Allow for visibility of ADS-B ground transmissions	Matching to flight plan may occur before departure because ADS-B data may be received whilst taxiing	Aircraft transmit ADS-B messages whilst taxiing. These messages can be received and processed.
	Site monitor processing	An integrity monitoring tool and fault detection tool	Monitor position, signal strength, HPL, GPS satellite ranging errors….

OTHER POSSIBLE ADS-B FEATURES

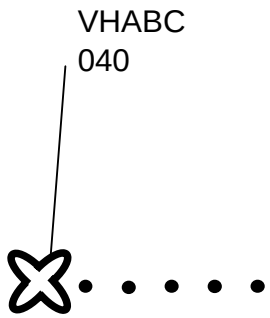
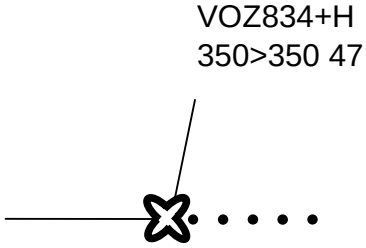
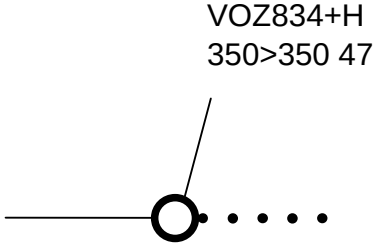
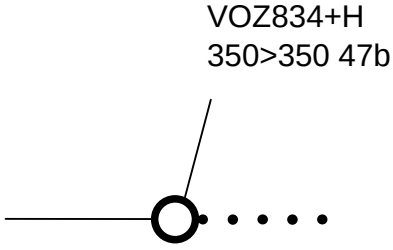
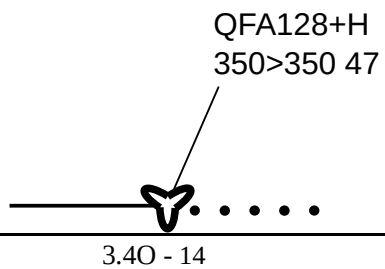
Feature	Description	Comment
Capability to manually disable display of ADS-B returns from a	Allow data to be discarded from a designated aircraft.	Could be useful in the unlikely event of erroneous data from an

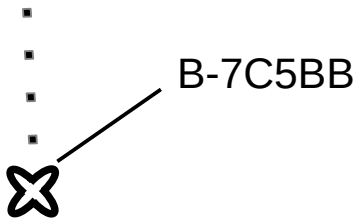
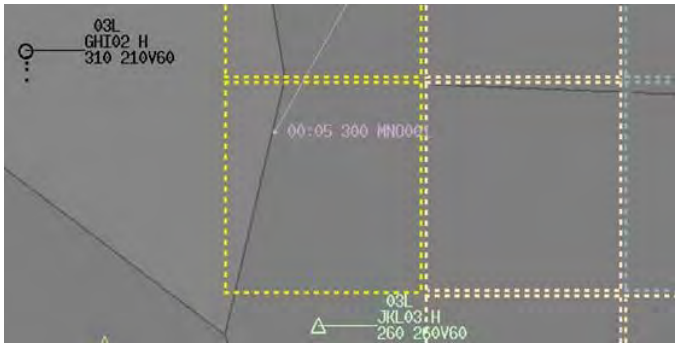
Feature	Description	Comment
particular target		aircraft
Display of new alerts (if used)	Lifeguard / medical and Minimum fuel. Also future “selected altitude” mismatch with Cleared flight level alert.	
Display of ACAS RA events		A downlink message has been defined in ICAO Doc 9871
Alert controllers to significant difference between ADS-B and other surveillance source		
RVSM Monitoring	Provide RVSM validation based on comparison of Geometric (GPS) altitude data and Barometric ADS-B data.	The capability to perform RVSM monitoring using ADS-B is not yet confirmed – however confirmation is currently expected by 2012.

APPENDIX B

ADS-B Display employed by one state

The following shows the ADS-B symbology used by Australia in 2010.

ADS-B track NOT matched to Flight Plan. Includes FlightID (from ADS-B transmission) and Altitude	
ADS-B track matched to Flight Plan	
Radar track – no ADS-B from this aircraft)	
Radar track – ADS-B being detected from this aircraft ("b" included in label – this is only displayed when the ADS-B data is of sufficient quality to allow its use for separation)	
ADS-B track – data from low reliability site – not suitable for 5 NM separation	

ADS-B track optional 24 bit code display "B-" indicates that 24 bit code expressed in hex follows	
ADS-B site monitor display on technical & supervisor display only.	
RAIM Prediction Display Dashed lines indicate areas of predicted RAIM outage in next 10 and 30 minutes. Radar and ADS-C tracks shown	

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Guidelines for Airworthiness and Operational Approval for ADS-B Avionics Equipage

a) The airworthiness compliance of the aircraft under the airframe OEM Type Certificate approval in the Airplane Flight Manual, in an AFM supplement or other appropriate airworthiness documentation is normally accepted by the State of Registry. If the aircraft does not have an existing certification, compliance with Appendix XI of CASA CAO 20.18 specified requirements needs to be established;
http://www.casa.gov.au/wcmswr/_assets/main/download/orders/cao20/2018.pdf

b) The continuing airworthiness of ADS-B system must be assured. As part of the operational approval process, existing established maintenance practices or a proposed maintenance programme for the aircraft needs to be reviewed to ensure that it meets relevant requirements. This is typically a demonstration that ADS-B is included as part of the normal maintenance process in the documentation provided;

c) The Minimum Equipment List needs to reflect the functional requirements of the ADS-B system;

d) Appropriate flight operations training programme and operational procedures are established to ensure that pilots are knowledgeable about ADS-B operations and their onboard operational equipment. This is typically a demonstration that ADS-B is included in the training process and operational documentation including Flight Dispatch considerations;

e) When the airworthiness, continuing airworthiness and operational requirements are met, the State of Registry will issue an operational approval to the operator in accordance with their normal procedures. Common methods include Ops Specs revision, Instrument of Authorisation or Letter of Approval;

f) When so required, the approval is registered with the relevant Regional Approval Monitoring Agency to be identified. With an operational approval from the State of Registry, an operator should be accepted to conduct operations in foreign States.

g) If a State Regulator does not have the ability to carry out the operational approval as described above, it is recommended that they seek technical assistance from a State Regulator that has the capability to provide the support.

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SURVEILLANCE STRATEGY
FOR THE ASIA/PACIFIC REGION

Considering that:

1. States are implementing CNS/ATM systems to gain safety, efficiency and environmental benefits, and have endorsed the move toward satellite and data link technologies;

2. The future air traffic environment will require increased use of aircraft-derived surveillance information for the implementation of a seamless automated air traffic flow management system;

3. The 11th Air Navigation Conference endorsed the use of ADS-B as an enabler of the global air traffic management concept and encouraged States to support cost-effective early implementation of ADS-B applications;

4. APANPIRG has decided to use the 1090MHz Extended Squitter data link for ADS-B air-ground and air-air applications in the Asia/Pacific Region, noting that in the longer term an additional link type may be required;

5. SSR and ADS-C will continue to meet many critical surveillance needs for the foreseeable future;

6. ACAS acts as situational awareness tool and last resort for safety conflict resolution;

7. SARPs, PANS and guidance material for the use of ADS-B have been developed;

8. ADS-B avionics and ground systems are available; and

9. Multilateration is a technology that can supplement SSR and ADS-B.

THE SURVEILLANCE STRATEGY FOR THE ASIA/PACIFIC REGION IS TO:

1. Minimise the reliance upon pilot position reporting, particularly voice position reporting, for surveillance of aircraft;

2 Maximise the use of ADS-B on major air routes and in terminal areas, giving consideration to the mandatory carriage of ADS-B Out as specified in Note 1 and use of ADS-B for ATC separation service;

3. Reduce the dependence on Primary Radar for area surveillance;

4 Provide maximum contiguous ATS surveillance coverage of air routes using 1090MHz Extended Squitter ADS-B and Mode S SSR based on operational requirements;

5. Make full use of SSR Mode S capabilities where radar surveillance is used and reduce reliance on 4-digit octal codes;

6. Make use of ADS-C where technical constraint or cost benefit analysis does not support the use of ADS-B, SSR or Multilateration;

7. Make use of Multilateration for surface, terminal and area surveillance where appropriate as an alternative or supplement to other surveillance systems;

8. Increase the effectiveness of surveillance and collision avoidance systems through mandatory use of pressure altitude reporting transponders;

9. Improve safety through sharing of ATS surveillance data across FIR boundaries;

10. Ensure provision of communication, navigation, and data management capabilities necessary to make optimal use of surveillance systems;

11. Enhance ATM automation tools and safety nets through the use of aircraft-derived data such as flight identification, trajectories and intentions; and

12. Ensure civil-military *cooperation and* interoperability.

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Note 1:

a) *Version 0 ES as specified in Annex 10, Volume IV, Chapter 3, Paragraph3.1.2.8.6 (up to and including Amendment 82 to Annex 10) and Chapter 2 of* Technical Provisions for Mode S Services and Extended Squitter *(ICAO Doc 9871) (Equivalent to DO260) to be used till at least 2020.*

b) *Version 1 ES as specified in Chapter 3 of* Technical Provisions for Mode S Services and Extended Squitter *(ICAO Doc 9871) (Equivalent to DO260A);*

c) Version 2 ES (including provisions for new set of 1 090 MHz extended squitter (ES) messages and traffic information service – broadcast (TIS-B) being developed by the Aeronautical Surveillance Panel (ASP) and scheduled to be incorporated in Annex 10 Vol. IV - Surveillance and Collision Avoidance System as part of Amendment 86 with target applicable date in November 2013. (Equivalent to DO260B and EUROCAE ED-102A which were issued in December 2009).

ISCS OPERATIONAL FOCAL POINTS

Note. – This list is kept up-to-date by the ICAO Secretariat based on the input from States

Update: July 2010

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APPENDIX B
EXAMPLE OF THE AUTHORIZATION FORM

Note. – This is an example of the form – the most up-to-date version of this form can be found on the WIFS web-site

WIFS AUTHORIZED USER APPLICATION

General Information	
Date of Application	
State	
ID	
WAFC	
Point of Contact Information	
First Name	
Last Name	
E-mail	
Phone	
Address	
City	
WorkStation Information	
E-mail	
Phone	
Address	
City	
Vendor	
Operating System	
FAA Approval Authority	
Approved Date	
Approved By	
For AWC use only	
Entered Date	
Entered By	
User Name	
Password	

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(Amended in July 2010)

REGIONAL PERFORMANCE OBJECTIVE: - ***APAC Objective 8***

IMPLEMENTATION OF AERONUTICAL TELECOMMUNICATION NETWORK (ATN) FOR GROUND – GROUND COMMUNICATION NETWORK

Benefits	
Safety	• Will provide reliable means of communication for Air Navigation Services, with the provision of automatic switching capability, in the event of failure of current media
Efficiency	• Routers will have the capability of choosing between different media based on defined criteria. • Multiplicity of protocols used for different communication requirements will be avoided; • Provision for lower case characters and graphic message included;

Strategy
Implementation strategy, short term (2009-2012)

ATM OC COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
SDM *(ATM Service Delivery Management)*	Ensure implementation of Ground to Ground Aeronautical Telecommunication Network (ATN) in the Asia and Pacific Regions			
	• Review the ATN Implementation Strategy, revise it when necessary taking into account the current developments.	2010	ATNICG.	The strategy was updated by ATNICG/5 Meeting held from 31 May to 4 June 2010 and endorsed by the CNS/MET SG/14 in July 2010
	o Review the Status of implementation of ATN at the Backbone Boundary Intermediate System hubs	2010	ATNICG	ATNICG reviewed the progress of ATN Implementation in its Fifth Meeting
	• States hosting Backbone Boundary Intermediate Stations to organize Testing of their system on bilateral basis	2010	States hosting Backbone Boundary Intermediate Systems	States reported the outcome of pre-operational trials/tests carried out by them at the ATNICG/5 meeting
	• Implementation of AMHS Directory Service. Availability of off-line support by Eurocontrol AMC considered essential for the efficient management of AMHS Addresses. ICAO HQ has directed the States to register the operating personnel with AMC.	2011	ICAO Asia/Pacific Office, Aerothai.	Progress made in the registration of operators with AMC and entering of data into AMC to be further reviewed by ATNICG/6

	• States hosting Backbone Boundary Intermediate System hubs to implement dual stack ATN (ATN over OSI and ATN over IPS). APANPIRG, through Conclusion 19/20 urges States to complete the implementation of dual stack ATN by 2011	2011	Asia and Pacific Region States hosting Backbone Boundary Intermediate Systems	States hosting BBIS hubs have been reminded of APANPIRG Conclusion 19/20 and urged to complete the installation by 2011
	• Completion of Networking with the BIS States	2012	Asia and Pacific Regions States	Some States started implementation and conducted operational trials
	• Review if implementation objectives have been met.	2009 - 2012	ATNICG	ATNICG to periodically review the status and direction in which the implementation is progressing and to ensure that the implementation efforts are leading towards the defined objectives
GPIs	GPI/17: Data link applications, GPI/22: Communication infrastructure			
References	• *Annex 10, Aeronautical Telecommunications, Volume III (Part I – Digital Data Communication Systems)* • *Manual on Detailed Technical Specifications for the Aeronautical Telecommunications Network (ATN) using ISO/OSI (Doc 9880)* • *ICAO Aeronautical Telecommunication Network (ATN) Manual for ATN using IPS Standards and Protocols (Doc 9896)* • *Manual on Required Communication Performance (Doc 9869)* • *Comprehensive Aeronautical Telecommunication Network (ATN) Manual (Doc 9739)* • *Manual of Technical Provisions for the Aeronautical Telecommunication Network (Doc 9705)* • *Regional Implementation guidance materials adopted by APANPIRG*			

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)
ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(Amended in July 2010)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 9* **ENHANCED COMMUNICATIONS AND SURVEILLANCE CAPABILITY IN OCEANIC AREAS**				
Benefits				
Environment	• reductions in fuel consumption and gaseous emissions as a result of efficiency gains;			
Safety	• improved monitoring of airspace will result in safety enhancement			
Efficiency	• facilitate utilization of advanced technologies (e.g, area navigation, UPRs, DARPs) and ATC decision support tools (e.g., vertical and lateral adherence monitors, short and medium term conflict detection), thereby enhancing safety and increasing efficiency. • enable aircraft to conduct flight more closely to preferred trajectories; • increase airspace capacity by enabling implementation of RHSM using data link;			
Strategy **Short term (2009-2011)**				
ATM OC COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
AOM *(Airspace Organisation and Management)* **CM** *(Conflict Management)* **AUO** *(Airspace Users Operations)*	Improve provision of satellite based communications and surveillance capabilities to enable FANS 1/A data link (ADS-C, CPDLC) to RNP 4 and RCP 240 specifications.			
	• codify/quantify existing anecdotal information and combine with available end-to-end system performance data. to summarise current satellite data link performance;	2009	Regional ANSPS, operators, FITS, CRAs. Communications Service providers (CSP)	Reported to Satellite Operational Continuity Meeting (SOCM/1), Bangkok, Thailand, August 2009

	• identify non conformities in current satellite data link performance against; o specifications in Global Operations Data Link Document (GOLD); o specifications in RCP Manual (Doc 9869); and o specifications in Oceanic SPR)	2009	Regional ANSPS, operators, FITS, CRAs.	reviewed status and identify issues at Satellite Operational Continuity Meeting (SOCM/1), August 2009
	• provide summary information on non conformities in current satellite data link performance to all affected parties in the end-to-end communications chain.	2009	Satellite Operational Continuity Meeting (SOCM) August 2009 to summarize and circulate information to affected parties, including CSP, Ground Earth Station (GES) providers, equipment suppliers and satellite service providers.	Issues identified have been summarized in the report of the first meeting of Satellite Operational Continuity Meeting (SOCM/1).
	• develop a regional strategy and work programme to identify/design suitable long term mitigations and solutions to non conformities that will enable continuous operational compliance with specifications for RNP4 and RCP 240.	2010	Regional ANSPs, operators, FITS, CRAs, CSP, Ground Earth Station (GES) providers, equipment suppliers and satellite service providers.	The Satellite Communication Datalink Service has been improved since late 2009 to some extent. But still does not meet operational requirements satisfactorily.
	• Develop a sample service level agreement for possible use by ANSPs	2010	Regional ANSPs, operators, FITS, CRAs, CSP	Consider convening SOCM/2 to progress this work
	• Implement mitigations and solutions in accordance with timelines in regional strategy	2010	Regional ANSPS, operators, FITS, CRAs, CSP, Ground Earth Station (GES) providers, equipment suppliers and satellite service providers.	State Letter dated 12 July 2010 issued conveying mitigation solution suggested by ICAO
	• monitor implementation progress	2011	Regional FITS, CRAs provide feedback to all affected parties	Assess implementation of mitigation solution in the next SOCM meeting
GPIs	GPI/5: RNAV and RNP, GPI/7: dynamic and flexible ATS route management, GPI/17: data link applications and GPI/22: Communication Infrastructure;			

References	• *Manual on Required Communication Performance (Doc 9869)* • *RTCA DO-306/EUROCAE ED-122, Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (the "Oceanic SPR')* • *FANS-1/A Operations Manual (FOM)* • *Global Operational Data Link Document (GOLD)* • *Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region* • *CEANS Report(2008) on ANS Infrastructure* • *APANPIRG Conclusion 19/24, 20/31, 20/32/20/33, 20/34 and 20/73*

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(Amended in July 2010)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 11*

IMPLEMENTATION OF ATS INTER-FACILITY DATA COMMUNICATION (AIDC) IN ASIA/PACIFIC REGION

Benefits	
Safety	• Will provide efficient and more reliable means of communication between ACCs in adjacent FIRs for the exchange of traffic coordination related operational messages. • Significantly reduce the coordination errors observed in controller to controller verbal communication across FIR boundaries thus enhance flight safety
Efficiency	• Increased efficiency for air traffic handover between ATS units • Will improve ATS direct communication between ATS units along the major traffic • Will improve the speed and capacity ; • Will facilitate inter-automation systems communication.

Strategy
Short term (2009-2015)

ATM OC COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
AOM *(Airspace Organisation and Management)* **CM** (Conflict management) **SDM** (ATM service delivery management)	Facilitate implementation of ATS Inter-facility Data Communication in the Asia and Pacific Regions			
	• Review the Status of Implementation	2009	ATNICG. ADS-B SITF	The status to reviewed and updated by ATNICG/4 and ADS-B SITF Meetings held in May 2009
	o Review the Options available for the implementation of AIDC in the region. Discuss options adopted by different states.	2009	ATNICG AEROTHAI	Options available were reviewed in ATNICG/4 meeting
	• Review implementation issues related to ATS automation systems and recommend methods of mitigating those issues	2009	ADS-B SITF CNS/MET SG	The automation issues discussed in the ADS-B SIFT/8

	• AIDC Seminar: A Seminar to be conducted to discuss various implementation issues and promote implementation	2010	ICAO Asia/Pacific Office	SIP Seminar to be conducted and scheduled from 12-13 Oct. 2010 in Bangkok
	• Develop implementation strategy to decide whether to continue pursuing AFTN AIDC or to choose ATN AIDC over OSI or IPS	2010	APANPIRG	ATN AIDC implementation deferred.
	• Trials to be conducted. Monitoring mechanism to be developed	2011	APANPIRG	State Letter be issued urging the States to expedite implementation and status to be monitored.
	• Review to ensure implementation objectives are met.	2009 - 2015	APANPIRG	APANPIRG to periodically review the status and direction in which the implementation is progressing and to ensure that the implementation efforts are leading towards the defined objectives
GPIs	GPI/17: Data link applications, GPI/22: Communication infrastructure			
References	• *Air Traffic Management* (Doc 4444) • *Manual of Air Traffic Services Data Link Applications* (Doc 9694) • *Manual of Technical Provisions for the Aeronautical Telecommunication Network (Doc 9705)* • *Asia/Pacific Regional Interface Control Document (ICD) for ATS Interfacility Data Communication (AIDC)*			

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(Amended in September 2010)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 10*

IMPROVED SITUATIONAL AWARENESS AND SURFACE SURVEILLANCE-IMPLEMENTATION OF THE ADS-B TO GROUND SURVEILLANCE

Benefits

Environment	• Reductions in fuel consumption and subsequent lower gas emissions
Efficiency	• Increased flexibility and flow of traffic operations • Ultimately, when performing *radar-like* control, potential redesign of airspace taking into account the application of reduced separation minima, integrate use of aircraft navigation and surveillance capability
Safety	• Introduction of surveillance in a non-radar environment • Support to search and rescue operations

Strategy
Medium Term (2011-2015)
Short term (2010)

ATM OC COMPONENTS	TASKS	TIME FRAME STARTED	RESPONSIBILITY	STATUS	REMARKS
AOM *(Airspace Organization and Management)* **CM** *(Conflict Management)* **AUO** *(Airspace Users Operations)*	Implementation of ADS-B based surveillance service in the sub-regions.				
ATM SDM (ATM *Service Delivery Management)*	• Compare current technologies with respect to concept of operations, relative costing, technical and operational performance and maturity of alternative technology/solutions (primary, secondary radar including Mode-S, ADS-B, multilateration, ADS-C)	2009	ADS-B Study and Implementation Task Force (ADS-B SITF)	In progress	COMPLETED Regional Guidance material on comparison of technologies developed and issued

	• Develop an implementation plan for near-term ADS-B applications in the Asia Pacific Region including implementation target dates taking into account: o available equipment standards; readiness of airspace users and ATS providers; o identifying sub-regional areas (FIRs) where there is a positive cost/benefit outcome expected for near-term implementation of ADS-B OUT; o developing a standardized and systematic task-list approach to ADS-B OUT implementation; and o holding educational seminars and provide guidance material to educate States and airspace users on what is required to implement ADS-B OUT.	2009-10	ADS-B Study and Implementation Task Force	In progress	The FASID Table CNS 4A and 4B – surveillance and ATM automation being updated; ADS-B Seminar conducted annually in conjunction with Task Force meetings. Potential sub-regions for using ADS-B identified; Requirement for avionics specification for the near-term application are being developed based on AMC2024 and Australian CASA document.
	• Develop Guidance Material to support harmonized regulation of ADS-B systems required on board the aircraft.	2010	ADS-B Study and Implementation Task Force	In progress	Forty Fifth DGCA Conference, through its Action Item 45/3 invited ICAO APANPIRG ADS-B SITF to develop the. The Guidance material has been developed by Regulators Workshop and ADS-B SITF/9 held in Aug. 10.

	• Study and identify applicable multilateration applications in the Asia and Pacific Region considering: - Concept of use/operations; - Required site and network architecture; - Expected surveillance coverage; Cost of system; Recommended separation minimas; and - If multilateration can be successfully integrated into an ADS-B OUT system for air traffic control	2011	ADS-B Study and Implementation Task Force	In progress	Concept of using multlateration has been developed; Some states have plan in place to introduce multilateration in particular & integrate it with A-SMGCS and Terminal area and en-route surveillance application
	• Coordinate ADS-B implementation plan and concept of operations with other ICAO regions where ADS-B implementation is going on and with relevant external bodies such as EUROCONTROL, EUROCARE, RTCA and Industry.	2013	ADS-B Study and Implementation Task Force	On- going	Updated information on ADS-B in Europe and North American Regions is provided to Task Force Meeting annually; Some Industry representatives provide input at ADS-B Seminar and meetings
	• Develop **Terms of Co-operation** for SEA which will include: • Establishing model documents for possible use by States when - Agreeing to share ADS-B data and DCPC (such as VHF radio voice communication) capability between adjoining States for various ADS-B applications (including a sample letter of agreement); or -Establishing ADS-B avionics fitment mandates • Identifying optimum coverage for ADS-B ground stations and	2011	South East Asia (SEA) Sub-Regional ADS-B Implementation Working Group	In progress	Terms of co-operation developed; sample agreement of data sharing developed; Some location for ADS-B ground stations identified. CBA for SEA project has been completed; Implementation plan for Australia-Indonesia and South China Sea Data and VHF communication capacity sharing projects are

	associated VHF radio voice communication in the sub-regional FIR boundary areas.				being developed by the SEA ADS-B WG.
	Develop an implementation plan for near- term ADS-B application in SEA which will deliver efficient airspace and increased safety on a regional basis that includes: • Schedule and priority dates to bring into effect ADS-B based services taking into account: - Timing of any equipage mandates; - Timing of any ATC automation upgrades to support ADS-B; - Timing of commissioning of any ADS-B data sharing and associated VHF radio voice communication facilities; • Consideration of major traffic flows.	2013	South East Asia (SEA) Sub-Regional ADS-B Implementation Working Group	In progress	Major traffic flow from Australia to Singapore through Indonesia and Singapore to Hong Hong along L642 and M771 in South China Sea being progressed.
linkage to GPIs	GSI-12 Use of Technology to Enhance Safety; GPI/9 Situational Awareness; GPI/5: RNAV and RNP, GPI/7: dynamic and flexible ATS route management, GPI/17: data link applications and GPI/22: Communication Infrastructure;				
References	• *Report of AN CONF/11;* • *Global ATM Operational Concept (Doc 9854);* • *Global Air Navigation Plan (Doc 9750);* • *Technical Provisions for Mode S Services and Extended Squitter (Doc 9871)* • *APANPIRG/16, 17, 19, 20 report on ADS-B* • *ADS-B related regional guidance materials adopted by APANPIRG*				

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(Amended July 2010)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 18* **IMPLEMENTATION OF ICAO PERFORMANCE BASED NAVIGATION PROVISIONS FOR TERMINAL AREA OPERATIONS**	
Implement ICAO Performance Based Navigation (PBN) provisions for terminal area operations in collaboration with stakeholders based on the Regional PBN Implementation Plan agreed by APANPIRG, to improve terminal area safety and efficiency by use of advanced navigation specifications for SIDs, STARs and instrument approach procedures.	
Benefits	
Environment	• reduction in fuel consumption and resulting emissions
Safety	• enhance safety by use of modern capabilities onboard aircraft; • implementation of more precise approach, departure, and arrival paths that will reduce dispersion and will foster smoother traffic flows; • increased airspace safety through the implementation of continuous and stabilized descent procedure using vertical guidance; • improved airport and airspace arrival paths in all weather conditions; and • decrease ATC and pilot workload by utilizing RNAV/RNP procedures and airborne capability and reduce the need for ATC-pilot communication and radar vectoring
Efficiency	• allows for more efficient use of airspace and increase airspace capacity through reduction of lateral and longitudinal separation between aircraft; • increase of predictability of the flight path; • reduced delays in high density airspace and airports through the implementation of additional parallel routes and additional arrival and departure points in terminal areas; • ability of air navigation service providers to make maximum use of aircraft capabilities; • ability of aircraft to conduct flights more closely to their preferred trajectories; • Reduced aircraft flight time due to the implementation of optimal flight paths; • facilitate utilization of advanced technologies thereby increasing efficiency; • optimized demand and capacity balancing through the efficient exchange of information; • reduces the need to maintain sensor-specific route and procedures, and their associated costs; • avoids the need for developing sensor-specific operations with each new evolution of navigation system, which would be cost prohibitive; • clarifies how RNAV systems are used; and • facilitate the operational approval process for operators by providing a limited set of navigation specifications intended for global use.

SAFETY COMPONENTS	TASKS	TIME FRAME	RESPONSIBILITY	STATUS
APANPIRG Conclusion 18/52	**Establishment of a Regional Performance Based Navigation Task Force (PBN/TF)** An Asia/Pacific PBN Task Force, with terms of reference as outlined in Appendix A to the APANPIRG/18 Report on Agenda Item 3.5, be established to develop a PBN implementation plan for the Asia/Pacific Region and address related regional PBN implementation issues.	**PBN TF –** As soon as practicable Regional PBN Implementat-ion Plan – by 2008 (Before APANPIRG-19)	APANPIRG PBN Task Force	Regional Performance Based Navigation Task Force (PBN/TF) established Meetings of PBN T/F held as per following schedule 1st 9–11 Jan 2008 2nd 1 – 3 April 2008 3rd 14-17 July 2008 4th 4-6 March 2009 5th 15-17 July 2009 6th 3-5 Feb..2010 APANPIRG/19 approved the Regional PBN Plan Interim Edition RASMAG reviewed the Plan in Dec 2008 suggested some changes PBN/TF 4 reviewed RASMAG proposals and incorporated comments in the **Version 0.2 of the Plan** Plan was further reviewed by: ATM/AIS/SAR/SG/19 ; and CNS/MET/SG /13 Version 0.3 was adopted by APANPIRG/20 as Asia/Pac Regional PBN Plan as Ver.1.0 PBN TF/6 proposed revision to the Plan (Ver.2.0)

APANPIRG Conclusion 18/53	**Development of State PBN Implementation Plans** The Regional Office should encourage States to begin development of their State PBN implementation plans in harmony with the development of the Asia/Pacific Regional PBN implementation plan being coordinated by the Asia/Pacific PBN Task Force for submission to APANPIRG/19 (2008).	**State PBN Implementation Plan** - 2009	STATES PBN TF APAC Office	State PBN Implementation Plan/Road map has been received from 21 States subject to review by PBNTF/7 States have not done so, are encouraged to provide their plan at earliest. Under development by some States
APANPIRG Conclusion 18/55	**Designation of Contact Person for PBN Implementation** States designate a focal contact person responsible for performance based navigation implementation and provide details of the contact person to ICAO Asia/Pacific Regional Office accordingly.	31 December 2007	STATES APAC Office	28 States and 3 Int'l Organizations have nominated Focal Points Reminders being regularly sent to States to nominate Focal Points
PBN/TF Report	**Develop detailed Status (database) regarding current and planned implementation of PBN terminal instrument procedures (SIDs and STARs) and Approaches**			ONLY 8 States have provided information Reminders are being sent regularly
	Data Collection – Runway ends /International Aerodromes	30 June 2008	STATE Focal Point	
	Data Collection – Runway ends /Domestic Aerodromes	31 December 2008	STATE Focal Point	
PBN Report	**Template developed by PBN TF for reporting progress:** **- Common Template will help in harmonizing the reporting process;** **- States requested to submit PBN Implementation Progress Report by 15 August 2009 for submission to APANPIRG 20.**	15 August 2009 and prior to each future PBN/TF Meeting	STATE	18 States have submitted PBN Implementation Progress on the new Template.

Strategy **Short term (2008 – 2012)**				
• **TMA– Arrival**	1. RNAV 1 in radar environment and with adequate navigation infrastructure. 2. Basic-RNP 1 in non-radar environment	RNAV 1 STAR for 50% of international airports by 2010 and 75% by 2012. Priority should be given to airports with RNP Approach	STATES APANPIRG PBN TF	
• **TMA-Departure**	1. RNAV 1 in radar environment and with adequate navigation infrastructure. 2. Basic-RNP 1 in non-radar environment	RNAV 1 SID for 50% of international airports by 2010 and 75% by 2012. Priority should be given to airports with RNP Approach	STATES APANPIRG PBN TF	
• **Approach**	1. RNP APCH with Baro-VNAV in most possible airports 2. RNP AR APCH in airport where there are obvious operational benefits.	RNP APCH (with Baro-VNAV) in 30% of instrument runways by 2010 and 50% by 2012. Priority should be given to airports with operational benefits	STATES APANPIRG PBN TF	

Strategy **Medium Term (2013 – 2016)**				
SAFETY COMPONENTS	**TASKS**	**TIME FRAME**	**RESPONSIBILITY**	**STATUS**
• **TMA– Arrival**	1. Expand RNAV 1 or RNP 1 Application 2. Mandate RNAV 1 or RNP 1 approval for aircraft operating in higher air traffic density TMAs	RNAV 1 or RNP 1 STAR for 100% of international airports by 2016 RNAV 1 or RNP 1 STAR for 70% of busy domestic airports where there are operational benefits	STATES PBN TF APANPIRG	
• **TMA- Departure**	1. Expand RNAV 1 or RNP 1 Application 2. Mandate RNAV 1 or RNP 1 approval for aircraft operating in higher air traffic density TMAs	RNAV 1 or RNP 1 SID for 100% of international airports by 2016 RNAV 1 or RNP 1 SID for 70% of busy domestic airports where there are operational benefits	STATES PBN TF APANPIRG	
• **Approach**	1. Expansion of RNP APCH (with Baro-VNAV) and APV 2. Expansion of RNP AR APCH where there are operational benefits 3. Introduction of landing capability using GNSS and its augmentations	RNP APCH with Baro-VNAV or APV in 100% of instrument runways by 2016	STATES APANPIRG PBN TF	

Strategy **Long Term (2016 and beyond)**	
In this phase, GNSS is expected to be a primary navigation infrastructure for PBN implementation. States should work co-operatively on a multinational basis to implement GNSS in order to facilitate seamless and inter-operable systems and undertake coordinated research and development programmes on GNSS implementation and operation. During this phase, States are encouraged to consider segregating traffic according to navigation capability and granting preferred routes to aircraft with better navigation performance. With the expectation that precision approach capability using GNSS and its augmentation systems will become available, States are encouraged to explore the use of such capability where there are operational and financial benefits.	
GPIs	GPI/5: Performance based navigation, GPI/9: Situational awareness, GPI/11: RNP and RNAV SIDs & STARs,
References	• *ICAO Asia Pacific Regional Performance-Based navigation Implementation Plan - Version 2* • *APANPIRG 18 Decision - ; APANPIRG 19 Decision -* • *ICAO Guidance Material – Performance-Based Navigation Manual Doc 9613 AN/937 Third Edition – 2008* • *Assembly Resolution 36-23*

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(amended25 July 2010)

REGIONAL PERFORMANCE OBJECTIVE: ***APAC Objective 12***

IMPLEMENT INTERNATIONAL AIRWAYS VOLCANO WATCH (IAVW), INTERNATIONAL TROPICAL CYCLONE WATCH (ITCW), AND IMPROVE THE QUALITY OF METEOROLOGICAL WARNINGS AND ADVISORIES

Benefits	
Safety **Efficiency**	• Improve in-flight safety by providing information on volcanic ash, tropical cyclone and other hazardous weather by way of meteorological advisories and warnings • Improve pre-flight planning by optimizing flight routes with respect to volcanic ash, tropical cyclone and other hazardous weather phenomena by way of meteorological advisories and warnings

Strategy
Short term (2010-2011)/Medium term (2012 - 2015)

ATM OC COMPONENTS	TASKS	TIME FRAME	RESPONSIBILITY	STATUS
MET	• Monitor and provide assistance in the regional implementation of meteorological warnings and advisories that include volcanic ash (VA) and tropical cyclone (TC) advisories and meteorological warnings and advisories based on current and future requirements	2010 - 2015	METWARN/I TF	In progress
	• Track and investigate deficiencies in the format and dissemination of meteorological advisories and warnings and propose remediation plans and provide information to ICAO and WMO groups for possible assistance	2010-2015	METWARN/I TF OPMET/M TF	In progress
	• Conduct periodic tests for SIGMET on VA, TC, and phenomena other than VA and TC in view of assessing improvements in their implementation	2010 – 2015	METWARN/I TF & RODB & VAACs & TCACs & OPMET/M TF	In progress
	• Provide guidance and/or training related to the implementation of meteorological advisories and warnings, including the Regional SIGMET Guide as they relate to the Annex 3 amendment cycle	2010, 2013	METWARN/I TF & OPMET/M TF & RO	In progress

	• Develop framework for contingency plan for specific phenomenon including VA, radioactive cloud, TC and Tsunami with reference to developments made by the IVATF and WMO scientific steering committee	2010-2011	METWARN/I TF & MET/ATM TF	To begin
Linkage to GPIs	GPI/19 – Meteorological Systems			
References	• *Annex 3* • *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (Doc 9691)* • *Handbook on the International Airways Volcano Watch (IAVW) Operational Procedures and Contact List (Doc 9766)* • *Manual on Low-level Wind Shear (Doc 9817)* • *Asia/Pacific Regional SIGMET Guide*			

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(amended 5 August 2010)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 13*

IMPLEMENT WAFS AND ASSOCIATED DEVELOPMENTS

Benefits	
Safety **Efficiency**	• Improve the regional implementation of weather forecasts (including upper winds and upper-air temperatures, direction, speed and height of maximum winds and tropopause heights, as well as turbulence, icing, cumulonimbus) used by airlines and ATM needed to optimize flight routes which will provide an increase in efficiency and reduced carbon emissions

Strategy
Short term (2010-2011)/Medium term (2012 - 2015)

ATM OC COMPONENTS	TASKS	TIME FRAME	RESPONSIBILITY	STATUS
MET	• Assist the regional implementation of new gridded products for turbulence, icing and CB forecasts	2010-2013	WAFS/I TF	In progress
	• Facilitate in organizing regional training of new gridded products for turbulence, icing and cumulonimbus forecasts	2010-2013	WMO & ICAO	In progress
	• Monitor the implementation of WIFS noting the planned cessation of ISCS-G2 broadcast in June 2012	2010-2015	WAFS/I TF	In progress
	• Monitor the implementation of Secure SADIS FTP service	2010-2015	WAFS/I TF	To begin
	• Develop and distribute WAFS service reference document to ASIA/PAC States	2010	WAFS/I TF	In progress
	• Monitor the implementation status of WAFS within the ASIA/PAC Regions, and report to CNS/MET SG	2010-2011	WAFS/I TF	To begin
	• Report WAFS training needs of ASIA/PAC States to CNS/MET SG	2010-2011	WAFS/I TF	To begin
Linkage to GPIs	GPI/19 – Meteorological Systems			

References	• *Annex 3* • *http://www.icao.int/anb/wafsopsg/* • *http://www.icao.int/anb/sadisopsg/* • *Asia/Pac WAFS Implementation Plan and Procedures*

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(amended 25 July 2010)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 14*

DEVELOP REGIONAL MET REQUIREMENTS TO SUPPORT ATM

Benefits	
Safety Efficiency	• Improve efficiency of ATM and airlines by providing tailored regional MET products needed to optimize flight routes in all weather conditions

Strategy
Short term (2010-2011)/Medium term (2012 - 2015)

ATM OC COMPONENTS	TASKS	TIME FRAME	RESPONSIBILITY	STATUS
MET	• Conduct MET ATM meeting in 2009 to determine actions needed to obtain regional MET requirements to support ATM	2009	MET/ATM TF	complete
	• Conduct survey on regional ATM requirements for MET information	2010 - 2011	MET/ATM TF	To commence after MET ATM meeting
	• Conduct MET seminar in coordination with WMO in 2011 to further develop list of possible regional MET requirements to support ATM	Jan 2011	MET/ATM TF	planning
	• Assess aviation meteorological services, systems and architecture in the region and how they can integrate weather information into decision support tools	2010-2015	MET/ATM TF	In progress
	• Investigate sub-regional exchange of MET information and associated agreements that facilitate ATM operations particularly over busy routes that overlap different FIRs	2010-2015	MET/ATM TF	In progress
	• Facilitate implementation of Meteorological Services for the Terminal Area (under development by WMO)	2013-2015+	MET/ATM TF	future
	• Monitor global policy associated with source data and delivery of MET products for ATM	2010-2015	MET/ATM TF	future

Linkage to GPIs	GPI/19 – Meteorological Systems Note that the MET/ATM TF will provide input to the METWARN/I TF in the developing a framework for contingency plan for specific phenomenon including VA, radioactive cloud, TC and Tsunami
References	• *Manual on co-ordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services (Doc 9377)*

ASIA/PACIFIC REGION

PERFORMANCE FRAMEWORK FORM
(REGIONAL)

(amended 2 August 2010)

REGIONAL PERFORMANCE OBJECTIVE: *APAC Objective 15*

IMPROVE OPMET EXCHANGE EFFICIENCY

Benefits	
Safety Efficiency	• Increase OPMET availability and reliability needed for flight planning (efficiency) and in-flight re-planning (safety)

Strategy
Short term (2010-2011)/Medium term (2012 - 2015)

ATM OC COMPONENTS	TASKS	TIME FRAME	RESPONSIBILITY	STATUS
MET	• Improve the availability of OPMET data at the Regional OPMET Data Banks (RODB)	2010 - 2015	OPMET/M TF	In progress
	• Improve the inter-regional OPMET exchange	2010 - 2015	OPMET/M TF	In progress
	• Improve the availability of OPMET data in the Pacific	2010 - 2015	OPMET/M TF &TCB & PASO & States	In progress
	• Review and update regional ROBEX tables and guidance material	2010 - 2015	OPMET/M TF & RO	In progress
	• Facilitate and provide guidance to the implementation new/modified standards before applicability date and carry out post implementation review to ensure that standardized procedures are followed	2010 - 2015	OPMET/M TF	In progress
	• Conduct periodic quality checks and OPMET monitoring to improve the quality and timeliness of OPMET in the Asia/Pac Region	2010 - 2015	OPMET/M TF & IATA	In progress
	• *Facilitate and monitor the migration to AIM and new MET codes (e.g. XML) for METAR/SPECI, TAF and SIGMET*	*TBD*	*OPMET/M TF & RO*	*TBD*
Linkage to GPIs	GPI/19 – Meteorological Systems (Note: the OPMETM TF will assist the METWARN/I TF in SIGMET test coordination and deficiency tracking of the format and dissemination of meteorological advisories and warnings and noted in the PFF of the METWARN/I TF)			

References	• *SADIS User Guide* • *ROBEX Handbook* • *Asia/Pacific OPMET Data Banks Interface Control Document*

CNS/ATM Implementation Planning Matrix

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
AFGHANISTAN									
AUSTRALIA	ATN tests were conducted. BIS Router and Backbone BIS Router and AMHS implemented.	AFTN based AIDC Implemented between Brisbane and Melbourne, Auckland, Nadi and Auckland. AIDC is also in use between Melbourne and Mauritius.	Implemented and integrated with ATM systems to support FANS1/A equipped aircraft.	Implemented	Implemented		A total of 29 UAP and 14 WAM stations are delivering ADS-B data to serve a 5 Nm separations service and fully operational. ADS-B mandate applies from 12/2013 at and above FL290. WAM operating in Tasmania. Commissioned in 2010. WAM being installed in Sydney to serve 3 Nm separation service and PRM application, expected to be operation 2010.	FANS 1/A ADS-C implemented.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
AUSTRALIA (Cont'd)							ASMGCS using multilateration operational in Melbourne & Sydney in 2010. Brisbane and Perth being installed.		
BANGLADESH	BIS Router and AMHS planned for 2011.	AIDC between Dhaka and CTG, Dhaka and Sylhet planned for 2011.		Not yet planned	Not yet planned		Not yet planned	Not yet planned	
BHUTAN	ATN BIS Router and UA service 2011.					Procedures developed for NPA.			
BRUNEI DARUSSALAM	ATN BIS Router planned for 2009 and AMHS planned for 2009-2011.								
CAMBODIA	BIS Router and AMHS planned for 2011.	Planned 2009	Planned 2009			Procedure developed for NPA.			
CHINA	ATN Router and AMHS deployed in 2008. Tripartite BBIS trial completed with Bangkok and Hong Kong, China	AIDC between some of ACCs within China has been implemented. AIDC between several other ACCs are being	Implemented to ATS Rout. L888 route, Trial on HF data link conducted for use in	Implemented in certain airspace. L888, Y1 and Y2 routes.	RNAV (GNSS) implemented in certain airports. Beijing, Guangzhou, Tianjin.	Ali, Linzhi and Lhasa airports	ADS-B trial has been conducted in 2006. 5 UAT ADS-B sites are operational and used for flight training of	FANS 1/A based ADS-C implemented. L888 route.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
	in Jan. 2003. ATN trial with Hong Kong using XOT over internet conducted in 2006, Further trials planned in 2009. AMHS/ATN technical tests with Macau completed in 2009. ATN/AMHS tests with ROK, India , Hongkong China planned in 2010.	implemented. AIDC between Sanya and Hong Kong put in to operational use in Feb 2007. AIDC between Qingdao and Incheon planned for 2013.	western China.				CAFUC. Another ADS-B project for ATS route between Chengdu and Jiuzhai using 1090ES conducted since 2008. Will be followed by Chengdu – Lhasa and B215 route.		
HONG KONG, CHINA	ATN and AMHS technical trial with Japan conducted in 2003. 64 Kbps ATN Link with Bangkok put into operational use in June 2004. Preliminary ATN/AMHS technical trials with China (Beijing) using VPN over Internet connection	AFTN-based AIDC with Sanya put into operational use in February 2007. AIDC trial with other adjacent ATS authorities planned for end 2009/2010. AIDC technical trial with Taibei to be undertaken in 2010.	FANS 1/A based CPDLC trials completed in 2002. VDL Mode-2 technical trial conducted in 2002. D-ATIS, D-VOLMET and 1-way PDC implemented in 2001. PDC service	Implemented in certain airspace	Implemented in certain airspace	RNAV (GNSS) departure procedures implemented in July 2005. RNP AR APCH procedures for 07L/25R runways implemented in June 2010.	A larger-scale A-SMGCS covering the whole Hong Kong International Airport put into operational use in April 2009. Data collection/ analysis on aircraft ADS-B equipage in Hong Kong airspace conducted on	FANS 1A trials for ADS-C completed in 2002.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
	conducted in September 2006. Operational AMHS commissioned in July2009. ATN/AMHS circuit with Macao put into operational use in Dec. 2009. ATN/AMHS interoperability tests with other adjacent communications centres commenced in late 2009, viz Taibei (2009), Beijing (2010), Japan (2012) AMHS trial with Philippines in late 2010. ATN/AMHS into operation in end 2009.	AIDC technical trial with Philippines to be undertaken by end 2010.	upgraded to 2-way data link in June 2008.				quarterly basis since 2004. ADS-B trial using a dedicated ADS-B system was conducted in April 2007. Further ADS-B trial planned for 2010.		
MACAO, CHINA	ATN/AMHS interoperability test with Beijing commenced in Mar 2009.								ATZ within Hong Kong and Guangzhou FIRs. In ATZ full VHF

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
	ATN/AMHS circuit with Hong Kong put into operational use in end Dec 2009.								coverage exist. Radar coverage for monitoring purposes.
COOK ISLANDS									
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	The ATN BIS Router and AMHS to be implemented in 2011.	With neighboring ACCs to be implemented TBD		Implemented in certain ATS routes G711, B467		RNAV(GNSS) Non-precision approach to be implemented in 2011.	ADS-B has been used as back-up surveillance of SSR since 2008.		
FIJI	ATN BIS Router and AMHS implementation by 4th quarter 2010.	AFTN based AIDC implemented between Nadi, Brisbane, Auckland and Oakland.	Implemented and integrated with ATM systems to support FANS1/A equipped aircraft.	Implemented		Implemented	ADS- B /multilateration ground stations installed. Surveillance service will be provided starting from end of 2012	FANS 1/A ADS-C implemented.	
FRANCE ***(French Polynesia Tahiti)***		Implementation of limited message sets with adjacent centres under discussion.	FANS-1. Implemented since 1996.					FANS 1/A ADS-C implemented since March 1999.	
INDIA	ATN BBIS router and AMHS Physical installation over. SAT in May	AFTN Based AIDC Coordinating with Bangladesh	FANS-1 implemented at Kolkata, Chennai,	SBAS Technical development in 2007.			Trial planned for 2006. ASMGCS	FANS 1/A ADS-C implemented at Kolkata,	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
	2008, Operational trials being conducted with Singapore with live traffic exchange. Coordinating with China, Thailand , Pakistan and Oman for conduct of test.	and Pakistan and, we are ready.	Mumbai and Delhi.	Implementation planned for 2009.			Implemented at IGI Airport New Delhi.	Chennai, Delhi and Mumbai.	
INDONESIA	ATN BIS Router and AMHS planned for trial in 2009. Trial with Singapore planned. ATNBIS Router and AMHS are still on going trial with Singapore to be finished in 2010 (Part D: AMHS Commission)	Brisbane and Makasar in planned in June 2009. Makasar and Brisbane is still on going trial AIDC, planned operational in 2011	FANS-1/A. CPDLC in Ujung Pandang FIRs already trial start from 2008 and will be implemented in 2009. FANS-1/A CPDLC in Ujung Pandang FIRs is completely trial operational and will be full operational for designated route on September 2010.				27 ADS-B ground stations have been installed in 2009. Upgrading ATC automation at Makasar for ADS-B application capabilities in 2009. Plan to install 3 additional ground stations.	FANS-1/A ADS-C trial planned at Jakarta and Ujung Pandang ACC in 2007. FANS-1/A ADS-C in Ujung Pandang FIRs is completely trial operational and will be full operational in September 2010.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
JAPAN	ATN BBIS router and AMHS installed at 2000. Connection tests with USA 2000 - 2004 and put into operational use in 2005. Connection test with Taibei 2008 - ongoing. Connection tests with Australia, China, Hong Kong, Singapore, Republic of Korea, Europe and Russian Federation is TBD	AFTN based AIDC implemented with Oakland, Anchorage and Incheon. Planned between Fukoka ATMC and Taibei ACC for 2012.	FANS1/A system Implemented in Fukuoka FIR.	SBAS implemented RNAV5 implemented.	RNAV1 implemented	RNP Approach implemented	Two Multilateration Systems have been implemented at Narita and Haneda airports.	FANS 1/A. ADS-C implemented in Fukuoka FIR.	
KIRIBATI									
LAO PDR	ATN BIS Router and AMHS completed planned for implementation with Bangkok in 2010.	AIDC with Bangkok planned for 2010.		Implemented. Planned for 2011.					
MALAYSIA	ATN BIS Router completed 2007. AMHS planned in 2011	AFTN AIDC planned with Bangkok ACC in 2011.	Implemented for Bay of Bengal in July 2008.	Implemented for Oceanic Routes.	Basic RNAV implemented	NPA at KLIA implemented	Implementation of ADS-B proposed in 2010 - 2015.	FANS 1/A ADS-C already implemented for Bay of Bengal area.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
MALDIVES	ATN BIS Router/AMHS planned for implementation in the 2011.	Planned for 2011.	FANS1/A installed Trials planned in last quarter of 2007.	Trials planed for 2005-2008. Implementation in later 2008.			Trials planned for 2007-2008. Implementation in late 2008.		
MARSHALL ISLANDS						NPA implemented at Majuro Atoll.			
MICRONESIA (EDERATED STATES OF)									
Chuuk				Implemented					
Kosrae				Implemented					
Pohnpei				Implemented					
Yap				Implemented					
MONGOLIA	ATN BIS Router and AMHS planned for 2005 and 2006. Trial with Bangkok conducted.		Function available. Regular trials are conducted.		GPS procedures are being developed and implemented at 10 airports.		ADS-B trial in progress implementation planned for 2006.	FANS 1/A ADS-C implemented since August 1998.	
MYANMAR	Implementation of AMHS to be completed by the end of 2010.	The capability of ATM Automation system to support AIDC by 2011	Implemented since August 1998.				A plan to implement ADS-B by 2011	Implemented since August 1998.	
NAURU									

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
NEPAL	BIS Router and AMHS planned for 2011.	AFTN/AMHS based AIDC between KTM-CAL, KTM-BAN, KTM-LHASA planned for 2011.			GPS departure and approach has been developed for 8 airports and planned for implementation in 2008.		ADS-B feasibility study planned for 2007.		
NEW CALEDONIA							Three ADS-B ground stations implemented in 2009 to cover international traffic at La tontouta airport serving Tontouta ACC & APP.		
NEW ZEALAND	BIS Router and AMHS implementation planned for 2010.	AFTN based AIDC implemented between New Zealand, Australia, Fiji, Tahiti, Chile and USA.	FANS-1/A. Implemented	Will be implemented as required.	RNAV procedures being implemented as developed.	RNP AR APCH implemented at Queenstown (ZQN).	Domestic trial was conducted in New Zealand. Use will be re-evaluated in 2008. Trial of Area MLAT conducted in 2006. ADS-B planned as an element of MLAT at specific sites for domestic use.*	FANS 1/A Implemented	*MLAT being implemented in Auckland (Surface Movement) and Queenstown.

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
PAKISTAN	ATN/AMHS considered as Phase II implemented since 2010.	Implemented between Karachi and Lahore ACCs Plan to implement AIDC with Mumbai and Muscat for December 2010	Implementation planned from 2005-2010.	Planned for 2005-2010.	RNAV arrival and departure procedure being developed.	NPA (RNP) procedure are being developed and under flight inspection.	Feasibility study for using ADS-B is in hand. One station was installed at ACC Karachi and evaluation is in progress.	Planned for 2005-2010.	Existing Radar system being upgraded.
PAPUA NEW GUINEA				Implemented		Implemented at certain aerodromes.			
PHILIPPINES	ATN G/G BIS Router/AMHS implemented in 2006. AMHS trials with Singapore by end 2008 and Hong Kong planned in 2009.	Planned for 2011.	CPDLC Planned for 2011.				Two ground stations scheduled for implementation in 2013.	FANS 1/A ADS-C planned for 2011.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
REPUBLIC OF KOREA	ATN BIS Router/AMHS planned for 2011.	AFTN based AIDC implemented between ACC and Fukuoka ATMC. AIDC between Incheon and Qingdao to be implemented.	PDC & D-ATIS implemented 2003.	RNAV 5 to be implemented 2012.	RNAV 1 to be implemented 2012.	APV Baro VNAV to be implemented 2012.	ADS-B implemented 2008 for SMC in Incheon International Airport.	FANS 1/A based ADS-C implemented since 2003 for contingency purpose.	
SINGAPORE	AMHS implemented. ATN BIS Router trial with Malaysia commenced in 2007 and with Indonesia in 2009. ATN/AMHS interoperability trial with India completed in Oct 2009. Commenced pre-ops trial in Dec 2009. Co-ordinating with UK and Australia on ATN/AMHS trial in Q4 2010.	AFTN based AIDC to be implemented	Implemented since 1997. Integrated in the ATC system in 1999.		RNAV SIDS and STARS implemented in 2006.	NPA Procedure implemented in 2005.	The airport M-lat system was installed in 2007 and “far-range” ADS-B sensor was installed in 2009.	FANS 1/A ADS-C implemented since 1997. Integrated with ATC system in 1999.	

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
SRI LANKA	ATN BIS Router Planned for 2009. AMHS planned along with BIS in 2009.		PDLC in trial operation since November 2000.				ADS-B Trials planned for 2010 and implementation in 2011.	FANS 1 /A ADS-C trial since November 2000.	GPS based domestic route structure being developed.
THAILAND	BBIS/BIS Routers already implemented. Target date for AMHS in 2008.	AFTN based AIDC planned for 2010.	FANS-1/A Implemented.	Under implementation	Implemented at Phuket Airport	Implemented at Phuket	Multilateration implemented in 2006 at Suvarnbhumi Int'l. Airport. ADS-B is planned to be part of future surveillance infrastructure	FANS 1/A ADS-C Implemented.	
TONGA	AMHS planned for 2008.					NPA planned for 2007.	Trial planned for 2010		CPDLC and ADS-C is not considered for lower airspace
UNITED STATES	AMHS implemented. AMHS Atlanta Sept 2009 to serve CAR/SAM,/ North Atlantic/Europe	AFTN based AIDC implemented.	FANS-1/A based CPDLC implemented.	Implemented	Implemented		Being implemented. Fully coverage by end of 2013 for NAS.	Implemented	
VANUATU									

				Navigation*					
State/Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**En-route**	**Terminal**	**Approach**	**ADS-B/ Multilateration**	**ADS-C**	**Remarks**
VIET NAM	BIS Routers planned for 2009. ATN/AMHS trial in 2010 and operation in 2012.	AFTN based AIDC implemented in 2009. Trial for ATN based AIDC planned in 2010.	CPDLC operational trial conducted in early 2007.	For en-route TBD.	RNAV		TBD	FANS 1/A ADS-C operational trial conducted for oceanic area of Ho Chi Minh FIR since March 2002.	

* Navigation – Navigation including Performance Based Navigation (PBN), APV and precision approach

SUBJECT/TASKS LIST IN THE CNS/MET FIELDS

The priorities assigned in the list have the following connotation:
A = Tasks of a high priority on which work should be expedited;
B = Tasks of medium priority on which work should be under taken as soon as possible but not to the detriment of Priority "A tasks; and
C = Tasks of medium priority on which work should be undertaken as time and resources permit but not to the detriment of priority "A" and "B" tasks.
TOR = Terms of Reference of the Sub-Group

TASKS NO. 1 TO 31 HAVE BEEN COMPLETED AND REMOVED FROM THE LIST

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
1 (32)	RAN/3 C.8/14 APANPIRG/14 (TOR 3)	A-Safety E-Continuity GPI-19	Subject: Inadequate implementation of procedures for advising aircraft on volcanic ash (VA) and tropical cyclones (TC) and other hazardous weather Task: Monitoring of the implementation of meteorological advisories and warnings which includes VA and TC	A	Monitor and provide assistance in the implementation of meteorological advisories and warnings procedures to ensure provision of timely information on weather hazardous to aircraft. Monitor outcomes of IVATF and WMO Scientific Steering Committee for developing framework of contingency plan for specific phenomenon including VA, TC, radioactive cloud and Tsunami for the Region (coordinate with MET/ATM TF when necessary)	CNS/MET SG Task Force on the implementation of meteorological advisories and warnings (METWARN/ITF)	On going
2 (35)	(TOR 3)	D – Efficiency All GPIs	Subject: To facilitate regional implementation of CNS/ATM Tasks: a) coordinate training/workshops to allow States to develop and implement new CNS/ATM procedures; b) encourage States to participate in	A	1) Identify topics for training, develop syllabi and plan training programme; 2) Encourage States in the evaluation and training of new CNS/ATM systems;	CNS/MET SG	On going On-going

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
			the evaluation and training of new CNS/ATM systems;		3) Co-ordinate with States and monitor progress;		On-going
			c) progress the adoption of WGS-84 co-ordinate system and introduction of high integrity systems for the management of the co-ordinate data.		4) Collect information and suggest methods of resolving problems commonly faced by the States.	ATM/AIS/SAR CNS/MET SG	On-going
3 (36)	APANPIRG D. 4/46 RAN/3 C.12/3 APANPIRG 5/3 (TOR 3)	D – Efficiency All GPIs	Subject: Provision of adequate CNS/MET services Task: Monitor CNS/ATM systems research and development, trials and demonstrations in the fields of CNS/MET and facilitate the transfer of this information and expertise between States.	A	1) Encourage States to conduct R&D, trials & demonstrations of new CNS/MET services; 2) Monitor global developments that may have beneficial consequences on regional planning activities; 3) Consolidate information on new capabilities in the CNS/ATM system, for the Sub-Groups review and action; 4) Serve as a focal point for review of ongoing work of Regional formal and informal working groups that is relevant to CNS/MET; 5) Provide for coordinated training/seminars to keep all States informed on developments of trials and demonstrations.	CNS-MET	On-going

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
4 (37)	C 12/24	D – Efficiency GPI-19	Subject : Transition to the GRIB and BUFR coded WAFS products	A	1) Monitoring of implementation of BUFR coded SIGWX forecasts	CNS/MET SG	Completed
			Task : Implementation of the transition to the GRIB and BUFR coded WAFS products		2) Monitoring of the migration to SADIS 2G 3) Assist in preparation for the new gridded products for turbulence, icing and cumulonimbus 4) Monitoring of the implementation of WIFS until cessation of ISCS G2 broadcast	WAFS Implementation Task Force WAFS/I TF WAFS/I TF	Completed 2013 2012
5 (38)	C12/36 APANPIRG C14/45	D – Efficiency GPI-19	Subject: Developing the new requirements for MET products and services in support of ATM.	A	1) Development of the initial draft of the MET Chapter; 2) Development of the MET components of the CNS/ATM concept/ strategy; 3) Inclusion of ATM requirements for MET information in the CNS/ ATM Plan; 4) MET/ATM Coordination Seminar – February 2006. 5) Conduct survey on ATM requirements for MET information	CNS/MET SG with assistance of MET WG on CNS/ATM Plan CNS/MET SG METATM TF METATM TF	Completed Completed Completed Completed Reconvene

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
					6) MET/ATM meeting in 2009 7) MET/ATM seminar in 2010 (in coordination with WMO)	MET ATM TF MET ATM TF	Completed Jan 2011
6 (39)	APANPIRG/13 D 13/28	A - Safety D – Efficiency GPI-19	Subject: To improve the efficiency of the regional and inter-regional OPMET exchange and the availability of OPMET information from the ASIA/PAC Region Task: Review and optimize the ROBEX scheme and other OPMET exchanges; introduce monitoring and management procedures for the ROBEX centres and Regional OPMET data banks	A	1) Review and update regional ROBEX tables and relevant documents; 2) Propose optimization changes to the ROBEX scheme; 3) Improve the availability of OPMET data at the Regional OPMET Data Banks (RODB); 4) Improve the availability of OPMET information from the Pacific States; 5) Introduce monitoring and management Procedures.	CNS/MET SG OPMET Management Task Force (OPMET/M TF)	Recurrent task Completed On-going On-going Completed
7 (43)		D- Efficiency GPI17,18,19,22	Subject: Implementation of data link Task: Encourage implementation	A	Encourage States to implement CPDLC, D-ATIS, D-VOLMET, PDC and DPC	CNS/MET SG	Continuous SIP Seminar on DFIS conducted. in 2008 - and first SOCM meeting held in 2009
8 (45)	APANPIRG List of deficiencies	A – Safety GPI - 19	Subject: Implementation of SIGMET Task: Improve regional procedures and availability of SIGMET from	A	1) Assist States in implementing SIGMET requirements;	CNS/MET SG	Recurrent task

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
			ASIA/PAC States		2) Conduct regular SIGMET tests; 3) Review and update training and guidance material; 4) Regular monitoring on the availability and quality of SIGMET and advisories.	METWARN/I TF in coordination with OPMET/M TF	Recurrent task Recurrent task Recurrent task
9 (46)	APANPIRG/17 C 17/23	D-Efficiency GPI-5 GPI-11	Subject: To implement Performance Based Navigation Concept in Asia/Pacific Region Task: Implement Performance Based Navigation in the Region.	A	1) To conduct Workshops/Seminars in the Region to familiarize the States about PBN Concept 2) To develop roadmap for implementation of RNP and RNAV procedures	CNS/MET SG ATM/AIS/SAR SG CNS/MET SG	Seminar and Workshop on PBN were Conducted in 07/08 and in 03/2009 Regional PBN plan was adopted in 2009.
10 (48)		D-Efficiency GPI22 GPI9	Subject: FASID Task: Updating of FASID Table CNS-1B, CNS-1C, CNS-1E, CNS-4A and CNS 4B.	A	Seek State revision of Tables prior to March 2010. Review and update FASID Tables with the assistance of the Secretariat	CNS/MET SG	Completed Amendment proposal processed.
11 (49)		A-Safety D-Efficiency E-Continuity GPI23	Subject: WRC-2011 (2012) Task: Supporting ICAO position for ITU WRC-2011 on agenda items related to civil aviation	A	Seek States to support ICAO position at regional telecommunity – APT APG and at WRC.	CNS/MET SG	On-going till 2012 RPG/1 was held in Dec. 09. APG2012-3 in March 2010.
12 (50)	CNS/MET SG/13 Decision 13/7 ToR (5)	D-Efficiency E-Continuity GPI21 GPI11	Subject: SBAS capability study Task: conduct study on the need for and feasibility of establishing a regional SBAS capability	B	To conduct study by members of the CNS/MET Sub-group	CNS/MET SG PBNTF	2011

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
13 (51)	TBD by APANPIRG/20	A-Safety D-Efficiency GPI9	Subject: Study of using SSR Mode S SI code Task: Study on the need for introduction of SSR Mode S SI code for future use in the Asia and Pacific region	B	To conduct study by members by the CNS/MET Sub-group	CNS/MET SG ADS-B SITF	2012
14 (52)	ToR of CNS/MET SG (4)	D-Efficiency GPI 22	Subject: HF Radio Communication Guidance material Task: Develop HF radio communication GM for North Pacific, BoB and Indian ocean area.	B	To develop the Guidance Material by members of the CNS/MET Sub-group.	CNS/MET SG	2013
15 (53)	ToR of CNS/MET SG (5) and APANPIRG Conclusion 20/72	A-Safety D-Efficiency GPI-5, 9 GPI-11	Subject: Develop a standard ionospheric model to facilitate implementation of GNSS; Task: Nominate focal point of contact and exchange of ionospheric data with objective of establishing a standard ionospheric model	A	Nominate focal point of contact and coordinate for measurement campaign	CNS/MET SG	2013
16 (54)	APANPIRG Conclusion 19/24 and Conclusion 20/32	A-Safety D-Efficiency GPI-5 and GPI22	Subject: Improve AMS(R) S communication in the remote and oceanic areal; Task: Promote development of performance and provision of satellite data link communication and develop solution for the challenges	A	Conduct satellite data-link operational continuity meetings. Mobilize stakeholders of AMS(R)S to improve the performance of the Satellite communication service. SOCM/2 was held in Aug.09	CNS/MET SG	2013

*** Number in bracket indicates sequential number since establishment of the Sub-group.**

Agenda Item 3.5: Other Air Navigation Matters

Agenda Item 3: Regional Air Navigation Planning and Implementation Issues

3.5 Other Air Navigation Matters

CIVIL AVIATION AND THE ENVIRONMENT

3.5.1 The meeting received a summary of current ICAO activities related to environmental protection. In support of the ICAO environmental goals, the meeting noted that Committee on Aviation Environmental Protection (CAEP) has taken a structured approach of first quantifying the environmental impacts and then establishing mitigation measures to address the impacts. The CAEP/8 meeting, held in February 2010, committed to a timetable for the development of a CO_2 Standard for commercial aircraft, recommended for new NOx standards and recommended that reports related to voluntary emissions trading systems, linking of open emissions trading systems, and offsetting emissions from aviation sector be published.

3.5.2 The meeting recalled that, at the request of PIRGs in 2006, CAEP delivered simple methodologies for estimating environmental benefits of CNS/ATM systems at the national level ("rules of thumb"). As this approach does not meet the requirements, the meeting was apprized that the work of CAEP during the CAEP/9 cycle includes preparing CNS/ATM systems environmental assessment best practices and high-level principles document by 2012. The scope of this document is broader than the rules of thumb and it is envisioned that globally agreed methodologies to account for benefits from operational changes could facilitate access to financial resources from green/environmental sources. Improvements in operational performance can deliver substantial emissions reductions and can be implemented in the shorter term. Regional initiatives such as AIRE, ASPIRE as well as continuous decent operations (CDOs) are demonstrating solid progress in this area.

3.5.3 The meeting noted that the 37th session of the ICAO Assembly, scheduled for October 2010, will review the ICAO Programme of Action on International Aviation and Climate Change, which specifies global goals, identifies possible mitigation measures, and establishes a framework for monitoring progress. This Programme of Action, developed by Group on International Aviation and Climate Change (GIACC) and the High-level Meeting on Aviation and Climate Change (HLM-ENV), is the first globally-harmonized agreement, as a sector, on a goal to address aviation emissions.

3.5.4 The meeting noting the developments in Environmental field agreed to continue to consider environmental issues in the planning and implementation of regional air navigation systems and encouraged States to develop action plans on international aviation CO_2 emissions and to submit them to ICAO.

Updates on Air Navigation activities in Vietnam

3.5.5 The meeting noted the update provided by Vietnam on air navigation activities for year 2009-2010. Vietnam informed the meeting about the development of a number of operational/guidance documents, implementation of a number of new routes and new automated AIS Systems, issuance of AICs, AIP Supplements and amendments, introduction of advance ATM system with integrated ADS/CPDLC, establishment of a flight calibration team, study of ADS-B project etc. Noting that the future activities like revision of SAR agreements with neighboring FIRs and setting up of AIDC with Sanya and Singapore ACCs calls for international cooperation, the meeting requested relevant CAAs to provide support to CAAV in implementing the projects.

CNS/MET Improvement Activities in LAO PDR – Lao PDR

3.5.6 Lao PDR informed the meeting about the existing CNS infrastructure available in their airspace and assured ensuring RCP 240 standard. Information on planned up gradations like implementation of two ATIS, AMHS capabilities, AIDC and advanced ATM was also provided. Study has been carried out to assess implementation outcomes of ADS-B. A contract has been signed between Lao Meteo Department and DCA to facilitate provision of OPMET database with access provide to the public through website http://dmhlao.etllao.com and connectivity with World Meteorological Organization website http://worldweather.wmo.int/

AGENDA ITEM 4: REGIONAL AIR NAVIGATION DEFICIENCIES

Agenda Item 4: Regional Air Navigation Deficiencies

4.1 Under its terms of reference, the APANPIRG has been regularly reviewing the status of implementation of the APAC Air Navigation Plan through its subgroups according to the uniform methodology approved by the ICAO Council to identify, assess and report the safety aspect of air navigation deficiencies.

4.2 The online deficiency database is available through the ICAO APAC website www.bankok.icao.int via secure access provided by the Regional Office to States and International Organizations concerned.

Deficiencies in the ATM/AIS/SAR fields

4.3 The meeting reviewed the updated List based on information provided by concerned States to the 20th Meeting of the ATM/AIS/SAR Sub-group (ATM/AIS/SAR/SG/20, July 2010) as shown in **Attachment A** to the Report on Agenda Item 4. The meeting also noted that only 15 States and 1 Administration have provided the contact person to coordinate with the Regional Office on matters relating to deficiencies and urged States who have not provided to do so at the earliest.

4.4 The meeting urged the States in the Pacific sub region who have not taken firm corrective action to eliminate the deficiencies, which have remained in the List for some time and to take necessary action for resolving and advise the Regional Office if difficulties are encountered in implementation, so that the Regional Office with available resources could assist implementation and adopted the draft conclusion.

Conclusion APANPIRG21/ 53 −Elimination of ATM Air Navigation Deficiencies

That, States concerned

a) be urged to take urgent actions to correct the deficiencies in the ATM/AIS/SAR fields identified in Attachment A to the Report on Agenda Item 4 ;

b) notify details of the problems/difficulties to the Regional Office; and

c) designate a point of contact in each State to deal with deficiencies and provide details to the Regional Office by 22 October 2010.

4.5 The updated List of Air Navigation Deficiencies in the ATM, AIS and SAR fields is in **Attachment A** to the report on agenda item 4.

Deficiencies in the AOP field

4.6 The meeting urged Myanmar to update the status on the provision of simple approach lighting system being installed for runway 03 and establishment of maintenance programme at Yangon International airport and inform Regional Office accordingly.

4.7 The meeting noted the findings observed by the AGA mission placed at **Attachment B1** to the Report on Agenda Item 4 and adopted the draft conclusion

Conclusion APANPIRG21/54- Aerodrome deficiencies

That, the States concerned be urged to validate and provide corrective action plan for the elimination of aerodrome deficiencies identified in Appendix B1 to the Report on Agenda item 4 of APANPIRG/21;

4.8 The updated List of Air Navigation Deficiencies in the AOP field is in **Attachment B** to the report on Agenda Item 4.

Deficiencies in the CNS field

Air-ground VHF Communication in Yangon FIR

4.9 The meeting noted and improvement in the VHF Communication performance in Myanmar. Based on the statistics collected by Myanmar, loss of communication with aircraft in Yangon FIR is rare. However, communication difficulties were still experienced by some pilots flying over the FIR. IATA informed that roadmap is being workout to remove requirement for the IFBP in Yangon FIR.

ATIS function at Kathmandu and Dhaka airports

4.10 The ATIS function has been implemented at TIA, Kathmandu and the deficiency (AP-CNS-03) had been deleted from the list of deficiencies in CNS field in 2009.

4.11 The ATIS function has been implemented at Dhaka Airport. The deficiency (AP-CNS-02) has been deleted from the list of deficiencies in CNS field accordingly.

Manila-Hong Kong AFTN circuit and Manila – Hong Kong ATS Direct Speech Circuit

4.12 The meeting noted the significant improvement in the operation of Manila/Hong Kong AFTN and DSC circuits. The circuit serviceability performance has shown satisfactory status and CAAP has been invited to notify the Regional Office for removal of the deficiency (AP-CNS-04) from the list.

HF Communication problem in Mumbai FIR

4.13 India informed that HF receivers for Mumbai ATC will be replaced with new ones at end of this year. The recent report from a flight on JNB-BOM indicated that the HF communications in Mumbai FIR have improved**.**

Navigation Aids Performance deficiencies in Philippines

4.14 The meeting noted that the new CNS/ATM project undertaken by the Administration is in procurement stage and is expected to be operational by 2013. Interim project for replacement of the 14 year old ATM System in Manila has also been taken up. It was also noted that the two ILS and DVOR provided at Ninoy Aquino International Airport (NAIA) are quite old and unreliable. ILS 24 and ILS06 became unserviceable on 26 September 2009 and 27 October 2009 respectively. This was considered as a deficiency in CNS field. Updating the information on ILS at Manila, Philippines informed the meeting that the ILS system was commissioned on 26 August 2010 and has been put into trial operation through a NOTAM.

4.15 The updated List of Air Navigation Deficiencies in the CNS field is given in **Attachment C** to this paper.

Deficiencies in the MET field

4.16 There are 19 air navigation deficiencies in the MET field for which updates are provided in **Attachment D** to the Report on Agenda Item 4.

4.17 The meeting noted that SIGMET is provided by the Yangon MWO and that Myanmar has participated in the SIGMET tests in November 2009. Since that time, an iterative process of monitoring by the Regional OPMET Data Bank (RODB) Bangkok allowed for targeted improvements in the issuance of SIGMET. The meeting also noted that further monitoring as recommended by the CNS/MET SG/14 meeting revealed a high degree of compliance and adopted the draft conclusion as below.

Conclusion 21/55 – Removal of the APANPIRG Air Navigation Deficiency AP-MET-13

That, the air navigation deficiency AP-MET-13 be removed from the APANPIRG air navigation deficiencies list.

4.18 Cambodia informed the meeting that they are in the process of obtaining SADIS FTP which is necessary in mitigating AP-MET-10 in that World Area Forecast System (WAFS) forecasts supplied in flight documentation (Chapter 9, Annex 3) would be satisfied. Furthermore, Cambodia is developing a Meteorological Watch Office which is necessary in mitigating AP-MET-11. Both efforts may be complete in early 2011 and addressed at APANPIRG/22. Lastly, Cambodia acknowledged China with appreciation for the issuance of SIGMET for the Phnom Penh FIR. These developments provided by Cambodia are noted in **Attachment D** to the Report on Agenda Item 4.

4.19 To partly address recommendation eleven, cost recovery, of the CAEMSA-SP Project Terminal Report, the CNS/MET SG/14 meeting reviewed the dilemma of providing necessary MET services for international aviation when cost recovery is not sufficient in certain States, particularly those with minimal air traffic (e.g. South Pacific Island States), yet their location for alternate aerodrome planning is crucial to the overall planning by airlines. To assist in finding an option for providing the necessary MET services based on cost recovery, the meeting agreed that larger air space blocks would need to be determined to develop and maintain a level of MET service that satisfies Annex 3 provisions and considers shared services amongst States in the air space block that are not redundant (e.g. one State issues SIGMET, another State issues TAF). The importance of reducing duplicate services in the case presented was expressed by IATA. Since the current documentation, in particular the *Manual on Air Navigation Services Economics* (Doc 9161, 4th edition, 2007) is limited in addressing this dilemma, the meeting adopted the following Conclusion proposed by the CNS/MET SG/14 meeting.

Conclusion 21/56 – Cost Recovery Guidance Material Update

That, ICAO be invited to consider updating the cost recovery guidance material that would take into account States whose air traffic volume is not sufficient in obtaining the cost recovery for the necessary MET services required in Annex 3 and consider shared services in airspace blocks that are based on the number flights needed in obtaining the necessary cost for the services required for that airspace block.

4.20 The meeting noted that tracking of and reporting on the above Conclusion would be useful and that the development should be in concert with WMO documents that provide guidance on cost recovery. Furthermore, to make cost recovery successful, other legislative matters such as the establishment of a MET Authority is necessary and that the establishment of MET in the Pacific Aviation Safety Oversight (PASO) would assist in these matters.

ICAO TC Activities

4.21 The meeting took note about the establishment of the TC officer at the ICAO Regional Office and the services provided by ICAO TCB on cost recovery basis.

Conclusion:

4.22 The meeting urged ICAO Regional Office to present a discussion Paper at the upcoming DGCA Conference highlighting the following points for DG's attention:

a) provision of contact point to deal with deficiencies; and
b) provision of adequate resources for timely resolving the identified deficiencies.

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AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

(deletions and additions are the updates by ATM/AIS/SAR/SG/20)								
Identification		**Deficiencies**			**Corrective Action**			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
ATS Routes								
~~Requirements of Part VIII, Table ATS 1 of the Air Navigation Plan~~	~~India/Nepal~~	~~A473 - Not implemented~~	~~16/3/99~~	~~A new proposal was submitted in mid-2003 by Nepal. This was coordinated by Airport Authority of India (AAI) with defense authorities.~~	~~Nepal - propose to delete A473 from BANP. India submitted the proposal in March 2008. Nepal yet to submited the proposal in January 2010. The Regional Office has forwarded the proposal to the headquartes.~~	~~Nepal~~ ~~ICAO~~	~~Item captured in Chapter 2 of the Route Catalogue. APANPIRG/19 (September 2008, Bangkok) updated re progress.~~	~~B~~
	~~Philippines/Thailand/ Viet Nam~~	~~G473 - Partially implemented~~	~~24/11/93~~	~~Co-ordination is in progress among States and ICAO.~~	ICAO - process the amendment the BANP. APAC 09/15 - ATS was approved in October 2010, thus being closed.	~~ICAO~~	~~Superseded by the re-structure of the South China Sea (SCS) route in 2001. Accordingly, the 15th Meeting of South-East Asia ATS Coordination Group (SEACG/15, May 2008) was informed that Thailand and States concerned agreed with the deletion of G473.~~ CLOSED	~~B~~
	China	R216 - Not implemented	24/11/93	China advised current the routing B215 KUQA A460 REVKI to Alma Ata met the requirements for traffic from Urumqi to Alma Ata and requests deletion of R216 from BANP (14 Apr 03).	China will coordinate with Kazakhstan to delete R216 from BANP.	China/Kazakhstan ICAO	Captured in Chapter 2 of the Route Catalogue.	B

AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	~~Cambodia/Lao PDR/Thailand~~	~~R345 - Not implemented. Coordination process completed.~~	~~24/11/93~~		APAC 09/15 - ATS was approved in October 2009, thus being closed.	~~Cambodia/Lao PDR/ Thailand needs to submit joint amendment proposal to Regional Office~~	~~Item captured in Chapter 2 of the Route Catalogue.~~ CLOSED	~~B~~
	Indonesia	R459 - Implemented as W51 and W36	24/11/93	ICAO has requested Indonesia to implement as R459.	Indonesia, Singapore - consider implementation of the route with designator L504. Singapore advised ATM/AIS/SAR/SG/20 (July 2010, Singapore) that a hollistic sub-regional review of ATS routes were being undertaken by Indonesia and Singapore.	Indonesia/Singapore	To be implemented as L504. Target implementation date TBD	B

AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
WGS-84								
Requirements of Paragraph ~~3.6.4~~3.7.1 of Annex 15	Bhutan	WGS-84 - Not implemented	2/7/1999	Data conversion completed, but not published		Bhutan	TBD	A
	China	WGS-84 - Patially implemented * implemented in the Sanya FIR as of 1 Nov 2001	2/7/1999	Differences to Annex 15 - *Aeronautical Information Services* are notified		China	China advised APANPIRG/19 (September 2008, Bangkok) that WGS 84 implementation is in progress and planned to be completed in 2010 for all existing airports. All new airports will use WGS84 immediately. China confirmed to ATM/AIS/SAR/SG/20 that the implementation would be completed by the end of 2010.	A
	DPR Korea	WGS-84 - Not implemented				DPR Korea	DPRK advised ATM/AIS/SAR/SG/18 verbally that WGS 84 implementation was completed. The Regional Office is waiting for a formal report.	A
	Kiribati	WGS-84 - Not implemented				Kiribati	TBD	A
	Nauru	WGS-84 - Not implemented		Conferring with consultant		Nauru	TBD	A
	Solomon Islands	WGS-84 - Not implemented				Solomon Islands	1999	A
	Vanuatu	WGS-84 - Implemented at main airports	2/7/1999			Vanuatu	1999	A

AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
Airspace Classification								
Requirements of Paragraph 2.6 of Annex 11	China	Airspace Classification - Not implemented	7/7/99		Difference to Annex 11 is published in AIP, China.	China	APANPIRG/19 updated, implementation planned by end 2010.	A
	Kiribati	Airspace Classifcation - Not implemented	7/7/99			Kiribati	TBD	A
	Nauru	Airspace Classification - Not implemented	7/7/99			Nauru	TBD	A
	Papua New Guinea	Airspace Classification - Not implemented	7/7/99			Papua New Guinea	Project in place	A
	Solomon Islands	Airspace Classification - Not implemented	7/7/99			Solomon Islands	TBD	A
	Viet Nam	Airspace Classification - Not implemented	7/7/99			Viet Nam	~~APANPIRG/19~~ATM/AIS/SAR/SG/19 updated, for ~~first~~fourth quarter 2009. ATM/AIS/SAR/SG/20 updated, for 2010.	A

AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
AIP Format								
Requirements of Chapter 4 of Annex 15	Cook Islands	AIP Format - Not implemented	7/7/99			Cook Islands	ATM/AIS/SAR/G/16 (June 2006) updated - AIP COOK ISLANDS in new format in progress with assistance of New Zealand~~, effective date by the end of 2008~~	A
	Kiribati	AIP Format - Not implemented	7/7/99			Kiribati	ATM/AIS/SAR/SG/18 (June 2009) was advised AIP in draft stage	A
	Nauru	AIP Format - Not implemented	7/7/99			Nauru	ATM/AIS/SAR/SG/18 (June 2008) was advised work soon to start	A
	Papua New Guinea	AIP Format - Not implemented	7/7/99			Papua New Guinea	TBA	A

ATTACHMENT A

AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
SAR capability								
Requirements of Annex 12	Cook Islands	Annex 12 requirements not implemented. No agreements with adjacent States.	31/1/95		Cook Islands - implement Annex 12 requirements and co-ordinate LOA with adjacent States ICAO - assist to develop SAR capability and to co-ordinate with adjacent States	Cook Islands	2009. SAR agreement with New Zealand completed 2007.	U
	Maldives	Annex 12 requirements not implemented. No agreements with adjacent States.	24/4/97	SAR services and facilites provided (details to be confirmed). SAR agreements with neighbouring States under development	Maldives - implement Annex 12 requirements and co-ordinate LOA with adjacent States ICAO - assist to develop SAR capability and to co-ordinate with adjacent States	Maldives	2009	U

AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
Carriage of ACAS II								
Requirement of Chapter 6 of Annex 6	Bhutan	Annex 6 requirement not implemented.	26/8/05		Bhutan - implement Annex 6 as required.	Bhutan	TBD	U
	Cook Islands	Annex 6 requirement not implemented.	26/8/05		Cook Island - implement Annex 6 as required.	Cook Islands	TBD	U
	Kiribati	Annex 6 requirement not implemented.	26/8/05		Kiribati - implement Annex 6 as required.	Kiribati	TBD	U
	Marshall Islands	Annex 6 requirement not implemented.	26/8/05		Marshall Islands - implement Annex 6 as required.	Marshall Islands	TBD	U
	Micronesia	Annex 6 requirement not implemented.	26/8/05		Micronesia - implement Annex 6 as required.	Micronesia	TBD	U
	Nauru	Annex 6 requirement not implemented.	26/8/05		Nauru - implement Annex 6 as required.	Nauru	TBD	U
	Palau	Annex 6 requirement not implemented.	26/8/05		Palau - implement Annex 6 as required.	Palau	TBD	U
	Papua New Guinea	Annex 6 requirement not implemented.	26/8/05		Papua New Guinea - implement Annex 6 as required.	Papua New Guinea	TBD	U
	Solomon Islands	Annex 6 requirement not implemented.	26/8/05		Solomon Islands - implement Annex 6 as required.	Solomon Islands	TBD	U

AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	Tonga	Annex 6 requirement not implemented.	26/8/05		Tonga - implement Annex 6 as required.	Tonga	Tonga-advised ATM/AIS/SAR/SG/19 verbally that ACAS II implementation was completed. The Regional Office is waiting for a formal report.	U
	Vanuatu	Annex 6 requirement not implemented.	26/8/05	Pressure altitude reporting transponder required in all airspace since 1/1/00.	Vanuatu - implement Annex 6 as required.	Vanuatu	TBD	U

AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
Carriage of Pressure Altitude Reporting Transponder								
Requirement of Chapter 6 of Annex 6	Bhutan	Annex 6 requirement not implemented.	26/8/05		Bhutan - implement Annex 6 as required.	Bhutan	TBD	U
	Cook Islands	Annex 6 requirement not implemented.	26/8/05		Cook Island - implement Annex 6 as required.	Cook Islands	TBD	U
	Kiribati	Annex 6 requirement not implemented.	26/8/05		Kiribati - implement Annex 6 as required.	Kiribati	TBD	U
	Marshall Islands	Annex 6 requirement not implemented.	26/8/05	ACAS II required.	Marshall Islands - implement Annex 6 as required.	Marshall Islands	TBD	U
	Micronesia	Annex 6 requirement not implemented.	26/8/05		Micronesia - implement Annex 6 as required.	Micronesia	TBD	U
	Nauru	Annex 6 requirement not implemented.	26/8/05		Nauru - implement Annex 6 as required.	Nauru	TBD	U
	Palau	Annex 6 requirement not implemented.	26/8/05		Palau - implement Annex 6 as required.	Palau	TBD	U
	Papua New Guinea	Annex 6 requirement not implemented.	26/8/05		Papua New Guinea - implement Annex 6 as required.	Papua New Guinea	TBD	U
	Solomon Islands	Annex 6 requirement not implemented.	26/8/05		Solomon Islands - implement Annex 6 as required.	Solomon Islands	TBD	U

AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	Tonga	Annex 6 requirement not implemented.	26/8/05	ACAS II required.	Tonga - implement Annex 6 as required.	Tonga	Tonga-advised ATM/AIS/SAR/SG/19 verbally that the pressure altitude reporting transponder implementation was completed. The Regional Office is waiting for a formal report.	U

AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
Non Provision of Safety-related Data								
Requirement of Paragraph 3.3.4.1 of Annex 11	Bangladesh	Annex 11 requirement not implemented.	11/9/09		Bangladesh - provide the safety-related data as required. Bangladesh advised ATM/AIS/SAR/SG/20 that the data were submitted to MAAR in 2008 and 2009. Thailand to confirm.	Bangladesh		U
	Lao PDR	Annex 11 requirement not implemented.	11/9/09		Lao PDR - provide the safety-related data as required.	Lao PDR		U
	Papua New Guinea	Annex 11 requirement not implemented.	21/8/06		Papua New Guinea - provide the safety-related data as required.	Papua New Guinea	TBD	U

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION

- 1 -Identification		Deficiencies			Corrective Action			
Requirements	**State/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action**
Annex 14 Vol. I Amendment 6 ***§ 10.1*** ***§ 10.2***	**Myanmar**			A maintenance programme should be established to maintain facilities in a condition which does not impair safety of air navigation.				"A"
Annex 14 Vol. I **§** 5.3.4		No approach Lighting RWY 03	1994	PAPI installed in 2002. Approach lights to be Installed when funds available.	Precision approach Cat I available for runway 21 and simple approach being installed for rwy 03.	DCA Myanmar	End of 2009	A

AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION FOR VALIDATION BY STATES

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Nepal							
Annex 14, Volume I	Katmandu International Airport	Runway/ taxiways	ICAO Mission of February 2008	Poor condition of runway -surface irregular with rut formation, cracks and base failure at some locations. Annex 14,Vol I, Section 10.2	Improve runway surface	Tribhuvan International airport/ CAAN		U
				Growth of thick grass on the airfield pavements.	Removal of grass from the pavement			U
				Provision of RESA in accordance with section 3.5 of ICAO Annex 14, Volume I.	Provision of RESA			U
				Provision of runway markings in accordance with the specifications given in Chapter 5 of Annex 14, Volume I.	Provide runway markings as per ICAO SARPs			A
				Insufficient runway strip, refer recommendations given in section 3.4 of Annex 14, Volume I.	Provide runway strip as per ICAO recommendations			A

AIR NAVIGATION DEFICIENCIES IN THE AOP FIELD IN THE ASIA/PACIFIC REGION FOR VALIDATION BY STATES

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Maldives					MACL/CW Unit		
Annex 14, Volume I	**Male International Airport**	**Runway/ Taxiways**	AGA Mission Report April 2008	Poor condition of runway shoulders. Water body within runway strip. Insufficient runway strip.	Improve runway shoulders. Fill water body.			U
				Growth of grass on the airfield pavements.	Remove grass from pavements			U
				Provision of RESA in accordance with section 3.5 of ICAO Annex 14, Volume I.	Provide RESA			U
				Airfield signs provided are not in accordance with the requirements given in section 5.4 of Annex 14, Volume I.	Provision of signage's as per ICAO requirements			A
				Poor condition of alpha and bravo taxiways and shoulders	Improve the pavement conditions			A
	Gan International airport	**Runway**	**AGA mission Report**	Provision of RESA in accordance with section 3.5 of ICAO Annex 14, Volume I.	Provide RESA			U

AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION FOR VALIDATION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	India							
Annex 14 Volume I	**Chennai International Airprot**	**Runway**	**AGA mission January 2009**	non frangible signage on runway strip. (5.4.1.3 & 9.9 of Annex 14, volume I)	Provision of frangible signs	AAI		A
				RESA not provided in accordance with Para 3.5 of Annex 14, Volume I requirements;	Provision of RESA	AAI		U
				Runway strip is insufficient-300m strip width is not available for the full length of runway 07/25 in accordance with 3.4.3 of Annex 14, Volume I	Provision of 300m strip width for full length of runway 07/25.	AAI		A
Annex 14, Volume I	**Mumbai International Airprot**	**Runway**	**AGA mission January 2009**	RESA not provided for R/W 09 and R/W 14 in accordance with Para 3.5 of ICAO Annex 14, volume I;	Provision of RESA	MIAL		U
				Taxiway light foundations not flush with shoulder - section 9.9 of Annex 14, volume I.	Taxiway light foundations flushed with shoulder surface.	MIAL		A
				Runway strip is insufficient-300m strip width is not available for the full length of runway 09/27 in accordance with 3.4.3 of Annex 14, Volume I	Provision of 300m strip width for full length of runway 09/27.	MIAL		A

AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION FOR VALIDATION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
Annex 14 Volume I	**India** **Delhi International Airprot**	**Runway/ Taxiway**	**AGA mission of January 2009**	Object(fence) strip near runway 27 threshold;	Relocate fence.	DIAL		U
				Poor condition of pavement (pre threshold pavement areas of r/w 10-28)- cracking, rutting and vegetation growth; 10.2	Improved pavement conditions	DIAL		U
				Poor condition of taxiway N adjoining r/w 10.	Improved pavement condition	DIAL		A
				Taxiway light foundations not flush with shoulder - section 9.9 of Annex 14, volume I.	Taxiway light foundations flushed with shoulder surface	DIAL		A

AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION FOR VALIDATION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Cambodia							
Annex 14 Volume I	**Phnom Penh International Airport**	**Runway**	**AGA mission of March 2009**	RESA not provided in accordance with Para 3.5 of Annex 14, Volume I.	Provision of RESA	SSCA Cambodia		U
				Runway strip is insufficient-300m strip width is not available for the full length of runway	Provision of 300m strip width for full length of runway.			U
				non frangible signage on runway strip. (5.4.1.3 & 9.9 of Annex 14, volume I)	Provision of frangible signs			A
	Siem Reap International Airport	**Runway**	**AGA mission of March 2009**	RESA not provided as per Para 3.5 of Annex 14, Volume I. ;	Provision of RESA			U
				non frangible signage on runway strip. (5.4.1.3 & 9.9 of Annex 14, volume I)	Provision of frangible signs			A

AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION FOR VALIDATION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Bangladesh							
Annex 14 Volume I	**Zia International Airport, Dhaka**	**Runway/ Taxiway**	**ICAO mission April 2009**	Runway strip width insufficient(300m strip not available for the full length of runway);	Provide runway strip in accordance with Annex 14, volume I	CAABD		A
				RESA not provided in accordance with Section 3.5 of Annex 14, Volume I requirements;	Provide RESA			U
				runway edge lights and taxiway edge lights does not meet frangibility requirements in accordance with 9.9 of Annex 14, Volume I. ;	Provision of airfield lighting system satisfying frangibility requirements			A
Annex 14, Volume I	**Shah Amanat International Airport, Chittagong**	**Runway**	**ICAO mission April 2009**	RESA not provided in accordance with Section 3.5 of Annex 14, Volume I requirements;	Provide RESA			U
				Runway strip width insufficient(300m strip not available for the full length of runway;	Provide 300m runway strip for full length of runway			A

AIR NAVIGATION DEFICIENCIES IN THE AOP FIELD IN THE ASIA/PACIFIC REGION FOR VALIDATION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Thailand					DCA/AOT		
Annex 14 Volume I	**Chiang Mai**	**Runway**	**AGA mission of July 2009**	300m strip width not available for the full length of precision approach CAT I runway in accordance with the standard 3.4.3, Annex 14, Volume I;	Provide 300m strip for full length of runway			A
				RESA to satisfy Section 3.5 of Annex 14, Volume I requirements; and	Provide RESA			U
				road hold position signage not provided at roads intersections crossing the runway/active taxiways.	Provide road holding position signage			A
Annex 14, Volume I	**Phuket International Airport**	**Runway**	**AGA mission of July 2009**	R ESA to satisfy Section 3.5 of Annex 14, Volume I requirements;	Provide RESA			U
				Runway strip width insufficient(300m runway strip for precision approach runways in accordance with Para 3.4.5 of Annex 14, Volume I;	Provide 300m runway strip width for full length of runway			A

AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION FOR VALIDATION

Identification		Deficiencies			Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date of completion**	**Priority for action****
	Malaysia							
Annex 14 Volume I	**Kota Kinabalu International Airport**	**Runway**	**AGA mission report November 2009**	RESA not provided for runway 20 in accordance with Para 3.5 of ICAO Annex 14, Volume I;	Provide RESA	MAHB		U
				300m strip width not available for the full length of runway;	Provide 300m strip for full length of runway			A
				Grading of taxiway strip is not in accordance with section 3.11 of Annex 14, volume I. Taxiway side stripe marking not provided.	Grade taxiway strip and provide marking			A
				Direct access road from fire station to runway not provided in accordance with the recommendation given in Para 9.2.30 of Annex 14, Volume I;	Provide direct access road from fire station to runway			B

* Priority for action to remedy the shortcoming is based on the following safety assessments:

"U" priority = Urgent requirements having a direct impact on safety and requiring immediate corrective actions. Urgent requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is urgently required for air navigation safety.

"A" priority = Top priority requirements necessary for air navigation safety. Top priority requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is considered necessary for air navigation safety.

"B" priority = Intermediate requirements necessary for air navigation regularity and efficiency. Intermediate priority requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is considered necessary for air navigation regularity and efficiency.

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE CNS FIELD IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirement	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action**
~~Provision of ATIS as specified in FASID Table CNS 2 (Doc 9673)~~	~~Bangladesh~~	~~To broadcast current, routine terminal information to arriving and departing aircraft to ease congestion on the Tower and Approach channels affecting safety of aircraft operation.~~	~~May 2007~~	~~Provide aerodrome Terminal Information broadcast system to ease congestion on VHF and to reduce controllers work load~~ Notification from Bangladesh received on 17 Sep 2009	~~The ATIS equipment installed has been out of service due to maintenance problem and is beyond repair. It is required to provide a new equipment.~~ ~~New ATIS equipment had already been installed and put into trial operation on 14 May 2008. Effort is required to resolve the technical problem and provide ATIS for operational use within shortest possible time. Further updates on the Status are required.~~	~~Civil Aviation Authority of Bangladesh~~	~~September 2009~~ Corrective action plan implemented. Deficiency is removed.	~~A~~
Adequate and reliable VHF COM	Myanmar	Quality and reliability of RCAG VHF inadequate and unavailability of required coverage. Improvement has been observed and pilot reports continued to indicate occasional communication difficulties. Further improvement has been observed with occasional communication problems reported.	1998 Early 2008 **July 2010**	Improvements in the quality of link to RCAG stations and power supply system at some remote stations are required.	Action should be taken to provide reliable links between the RCAG stations and Yangon ACC. ICAO missions were conducted. An action plan was developed to upgrade equipment at RCAG stations, provide VSAT link at all RCAG stations, to improve power supply system. DCA Myanmar has replaced equipments at all 6 RCAG sites with digital VHF system and has provided VSAT links and solar power supply system at all sites. New HF transmitters were used to provide service to aircraft flying beyond VHF coverage in a small portion of Yangon FIR	DCA Myanmar	Revised target date is end of 2009 This deficiency will be removed from the list upon receipt of official report providing full details of action taken by Myanmar and confirmation by the users.	A

Identification		Deficiencies			Corrective Action			
Requirement	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action**
Requirements for provision of AFS circuits between Hong Kong and Manila is specified in FASID Table CNS 1A and 1D (Doc.9673 Vol.II)	Philippines	Total disruption of the AFTN circuit between Manila and Hong Kong after Philippines Long Distance Telephone Company (PLDT) failed to provide communication link between Manila and Hong Kong. The fluctuation of service availability of AFTN circuit and ATS direct speech circuit were recently observed from total outage of 400minutes in June to over 13000minutes in August 2009.	February 2007 June 2009 The normal operation fully restored in February 2010.	It is urgently required to improve the performance of the AFTN circuit to meet the requirement for the exchange of safety messages between Manila and Hong Kong within the established transit time of 5 minutes. It is also required to restore normal operation of the ATS direct speech circuit as soon as possible.	Prolonged delay in rectification of problem experienced at Manila has resulted in diversion of message traffic for a long time via Taipei with alternate routing via Hong Kong/Fukuoka/Singapore/Manila causing traffic congestion as well as higher transit time of AFTN message. Remedial actions for improvement of the circuit performance were discussed among ICAO Secretariat, Hong Kong CAD and the CAAP Philippines. ICAO mission was carried out and action plan was developed.	Civil Aviation Authority of the Philippines (CAAP)	By the end of September 2009 The circuit was resumed fully normal operational in Feb 2010. Latest monthly performance report indicates its serviceability meets the operational requirements. The CAAP is invited to notify Regional Office to remove the deficiency from the list.	U

Identification		Deficiencies			Corrective Action			
Requirement	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action**
Requirements for provision of navigation facilities specified in FASID Table CNS 3 (Doc.9673 Vol.II)	Philippines	Disruption of Air Traffic Services in Manila FIR was reported on 13 September 2009 for about two hours because the Standby Power source failed to takeover the load when the main power failed. On 19 June 2010, DVOR at Manila broke down at 05:30 leading to non availability of instrument approach procedures at the Airport (NAIA) till early July. Both the ILSs provided to serve the instrument runway were unserviceable. Both ILSs and DVOR are quite old and have become unreliable. Moreover, difficulty is being faced in getting spares for the equipment.	September 2009	The instrument approach procedures using these two equally vital radio navaids It is urgently required to improve the performance of the radio navigation aids and power supply system,	Action for the new CNS/ATM project is in procurement stage and is expected to be operational by 2013. Interim project of replacement of the 14 year old ATM System in Manila has also been taken up. The site installation and system commissioning for new ILS is scheduled for August 2010. The proposal is being developed to complete fully restoration of DVOR facility	The Civil Aviation Authority of Philippines (CAAP)	Dec. 2010 The CAAP has been urged to take necessary remedial action at the earliest.	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION

If State is bold/italic – see further description in narrative below – associated with the deficiency designator (AP-MET-xx)
Blue highlight – information provided by 10 August 2010; Green highlight – information provided at the APANPIRG/21 meeting, 9 September 2010

Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Meteorological observations and reports. (Annex 3, Chapter 4)	Solomon I.	Weather information is inadequate and not provided on a regular basis	1996 Confirmed 2006 SOA	Reported by airlines operating to Solomon I.	Equipment to be upgraded and arrangements to be made for regular observations TC expert recommendation to replace and/or calibrate MET obs. equipment AGGH – 2008 State made aware of MET Services gaps identified by ICAO TC Project, CAEMSA-SP, in late 2008 CAEMSA-SP Phase II plan for Donors and associated remedies	Ministry of Transport, Works and Aviation, Solomon I. *Note: OPMET/MTF to carry out survey*	2010	A
Meteorological observations and reports. (Annex 3, Chapter 4)	Kiribati	METAR from Kiribati not available on regular basis.	1998 Confirmed 2005 SIP	Reported by airlines	State's MET authority to consider urgent action to be taken for providing regular observations and reports TC expert recommendation to purchase/install AWOS – 2008 ICAO SIP conducted in 2005 State made aware of MET Services gaps identified by ICAO TC Project CAEMSA-SP, in late 2008 CAEMSA-SP Phase II plan for Donors and associated remedies	Directorate of Civil Aviation, Kiribati. *Note: OPMET/MTF to carry out survey*	2009/2010	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION

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Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Reporting of information on volcanic eruptions to civil aviation units. (Annex 3 p. 4.14 (recom.))	Indonesia	Information on volcanic activity not provided regularly to ATS units and MWOs.	1995 Confirmed by ICAO SIP mission Dec 2003	Observed by States concerned. Reported at the WMO/ICAO Workshop on Volcanic Ash Hazards (Darwin, 1995)	Three-party LOA to be signed between the MGA, DGCA and DVGHM Information exchange between CVGHM & ABA in draft form. VSAT comms installed to improve the monitoring in E Nusa Tenggara – provides direct transfer of data to CVGHM HQ full time. (AusAID-funded project) Bilingual reporting form based on VONA to improve comm. to VAAC in Sulawesi	DGCA, MGA Indonesia	TBD (no action plan submitted to RO)	A
Reporting of information on volcanic eruptions to civil aviation units. (Annex 3 p. 4.14 (recom.))	Papua New Guinea	Information on volcanic activity not provided regularly to ATS units and MWOs.	1995 Confirmed by ICAO SIP mission Dec 2003	Observed by States concerned. Reported at the WMO/ICAO Workshop on Volcanic Ash Hazards (Darwin, 1995)	Procedures to be set up for exchange of data between NWS, ATS and Rabaul Volcano Observatory (RVO) and a LOA to be signed Discussion of an agreement between RVO & PNG CAA to provide volcanic information to aviation through cost recovery is underway.	NWS, ATS Papua New Guinea *Note: ICAO Regional Office to monitor*	TBD (no action plan submitted to RO)	A
Provision of SIGMET for volcanic ash (Annex 3, Chapter 7; ASIA/PAC FASID Table MET 1B)	Indonesia Philippines Papua New Guinea	Requirements for issuance and proper dissemination of SIGMET, including SIGMET for	ICAO SIP mission Dec 2003	a) Reported by airlines b) Noted by Volcanic Ash Advisory	a) ICAO to carry out a Special Implementation Project (SIP) with the primary objective to improve implementation of SIGMET procedures, especially for VA. b) State to take urgent actions to implement the	a) State's Met authorities b) ICAO to impleme	To be advised	U

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Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
		volcanic ash, have not been fully implemented		Centres	SIGMET procedures. Note. ICAO SIP carried out in 2003, progress in issuance of SIGMET for VA is noted; the outstanding problems to be resolved within 1-year (progress reported by VAAC Darwin) LOA between ATO, PHIVOCS & PAGASA signed in 2004 to make reporting part of information dissemination practice. LOA is undergoing periodic review (ref. letter of PAGASA dated March 12, 2008) VAAC Darwin trained forecasters in PNG and Philippines to prepare VA SIGMET Participated in VA SIGMET test 17Nov2009	nt the SIP. c) ICAO Regional Office to co-ordinate and monitor.		
a) Service for operators and flight crew members. (Annex 3, Chapter 9). b) WAFS products for flight documentation. (ASIA/PAC FASID Table MET 1A).	Cambodia ***Myanmar*** ***(AP-MET-10)***	Briefing and flight documentation not provided as required. WAFS products not available	1999	Airlines do not receive the required flight documentation including WAFS forecasts.	States to consider urgent action for installation of SADIS VSAT for receiving WAFS products and OPMET information. Action plan proposed by ICAO MET mission 2003 A TC project proposal submitted to SSCA, Cambodia Myanmar SADIS FTP approved in 2008, needs to acquire hardware associated with SADIS FTP Cambodia expects to have SADIS FTP operational in early 2011 and may require training from a nearby State – APANPIRG/21	State's MET authorities	TBD	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION

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Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
MWO for Phnom Penh FIR and SIGMET (Annex 3, Chapter 3 & 7; ASIA/PAC FASID Table MET 1B)	***Cambodia*** ***(AP-MET-11)***	Requirements for meteorological watch office (MWO) to be established at Phnom-Penh international airport have not been met.		MWO not established due to lack of trained personnel and technical facilities. No SIGMET service for Phnom Penh FIR	Establishment of MWO currently not feasible. Urgent need for bi-lateral agreement for SIGMET service by a neighboring State. A TC project proposal submitted to SSCA, Cambodia (note SIGMET deficiency removed due to bilateral agreement with China) In process of establishing MWO with target date of 2011 – APANPIRG/21	SSCA, Cambodia	TBD	U
Provision of SIGMET information (Annex 3, Chapter 7; ASIA/PAC FASID Table MET 1B)	***Lao PDR*** ***(AP-MET-12)*** ***Myanmar*** ***(AP-MET-13)*** Nepal	Requirements for issuance and dissemination of SIGMET have not been fully implemented.	2000	SIGMET frequently not available Reported by airlines	State's MET authority to take urgent actions to implement the SIGMET procedures. ICAO issued new version of ASIA/PAC Regional SIGMET Guide in September 2003 *Note: ICAO Regional Office to enquire action plans with fixed target dates from the listed States* Bi-lateral agreement on provision of SIGMET by Kunming MWO (China) on behalf of Phnom Penh (Cambodia) effective 1 June 2009. Deficiency for Cambodia removed - APANPIRG/20. Lao PDR expects to issue SIGMET the end of 2010 – participated in SIGMET tests in Nov 2009 Myanmar issues SIGMET and successful verification process (State and airline verification) confirmed in early Aug 2010. In addition, participated in SIGMET test in Nov 2009 –	State's MET authorities	CLOSED as of 1 June 2009 ***Cambodia*** ***(AP-MET-15)*** Dec 2010 Lao PDR 2009/10 Myanmar	U

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION

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Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
					recommend this deficiency be removed APANPIRG/21 agreed to remove deficiency AP-MET-13			
MWO for Pyongyang FIR and SIGMET (Annex 3, Chapter 3 & 7; ASIA/PAC FASID Table MET 1B)	***DPR Korea*** ***(AP-MET-16)***	Requirements for meteorological watch office (MWO) to be established at Pyongyang international airport have not been met.	2008	MWO not established due to lack of trained personnel and lack of resources. No SIGMET service for Pyongyang FIR Reported by RO mission	Aerodrome MET Office in place can also serve as MWO in future. *ATMB/GACA Immediate consideration of action plan – establish MWO and provide required regular MET service for Pyongyang FIR.* MWO established in February 2009 as reported by State. It is necessary to send SIGMET to RODBs in Region for access by the users. Verification of reception will allow for removal of deficiency. Participated in SIGMET tests in Nov 2009 – however RODBs not receiving real time SIGMET	General Administration of Civil Aviation (GACA) DPR Korea	Est. of MWO Feb 2009 Real time SIGMET have to reach RODBs	U
Volcanic activity information to be provided to ATS units, MWOs, and VAAC (Annex 3, 3.6 and 4.8)	***Tonga*** ***(AP-MET-17)***	Information on volcanic activity not provided regularly to ATS units, MWOs, and VAAC	2008	Reported by TCB CAEMSA-SP technical expert	Agreement drafted for the dissemination of volcanic ash information from MLSNRKT to MTKT for distribution to ACCs, MWOs and VAACs (under consideration)	Ministry of Transport of the Kingdom of Tonga (MTKT) Ministry of Lands, Survey and Natural Resources of	2010	U

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION

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Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
						the Kingdom of Tonga (MLSNRKT)		
Briefing and flight documentation (Annex 3, Chapter 9, Appendix 2 & 8)	***Kiribati*** ***(AP-MET-19)*** ***Nauru*** ***(AP-MET-18)*** ***Solomon Islands*** ***(AP-MET-20)***	WAFS products not accessed and therefore not available for inclusion in flight briefings and documentation	2008	Reported by TCB CAEMSA-SP Technical Expert	WAFS Internet File Service (WIFS) allows for the retrieval of WAFS forecasts for flight briefings and documentation (versus more expensive satellite dish) – available for operations since May 2010 Will seek donor ship for installation and training on WIFS as part of CAEMSA-SP Phase II	MET Services, TCB, Donor, ISCS Provider State	2010	U
Provision of meteorological observations (Annex 3, 4.3.1, 4.5, 4.6)	***Nauru*** ***(AP-MET-21)***	No METAR/SPECI observing programme in place (no calibrated and maintained equipment available)	2008	Reported by TCB CAEMSA-SP Technical Expert	Automatic observing station needed as well as maintenance programme Will seek donor for observing system and maintenance contract and/or training as part of CAEMSA-SP Phase II	MET Service, TCB, Donor	2010	U

Narratives on specific deficiencies are provided:

AP-MET-10: The CNS/MET SG/14 meeting also noted that Myanmar notified the Regional Office (February 2010) of an action plan on obtaining SADIS FTP in 2010 that would provide the required WAFS information in flight briefings. Confirmation of WAFS information in flight documentation is needed for removal of this deficiency.

AP-MET-11: The establishment of an MWO still exists for Cambodia since other provisions (e.g. dissemination of radioactive material information) are necessary for a MWO. MWO being established with target date of 2011 as stated at APANPIRG/21.

AP-MET-12: The CNS/MET SG/14 meeting noted that Lao PDR plans to establish a MWO responsible for the provision of SIGMET in 2010 and that Lao PDR participated in the November 2009 SIGMET tests. The meeting agreed that once this is achieved, a RODB monitor for the issuance of SIGMET for the removal of the related deficiency.

AP-MET-13: Addressed in report on Agenda Item 4 to the APANPIRG/21 (this deficiency on issuance of SIGMET will be removed as per APANPIRG/21).

AP-MET-15: The CNS/MET SG/14 meeting recalled APANPIRG/20 Conclusion 20/74 which resulted in the removal of the deficiency on the provision of SIGMET for the Phnom Penh FIR. The Kunming MWO provides SIGMET for the Phnom Penh FIR since June 1, 2009 in accordance to a bilateral agreement between China and Cambodia. Note that the bilateral agreement is being updated to reflect the MWO responsibility change from Kunming to Chengdu for consideration by Cambodia.

AP-MET-16: The CNS/MET SG/14 meeting recalled that DPR Korea notified the Regional Office on 30 March 2009 of the establishment of an MWO at Sunan (published in AIP) and has participated in the WS SIGMET test on 24 November 2009. Furthermore, DPR Korea acknowledged the request to send SIGMET to all RODBs in the Region and planned to follow this request beginning 10 March 2010. As a result, FASID Table MET 1B reflects the establishment of the MWO (approved amendment proposal - SN: APAC 10/06 - MET).

The CNS/MET SG/14 meeting noted that the removal of the deficiency on SIGMET for DPR Korea is contingent upon sufficient evidence of SIGMET issuance through monitoring by RODB Tokyo. RODB Tokyo monitored the issuance of SIGMET for the period 1 April to 20 June 2010 for the Sunan FIR and neighboring FIRs (Shenyang, Incheon, and Vladivostok) which revealed dozens of SIGMET in the neighboring FIRs, but none from Sunan FIR. SYNOP and TAF data from DPR Korea were also used in the analysis which revealed thunderstorm observed at one of the SYNOP stations in a three hour period over 100 times and 8 TAF with thunderstorm in the forecast. Note that the strength and aerial coverage of thunderstorms were not verified. Nevertheless, the CNS/MET SG/14 meeting agreed that there is not enough sufficient evidence for the removal of this air navigation deficiency at this time.

AP-MET-17: Included in list of deficiencies with adoption of APANPIRG/20 Conclusion 20/75 as result of findings from ICAO Technical Co-operation Project *Cooperative Agreement for Enhancement of the Meteorological Service for Aviation in the South Pacific (CAEMSA-SP)*. Specifically, lack of volcano monitoring for the Kingdom of Tonga was identified. An agreement between the Ministry of Transport of the Kingdom of Tonga (MTKT) and the Ministry of Lands, Survey and Natural Resources of the Kingdom of Tonga (MLSNRKT) on the dissemination of volcanic ash information from MLSNRKT to MTKT for distribution to ACCs, MWOs and VAACs is under consideration.

AP-MET-18, -19, and -20: Included in list of deficiencies with adoption of APANPIRG/20 Conclusion 20/75 as result of findings from ICAO Technical Co-operation Project *Cooperative Agreement for Enhancement of the Meteorological Service for Aviation in the South Pacific (CAEMSA-SP)*. Specifically, lack of WAFS forecasts in flight briefings for Nauru, Kiribati, and Solomon Islands (AP-MET-18, -19 and -20) was identified. States are encouraged to obtain WAFS forecasts via WIFS, which would mitigate this deficiency. The cost of acquiring WIFS will be provided by the WAFC Washington Provider State and added in the proposal to obtain a sponsor to assist States in acquiring WAFS products.

AP-MET-21: Included in list of deficiencies with adoption of APANPIRG/20 Conclusion 20/75 as result of findings from ICAO Technical Co-operation Project *Cooperative Agreement for Enhancement of the Meteorological Service for Aviation in the South Pacific (CAEMSA-SP)*. Specifically, lack of meteorological observing station for Nauru was identified. Assistance is likely needed from a Donor to provide the necessary equipment and possible training for maintenance or a maintenance contract, which is expected to be discussed at the ICAO TCB CAEMSA-SP Phase II Donor Workshop in Vanuatu in October 2010. This Workshop is expected to secure donations and develop and assign tasks necessary in mitigating the MET deficiencies identified in CAEMSA-SP.

General: The CNS/MET SG/14 meeting noted that coordination with States on formalizing inter State MET Services in the South Pacific was conducted to address recommendation six, safety oversight, of the CAEMSA-SP Project Terminal Report. Agreements on the provision of **TAF** by Fiji for several Island States (Kiribati, Niue, Samoa, Cook Islands and Tonga) were drafted for States' consideration. In addition, a draft agreement was developed for the provision of **SIGMET** by Papua New Guinea on behalf of the Solomon Islands.

At the CNS/MET SG/14 meeting, IATA made tribute to the efforts being made with the deficiencies referenced above and encouraged continued effort in mitigating these deficiencies. IATA further noted that aerodromes in the South Pacific are critical to safety of operations, in particular to ETOPS.

AGENDA ITEM 5: FUTURE WORK PROGRAMME

Agenda Item 5: Future Work Programme

Schedule of Future meetings

5.1 The meeting agreed that the tentative schedule of meetings for the rest of 2010, 2011 and 2012 should be as follows (Notes: A decode of acronyms has been included in **Appendix A** to the Report on Agenda Item 5):

2010 – outstanding meetings

ATNICG WG/8	27 to 30 Sep	Christchurch
BOB-RHS/TF/4	18-22 Oct	Bangkok
AIDC Implementation Seminar	12-13 Oct	Bangkok
SEA RR/TF/4	22-25 Nov	Bangkok
ATFM steering group	8-10 Dec	Tokyo
2011		
RASMAG/14	14-18 Feb	Bangkok
MET/ATM Seminar & TF/2 Meeting	24-28 Jan	Fukuoka, Japan
SEA ADS-B WG/6	Feb	TBD
Seamless ATM Workshop	24-25 Feb	Bangkok
BOB-RHS/TF/5	28 Feb–04 Mar	Bangkok
AAITF/6	15-18 Mar	Bangkok
FPL&AM/TF/4 & Seminar	21-25 Mar	TBD
OPMET/M TF/9	23-24 Mar	Bangkok
METWARN/I TF/1	24-25 Mar	Bangkok
SEA-RR/TF/5	28 Mar-01 Apr	
SOCM/2	Mar	Bangkok
PBN TF/8	Mar	Delhi, India
ADS-B SITF/10	April	Singapore
ATN IC G/6	23 to 27 May	Seoul
BOB-RHS/TF/6	30 May–03 Jun	Bangkok
BBACG/22&FIT-BOB/13	May	Bangkok
SEACG/18 & FIT-SEA/11	May	Bangkok
SEA-RR/TF/6	13–17 Jun	Bangkok
ATM/AIS/SAR/SG/21	27 June–01 Jul	Bangkok
RASMAG/15	1-5 Aug	Bangkok
CNS/MET SG/15	18-22 Jul	Bangkok
BOB-RHS/TF/7	15-19 Aug	Bangkok
APANPIRG/22	5-9 Sep	Bangkok
SEA-RR/TF/7	19-23 Sep	Bangkok
RASMAG/16	Dec	Bangkok
	2012	
BBACG/23 & FIT-BOB/15	Jan	Bangkok
OPMET/M TF/10	Mar	Bangkok
METWARN/I TF/1	Mar	Bangkok
SEACG/19 & FIT-SEA/12	April	Bangkok
ADS-B SITF/11	April	
AAITF/7	May	
ATN IC G/7	May	
SEACG/19 & FIT-SEA/12	May	Bangkok
ATM/AIS/SAR/SG/22	Jun	Bangkok
CNS/MET SG/16	July	Bangkok
APANPIRG/23	3-7 September	Bangkok

5.2 The meeting noted that the provisional agenda for APANPIRG/21 was prepared in line with Air Navigation Commission's proposal for a uniform approach to formulation of agenda for the PIRGs meetings. The provisional agenda for future APANPIRG meetings will be in this format.

Coordination meeting between Chairmen of Sub-Groups

5.3 The Chairman of ATM/AIS/SAR SG presented a paper on the coordination meeting between chairpersons of sub groups and highlighted significant issues.

5.4 The meeting took note of the updated list of APANPIRG contributing bodies. The list was updated by the Chairmen with assistance provided by the Secretariat.

5.5 The Chairmen identified some common matters between the sub groups and stated that these issues have been appropriately presented through individual Sub-group Reports.

Future Development and Possible Restructuring of the Sub-Groups

5.6 In this connection, the meeting discussed on the working paper presented by New Zealand and a proposal from Sub-group Chairpersons on possible changing of the present set-up and explores possibility of re-allocation of tasks amongst the Sub-groups.

5.7 The paper from New Zealand invited various interventions and had discussions on the composition and activities of APANPIRG Sub-groups and associated Task forces. It was observed that structure of the Sub-groups has remained largely unchanged since their inception. It was stated that current developments in air navigation especially in regard to data provisions, performance based systems and technologies means that the structure and shape of air navigation is changing. This is resulting in several Sub-group and Task Force activities overlapping and calls for further technical input from other areas of specialization and disciplines. It was also pointed out that ATM/AIS/SAR should be renamed ATM/AIM/SAR.

5.8 The Chairmen of Sub-groups agreed that there is a need to deliberate further as to the long term working mechanism of the SGs and how to better coordinate and distribute their respective roles and responsibilities, particularly between the CNS/MET and ATM/AIS/SAR Sub-groups. There was the proposal that the MET function should align with AIM to form the AIM/MET sub-group, or alternatively to have the MET function come under the ATM/AIS/SAR SG. This proposal though discussed but was not supported in the most recent Sub-Group Meetings. In the absence of detailed justifications no further discussions took place.

5.9 Chairmen of Sub-group also noted that in light of the many technological changes in recent years giving rise to a multitude of inter-related issues, particularly under the CNS/MET and ATM/AIS/SAR Sub-groups, there are certainly merits to better coordinate the work amongst them. The Chairmen generally supported the view that the sub-group structure, their activities and frequency of meetings be reviewed. The chairmen consider that the review could be undertaken by a small working group similar to the former Future Development Task Force (FDTF). However, the Chairmen of the Sub-groups were of the view that in case major changes to the structure of the Sub-groups happen then new structure should provide an adequate period for transition planning from existing to new one.

5.10 Vice Chair of CNS/MET sub-group informed that CNS/MET SG was of the view that any significant change should be programmed to have effect from the 2013 meeting year with 2012 meetings of the sub-groups being used to implement transitional arrangements.

5.11 Regarding the contributory bodies of APANPIRG, chairmen of Sub-groups were of view that as a matter of policy these should be dissolved when they have either completed their assigned task or it has become apparent that the work on the subject in question cannot be usefully continued. The chairmen reiterated that the establishment of additional contributory bodies should be made on a need basis with due consideration to the limited resources available. In light of possible review of the structure of the Sub-groups, any proposal for the establishment of additional work groups or task forces must be carefully coordinated with the Regional Office taking into account adequacy of the resources available to support such an action. .

5.12 In view of foregoing, the meeting agreed to establish APANPIRG Contributory Bodies Structure Review Task Force and adopted following Decision.

Decision 21/57 - APANPIRG Contributory Bodies Structure Review Task Force (ABSRTF)

That,

a) APANPIRG Contributory Bodies Structure Review Task Force with members consisting of Sub-group chairpersons, vice-chairpersons and voluntary members nominated by States be established; and

b) In coordination with ICAO Regional Office, the Task Force undertakes a review of the Terms of Reference and activities of the APANPIRG contributory bodies and proposes rationalization of their structures to APANPIRG/22 to meet the changing environment.

5.13 The Chairman of ATM/AIS/SAR SG further suggested that the Term of Chairperson of Sub Groups may also be reviewed by the ABSRTF.

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APPENDIX - A
ACRONYMS

ATFM	Air Traffic Flow Management
WPAC/SCS RSG	Western Pacific/South China Sea RVSM scrutiny working Group
SAREX	Search and Rescue Exercise
RNP-SEA/TF	South East Asia RNP Implementation Task Force
D-FIS	Data Link Flight Information Service
RVSM/TF	Reduced Vertical Separation Minima Implementation Task Force
RASMAG	Regional Air Space Monitoring Advisory Group of APANPIRG
BBACG	Bay of Bengal ATS coordination Group
FIT-BOB	FANS 1/A Implementation Team, Bay of Bengal
AIS	Aeronautical Information Services
TRASAS	Trans-Regional Airspace and supporting ATM systems Steering Group
OPMET/M TF	Operational Meteorological Management Task Force.
ADS-B SITF	ADS-B Study and Implementation Task Force
ATN IC G	Aeronautical Telecommunication Network Implementation and Coordination Group
SEACG	South East Asia ATS coordination Group
FIT-SEA	FANS 1/A Implementation Team, South East Asia
ATM/AIS/SAR/SG	ATM/AIS/SAR Sub-Group of APANPIRG
CNS/MET SG	CNS/MET Sub- Group of APANPIRG
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Group
AAITF	Aeronautical Information Services – Aeronautical Information Management Implementation Task Force
FPL & AM/TF	ICAO Flight Plan and ATS Messages Task Force

BOB-RHS/TF	Bay of Bengal Reduced Horizontal Separation Implementation Task Force
PBN TF	Performance Based Navigation Task Force
SEA-RR/TF	Southeast Asia Route Review Task Force
AIDC	ATS Inter-Facility Data Communication
SEA ADS-B WG	The Southeast Asia Sub-regional ADS-B Implementation Working Group
SOCM	Satellite Data Link Operational Continuity Meeting
METWARN	Meteorology Warning

AGENDA ITEM 6: ANY OTHER BUSINESS

Agenda Item 6: Any other business

6.1 ESTABLISHMENT OF THE REGIONAL AVIATION SAFETY GROUPs (RASGs) – NEED TO AMEND TOR OF APANPIRG

6.1.1 The meeting was informed that, subsequent to the decision of the Council in March 2008, which called on the ANC to present a report regarding the development of new structures for the implementation Business Plan related to safety, the Commission through and ad hoc working group initiated a study aimed at identifying a regional mechanism to address safety issues.

6.1.2 As the current regional mechanisms (such as PIRGs, COSCAPs, RSOOs, DGCA meetings) were not sufficient in addressing and harmonizing regional flight operations safety issues, it was proposed that a new follow-up body is needed that would monitor progress, coordinate actions among States and make recommendations to ICAO to facilitate the implementation of the Global Aviation Safety Plan (GASP) and the associated Global Aviation Safety Roadmap (GASR).

6.1.3 Further to consultations with States and international organizations, the Commission agreed with the concept of establishing a new regional mechanism, the Regional Aviation Safety Groups (RASGs) and noted that in some areas (e.g. Pan-America), States have already established their own regional mechanism for addressing flight safety issues. The meeting noted that the establishment of RASGs would not fundamentally change the efforts that are presently underway in several ICAO regions.

6.1.4 In May 2010, on the recommendation of the Commission, the Council approved for establishment of RASGs in all regions: Regional Aviation Safety Group – Pan American (RASG-PA) for the Caribbean, South American and North American Regions; Regional Aviation Safety Group – Europe (RASG-EUR) for the European Region; Regional Aviation Safety Group – Asia Pacific (RASG-APAC) for the Asia and Pacific Regions; Regional Aviation Safety Group – Africa (RASG-AFI) for the African Region; and Regional Aviation Safety Group – Middle East (RASG-MID) for the Middle East Region. The RASG will develop and implement a work programme that supports a regional performance framework for the management of safety on the basis of the GASP and the GASR. The reports of RASG meetings will be reviewed by the Commission on a regular basis and by the Council as deemed necessary.

6.1.5 The meeting noted that a concern arose related to the parallels that were being drawn between the PIRG framework and the RASGs. It was noted that while the PIRGs did touch on some safety issues related to ATM, they had been developed to deal with air navigation plans at a regional and global level with ICAO playing a key leadership role. In contrast, safety continued to lie within the sovereignty of individual States. Also, the need for a mechanism for coordination between PIRGs and RASGs was discussed and this aspect has been reflected in the suggested terms of reference for RASGs as well as for PIRGs. Accordingly, the revised terms of reference of APANPIRG that includes the following sentence, “coordinate with respective RASG on safety issues” is available in **Appendix A to the Report on Agenda Item 6.**

6.1.6 Concluding the discussions on RASGs, the meeting agreed for adopting the following conclusion;

Conclusion 21/58: Establishment of RASGs – Consequent revision to TOR of APANPIRG

That meeting adopt the revised terms of reference of APANPIRG as shown in the Appendix **A to the Report on Agenda Item 6**.

6.2 New Administration

6.2.1 **Election of Chairperson, First Vice Chairperson and Second Vice Chairperson**

6.2.2 The ICAO Regional Director (Secretary APANPIRG) announced election for the new administration and invited the meeting to propose nominations for 1) Chairperson, 2) First Vice Chairperson and 3) second Vice Chairperson.

6.2.3 The Director General of the Civil Aviation Administration of Singapore Mr. YAP Ong Heng proposed the name of Mr. Norman Lo DG, Civil Aviation Department, Hong Kong, China for Chairperson. Mr. Yap highlighted the qualification, experience, credentials and achievements of Mr. Lo. Singapore proposal was seconded by Mr. Aun Chea, DG, State Secretariat of Civil Aviation, Cambodia. The proposal was also supported by India, Thailand, Nepal, Philippines, China, Macao China, Indonesia, Fiji Islands and Mongolia. The Group unanimously elected Mr. Lo as the Chairperson.

6.2.4 Fiji proposed the name of Mr. Azharuddin Abdul Rahman, DG of Department of Civil Aviation Malaysia for First Vice Chairperson. The proposal was seconded by Philippines. Mr. Rahman was unanimously elected as First Vice Chairperson of the Group.

6.2.5 India proposed Mr. Nimalsiri DG, Civil Aviation Authority of Sri Lanka for second Vice Chairperson and this was seconded by Nepal. Mr. Nimalsiri was unanimously elected as the second Vice Chairperson.

6.2.6 In thanking Singapore for the nomination and strong support from China and trust from States bestowed on him, Mr. Lo stated that he looked forwarded to close cooperation and guidance of the Group in carrying out the duties as Chairperson of APANPIRG. He also paid tribute to Mr. Wong Woon Liong for the excellent work carried out in past years and requested him to complete APANPIRG/21 Session for continuity.

6.2.7 Mr. Azharuddin Abdul Rahman and a delegate from Sri Lanka on behalf of Mr. Nimalsiri also expressed their thanks to the Group for the trust bestowed on them.

6.2.8 The Group acknowledged the able leadership provided by Mr. Wong since 2002; and recognized his significant contribution and valuable support to the air navigation system in the APAC region as Chairman APANPIRG

6.3 Review of Regional Air Navigation Plan

6.3.1 New Zealand presented a paper highlighting current status and relevance of the Asia and Pacific Regions Air Navigation Plan (RANP). New Zealand referred to the Doc9673 (first Edition -2006) and observed that much of the material is not current and amendment proposals have not been incorporated. It was pointed out that in the 13 year since the RANP concept was agreed; there have been fundamental changes in air navigation and aviation system in general. The Doc9673 appears to be out-of-date and does not appear to provide the basis of the complete planning document that can be relied upon and its current status does not provide a plan of comprehensive direction to a future vision.

6.3.2 In this regard, the meeting received a detailed account on how ICAO Headquarters was progressing towards development of e-ANPs for all the regions. The e-ANP will have revised contents of Basic and FASID parts of ANP and will reflect the recent developments in the air navigation field. The e-ANP will be an online interactive plan with access rights to States, International organizations and Regional offices and will be made available by 2012. The meeting noted that the BORPC of Basic ANP has already been revised and will be presented to ANC in

October 2010 for its review and then transmitted to States and International organization by January 2011 for their comments. The meeting was also informed that the current working version of FASID Tables of RANP is available on the ICAO APAC website.

6.3.3 As result of discussion, the meeting adopted the following Conclusion inviting ICAO to expedite development of new e-ANP.

Conclusion 21/59 - Development of new RANP

That, ICAO be invited to review the regional air navigation plan structure, processes and contents to incorporate them in to e-ANP and expedite its provision for use.

APPENDIX A

REVISED TERMS OF REFERENCE FOR THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG)

(C-WP/13558, C 190/4 on 25 May 2010)

1. **Membership**

All ICAO Contracting States, who are service providers in an air navigation region and part of that region's ANP, should be included in the membership of that region's PIRG. Furthermore, user States are entitled to participate in any other PIRG meetings as a non-member. International organizations recognized by the Council may be invited as necessary to attend PIRG meetings as observers.

2. **The Terms of Reference of the Group** are:

a) to ensure continuous and coherent development of the Asia/Pacific Regional Air Navigation Plan and other relevant regional documentation in a manner that is harmonized with adjacent regions, consistent with ICAO SARPs and Global Air Navigation Plan for CNS/ATM systems (Doc 9750) and reflecting global requirements;

b) to facilitate the implementation of air navigation systems and services as identified in the Asia/Pacific Regional Air Navigation Plan with due observance to the primacy of air safety, regularity and efficiency; and

c) to identify and address specific deficiencies in the air navigation field.

3. **In order to meet the Terms of Reference, the Group** shall:

a) review, and propose when necessary, the target dates for implementation of facilities, services and procedures to facilitate the coordinated development of the Air Navigation Systems in the Asia/Pacific Region;

b) assist the ICAO Asia/Pacific Regional Office in fostering the implementation of the Asia/Pacific Regional Air Navigation Plan;

c) in line with the Global Aviation Safety Plan (GASP), facilitate the conduct of any necessary systems performance monitoring, identify specific deficiencies in the air navigation field, especially in the context of safety, and propose corrective action;

d) facilitate the development and implementation of action plans by States to resolve identified deficiencies, where necessary;

e) develop amendment proposals to update the Asia/Pacific Regional Air Navigation Plan to reflect changes in the operational requirements;

f) monitor implementation of air navigation facilities and services and where necessary, ensure interregional harmonization, taking due account of organizational aspects, economic issues (including financial aspects, cost/benefit analyses and business case studies) and environmental matters;

g) examine human resource planning and training issues and propose where necessary human resource development capabilities in the region that are compatible with the Asia/Pacific regional Air Navigation Plan;

h) review the Statement of Basic Operational Requirements and Planning Criteria and recommend to the Air Navigation Commission such changes as may be required in the light of new developments in the air navigation field;

i) request financial institutions, on a consultative basis as appropriate to provide advice in the planning process;

j) maintain close cooperation with relevant organizations and State grouping to optimize the use of available expertise and resources;

k) conduct the above activities in the most efficient manner possible with a minimum of formality and documentation and call meetings of the APANPIRG when deemed necessary to do so; and

l) coordinate with RASG-APAC on safety issues.

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LIST OF INFORMATION AND WORKING PAPERS

Paper No.	Agenda Item	Title	Presented by
		Information Papers	
IP/1	-	Meeting Bulletin	Secretariat
IP/2	3.1	Amendment 10 to Annex 14, Volume I- Aerodrome Design and Operations	Secretariat/ RO
IP/3	3.1	Amendment 4 to Annex 14, Volume II- heliports	Secretariat/ RO
IP/4	5	Work Programme of ANC Panels and Study Groups.	Secretariat/ HQ
IP/5	3.5	Economic Analysis	Secretariat/ HQ
IP/6	6	Development in the Economic aspects of airports and ANS	Secretariat/ HQ
IP/7	3.4	Outcomes of International Volcanic Ash Task force(IVATF)	Secretariat/ RO
IP/8	3.1	Development of PANS- Aerodromes	Secretariat/ RO
IP/9	3.4	CNS/MET improvement activities in Lao PDR	Lao PDR
IP/10	3.2	Status of ATM related Regional Guidance Material.	Secretariat/ RO
IP/11	3.2	Review of ATS Coordination Group Activities	Secretariat/ RO
IP/12	3.4	Automatic Dependent Surveillance – Broadcast (ADS-B)	USA
IP/13	2	US Next Generation Air Transportation System	USA
IP/14	3.4	US GPS Performance Commitment	USA
IP/15	3.4	FAA Volcanic Ash Response	USA
IP/16	3.5	Promoting ATM Industry best practices in the Asia Pacific Region	CANSO

Paper No.	Agenda Item	Title	Presented by
IP/17	3.2	CANSO's Seamless Airspace Guidance Document	CANSO
IP/18	3.4	ICAO Assembly -37th Session Working Paper A 37-WP/13 Performance Based Navigation –implementation Challenge	Australia
IP/19	3.4	ICAO Asia and Pacific MET/ATM Seminar	Japan
IP/20	2	Update on Activities of the Asia and Pacific initiative to reduce emissions(ASPIRE)	Australia
IP/21	3	New Zealand Airspace, Air navigation Policy and planning	New Zealand
IP/22	3.2	AIS/AIM Automation in India	India
IP/23	3.0	National Performance Objectives and performance Framework Forms	India
IP/24	3.2	Optimization of ATS Routes in Enroute Airspace conditional/ connector of ATS routes	India
IP/25	3.4	ATS inter-facility data communication (AIDC) implementation seminar	Secretariat/ RO
IP/26	3.2	Pacific Project-IATA	IATA
IP/27	3	Implementation of GAGAN (GPS Aided Geo Augmented Navigation) – An Update	India

Paper No.	Agenda Item	Title	Presented by
		Working Papers	
WP/1	-	Provisional Agenda	Secretariat/ RO
WP/2	1.1	Review of the actions of the Air Navigation Commission on the report of the twentieth meeting of Asia/PAC Air Navigation Planning and Implementation regional Group (APANPIRG/20)	Secretariat/ HQ
WP/3	1.2	Review of the Status of Implementation of APANPIRG/20 Conclusions and Decisions	Secretariat/ RO
WP/4	1.3	Review of the Status of Implementation of APANPIRG Outstanding Conclusions and Decisions	Secretariat/ RO
WP/5	2.0	Report on outcomes of initiatives regarding next generation of aviation professionals	Secretariat/ HQ
WP/6	2.0	Transition towards aeronautical information management	Secretariat/ HQ
WP/7	2.0	Civil/Military Cooperation in support of optimum airspace	Secretariat/ HQ
WP/8	2.0	A global CNC technology Roadmap - A tool to aid investment decisions	Secretariat/ HQ
WP/9	2.0	Tackling the Global issue of runway safety	Secretariat/ HQ
WP/10	2.0	Keeping Standards relevant	Secretariat/ HQ
WP/11	3.0	Performance based Global Air Navigation System-developments in implementation	Secretariat/ HQ
WP/12	3.1	Implementation of Annex 14, Volume I requirements on wildlife strike reduction	Secretariat/ RO
WP/13	3.1	Status of implementation of Annex 14, Volume I requirements on Aerodrome certification and SMS	Secretariat/ RO
WP/14	3.2	Report of the 20th Meeting of the ATM/AIS/SAR SG	Secretariat/ RO
WP/15	3.3	Report on the Activities of RASMAG	Secretariat/ RO

Paper No.	Agenda Item	Title	Presented by
WP/16	3.2	Seamless ATM operations in the Asia/Pacific regions	Japan
WP/17	3.4	Use of the aviation frequency spectrum and the ITU/WRC	Secretariat/ HQ
WP/18	3.4	Report on the 14th meeting of CNS/MET sub-Group	Secretariat/ RO
WP/19	3.4	Performance Based Navigation- The implementation challenge	Secretariat/ HQ
WP/20	3.4	Regional Support Strategy for PBN Implementation	IATA
WP/21	3.2	Proposal to progress DGCA/46 Action Item 46/1 - Establishment of Network Manager Asian Skies	IATA
WP/22	3.2	ICAO 2012 FLIGHT PLAN – Implementation Issues	Australia
WP/23	3.2	IATA route Optimization Proposals-Europe- North Asia - vv	IATA
WP/24	3.2	Regional Guidance material for the implementation of New Flight plan Format	Secretariat/ RO
WP/25	3.4	Report of the 9th meeting of ADS-B study and implementation TF	Secretariat/ RO
WP/26	3.5	Civil Aviation and the Environment	Secretariat/ HQ
WP/27	3.2	Global Operational Data Link document(GOLD)	USA
WP/28	4	Air Navigation Deficiencies	Secretariat/ RO
WP/29	5	Future Work programme	Secretariat/ RO
WP/30	6	Establishment of the Regional Aviation safety group (RASG) - the need to amend ToR of APANPIRG	Secretariat/ HQ
WP/31	3.2	Seamless transition to the ICAO New Flight Plan format	Japan & RoK
WP/32	3.2	Promotion of coordination for transition between adjacent States	Japan & RoK

Paper No.	Agenda Item	Title	Presented by
WP/33	3.5	Updates on Air Navigation Activities in Vietnam	Viet Nam
WP/34	3.3	Regional RVSM and horizontal safety performance	Secretariat/ RO
WP/35	6	Review of APANPIRG Sub group composition and activities	Australia & New Zealand
WP/36	6	Review of the Regional Air Navigation Plan	New Zealand
WP/37	3.2	Review of the 3rd meeting of the Asia/Pacific ICAO flight Plan & ATS messages implementation Task force	Secretariat/ RO
WP/38	3.4	PBN Implementation in India	India
WP/39	3.2	Seamless transition to the ICAO New flight Plan Format	USA
WP/40	3.2	New ICAO FPL and ATM messaging Format	IATA
WP/41	5	Report of Coordination between Chairmen of the Sub-Groups	Chairman ATM/AIS/SAR Sub-Group

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APANPIRG/21 Conclusions/Decisions – Action Plan

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/1	**States air navigation modernization plans**	That, States developing their national air navigation modernization plans, which may have an impact on ICAO SARPs, be urged to share those plans in a timely manner with ICAO for review and assessment, to ensure global compatibility and harmonization.	Notify states	ICAO APAC office	State letter	February 2011
C 21/2	**Wildlife hazard reduction**	That, States confronting problems of wildlife/bird strike hazard to consider developing and implementing an effective wildlife hazard management plan with procedures to control wildlife at or near airports.	Notify States	ICAO APAC office	State letter	January 2011
C 21/3	**Common Set of Performance Metrics for all the ICAO Regions**	That, ICAO be invited to: a) develop a common set of performance metrics for all the ICAO regions so as to facilitate comparative analysis; and b) establish the globally harmonised guidance on methodology of how to collect the data in order to achieve commonality.	HQ to develop a common set of performance metrics and establish the globally harmonized guidance.	ICAO APAC Office	Issue Form	December 2010

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/4	**Regional Guidance material for the implementation of Amendment 1 to PANS-ATM**	That, in order for States to clearly understand what is intended in Amendment 1, the '*Asia/Pacific Guidance Material for the Implementation of Amendment 1 to the 15th Edition of the Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444)'* provided in **Appendix B** to the APANPIRG/21 Report on Agenda Item 3.2 be adopted and published as regional guidance material.	Publish the guidance material	ICAO APAC office	a) State letter b) Upload on the website	September 2010 September 2010
C 21/5	**Strategy for implementation of New flight Plan Format**	That, the '*Strategy for the Implementation of new ICAO Flight Plan Format and Supporting ATS Messages'* provided in **Appendix C** to the APANPIRG/21 Report on Agenda Item 3.2 be adopted and published. States and users to be urged to continue implementation planning based on the strategy.	Publish the strategy	ICAO APAC Office	a) State letter b) Upload on the website	September 2010 September 2010
C 21/6	**Notification of State Transition Date to the New flight Plan Format**	That, in order to keep the ICAO Flight Plan Implementation Tracking System (FITS) website updated, States which have not yet provided data inform the Regional Office of the initial set of data required in the FITS website, such as scheduled date and contact person, by 22 October 2010, and subsequently update the data as required.	Update FITS	States	a) State letter b) FITS update	September 2010 22 October 2010

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/7	**Use of Global database for allocation of five-letter name codes in the Asia and Pacific Regions**	That, States which have not yet done so be urged to:				
		a) nominate an ICARD authorized user in order to make use of the ICARD system and improve the process of allocation of Five-Letter Name-Codes (5LNCs);	a) nominate user	States	a) authorized user	Ongoing
		b) review the list of allocated 5LNCs with respect to each States, identify non-used, duplicate or non-ICAO 5LNCs and take actions to rectify the situations; and	b) review 5LNCs		b) resolutions of duplication or non-ICAO 5LNC	Ongoing
		c) update the ICARD database by adding missing information, e.g. latitude and longitude coordinates, etc; and	c) update ICARD		c) ICARD update	Ongoing
		d) take necessary actions to implement the widespread use of the ICARD system.	d) implement ICARD			

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/8	**ICAO Asia/Pacific Seamless ATM workshop**	That, ICAO be invited to organize the Asia and Pacific Seamless ATM Workshop to be held in early 2011 inviting the APANPIRG member States and other parties of interest in order to foster discussion and action for the Asia and Pacific States in the planning of the future air traffic management system, considering the overall vision for the region for seamless ATM.	Convene Seamless ATM Workshop	ICAO APAC Office	Seamless ATM Workshop	February 2011
D 21/9	**Develop Sub- Regional volcanic Ash Contingency Plan**	That, a) in view of the recent volcanic activity in Iceland, the CNS/MET Sub-Group be requested to develop sub-regional volcanic ash contingency plans; and b) urge States to designate appropriate contact points to establish/maintain contacts in the interim period until the sub-regional volcanic ash contingency plans become available.	**Request CNS/MET SG to develop volcanic ash contingency plans** **Request States to provide POC for volcanic ash events**	**RO ATM/MET** **RO ATM/MET**	**Assignment of duties – CNS/MET SG/14 D14/30 to METWARN/I TF and MET/ATM TF** **Contingency contact list** **Volcanic ash contingency plans in Region**	**Complete** **Jan 2011** **Dec 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/10	**Transfer FASID Table ATS 2 from ATS to MET**	That, ICAO considers the transfer of FASID Table ATS 2, HF radiotelephony VOLMET broadcasts, from ATS to MET, which would involve moving the Tables related to VOLMET broadcasts from the ATS part to the MET part of all ANP/FASID, where applicable.	**Request HQ to assess the transfer of FASID Table ATS 2 to MET part**	**MET/AIM Section**	**Assessment of FASID Table ATS 2 transfer from ATS to MET**	**Dec 2011 (assessment)**
D 21/11	**ATM/AIS/SAR Task List**	That the ATM/AIS/SAR Sub-Group Task List and attachments contained in Appendix D to the APANPIRG Report on Agenda Item 3.2 be adopted as the current work programme for the ATM/AIS/SAR Sub-Group of APANPIRG.	Adopt the task list	ATM/AIS/SAR/ SG/21	Task List	June 2011
C 21/12	**Convening of the Seamless- ATM Ad Hoc meeting**	That, while recognizing the seamless ATM needs to be addressed in a holistic manner, ICAO Regional Office be invited to organize a seamless ATM Ad Hoc working group meeting as soon as possible.	Convene the Seamless ATM Ad-Hoc Meeting	ICAO APAC Office	Seamless ATM Ad-Hoc Meeting	As soon as possible but not later than February 2011

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/13	**Coordination for the Transition to the NEW Flight Plan Format among States**	That, as the global and the regional harmonization is crucial in implementing the NEW flight plan format by 15 November 2012, States start close coordination soon with adjacent States/FIRs on transition about, but not limited to: i) difference of timing for transition between the States/FIRs; ii) operations in the mixed environment of PRESENT and NEW; iii) operational transition for AIDC; and iv) procedures when ATS messages are not processed properly.	Start coordination	ICAO APAC Office States	State letter Coordination	March 2011

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/14	**Enhancement of the Global Coordination for Implementation of the NEW Flight Plan Format**	That, in light of the varying degree of States in implementing the NEW flight plan format, ICAO: i) urge all the States, including those outside the Asia/Pacific Region, to record their readiness in the FITS; ii) take action to ensure that any States or ICAO regions not use non-standard local procedures; and iii) ensure appropriate coordination take place between ICAO regional planning and implementation groups (PIRGs) to address implementation issues.	Enhance global coordination	ICAO HQ	Issue Form	April 2011
C 21/15	**Responsibility Area of China RMA**	That, the China RMA be approved as an APANPIRG Asia/Pacific RVSM Regional Monitoring Agency with responsibility for all RVSM airspaces in China FIRs, and the Pyongyang FIR.	Approve China RMA fort the expansion of responsibility	ICAO APAC Office	State letter to China and MAAR	September 2010
D 21/16	**ATNICG Subject/Tasks List**	That, the updated Subject/Tasks List placed at Appendix A to the Report on Agenda Item 3.4 be adopted.	**Notify ATNICG /8 and ATNICG/6**	**ICAO APAC Office**	**ATNICG WG and ATNICG informed and paper prepared**	**September 2010** **May 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/17	**ICAO Doc 9896 clarifications**	That ICAO be invited to provide clarifications on the following issues related to ATN/AMHS implementation. i) VoIP should be limited to ATS ground service since the ICAO approach is to encourage data communication such as CPDLC. Furthermore, the VoIP performance is network dependent and thus performance acceptance is varied; ii) how the States will come to know about updates on the relevant RFCs; and iii) IPv6 address structure.	**Prepare Issue Form**	**ICAO APAC Office**	**Issue form sent to ICAO HQ**	**December 2010**
D 21/18	**Regional ATN/AMHS Implementation Planner**	That, the Asia/Pacific Regional Implementation Planner Placed at Appendix B to the Report on Agenda Item 3.4 be adopted to report ATN/AMHS implementation progress in the region.	**Notify ATNICG WG and ATNICG**	**ICAO APAC Office**	**ATNICG WG and ATNICG informed**	**September 2010** **May 2011**
C 21/19	**AMHS connectivity with ICAO MID region**	That Singapore, Pakistan and India take initiative in transiting to AMHS connectivity with Bahrain, Kuwait, Iran and Oman respectively at the earliest.	**Remind States concerned to take initiative**	**ICAO APAC Office** **States concerned**	**Stated reminded and initiative by States taken**	**April 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/20	**Strategy for Implementation of Aeronautical Telecommunication Network (ATN) in the Asia/Pacific Region**	That, the document provided at Appendix C to the Report on Agenda Item 3.4 be adopted as Strategy for Implementation of Aeronautical Telecommunication Network (ATN) in the Asia/Pacific Region.	**Notify States**	**ICAO APAC Office**	**State Letter** **Available on the website**	**November 2010**
C 21/21	**AMC Information Form**	That, States be invited to provide data for AMC in respect of their Administration in the format provided at Appendix D to the report on agenda item 3.4.	**Notify States**	**ICAO APAC Office**	**State Letter**	**November 2010**
C 21/22	**Asia/Pacific ATN Interim Addressing Plan**	That, i) the proposed IPv6 and IPv4 addressing schemes be submitted to ICAO and ICAO be requested to consider a global IPv6 addressing scheme for ground-ground communication; ii) the proposed IPv4 address plan placed at Appendix E to this report on agenda item 3.4 be adopted to enable the Asia/Pacific ATN ground IPS network implementation to proceed using IPv4 in the interim with minimum delay; and iii) The Asia/Pacific region transition to IPv6 once the above issues have been resolved.	**Prepare Issue Form and notify the States**	**ICAO APAC Office**	**Issue Form sent to HQ and State letter**	**March 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/23	**Amendment/update of Regional ATN/AMHS Guidance Documents**	That, the following amended Regional Guidance Documents for ATN/AMHS implementation be adopted and distributed to the States. a) the amended Asia/Pacific ATN Network Service Access Point (NSAP) Addressing Plan for Asia/Pacific Region as provided in the Appendix F to the Report on Agenda Item 3.4; b) the Test Procedure for ATN Router Connection Test, Annex C to Asia/Pacific AMHS Manual as provided in the Appendix G to the Report on Agenda Item 3.4; c) "Asia/Pacific ATN Security Guidance Document" to replace the existing Asia/Pacific ATN Security Guidance Document, Draft First Edition as provided in Appendix H to the Report on Agenda Item 3.4; and d) the phased testing procedure to transit from AFTN routing to MTA-to-any-MTA routing to be incorporated in the AMHS Manual as provided in Appendix I to the Report on Agenda Item 3.4.	**Notify States**	**ICAO APAC Office**	**State Letter and** **Updated guidance material available on the website**	**November 2010**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/24	**Points for Proposed Defect Report (PDR) (Amendment Proposal) raised in the region**	That, States be invited to present their ATN/AMHS implementation related Points for Proposed Defect Report (PDR) (Amendment Proposal) to the ICAO APAC Office. These points will be presented to the ATNICG/ATNICG Working Group (whichever is scheduled earlier) by the Secretariat for endorsement, so that these points, along with the ATNICG/ATNICG WG recommendations can be forwarded to ACP WG – M Secretariat through ICAO APAC Office	**Notify States**	**ICAO APAC Office**	**State Letter and** **Procedure is followed**	**December 2010**
C 21/25	**Japan/Russia AFTN Routing Change**	That, ICAO be requested to coordinate with Europe Region for updating AFTN routing directory and consequential change to the APAC AFTN routing directory.	**Coordinate with ICAO European Office for the change**	**ICAO APAC Office**	**Coordination carried out and Routing Directory updated**	**March 2011**
C 21/26	**Pan-Regional ICD for AIDC**	That, ICAO Regional Office inform the NATSPG that the proposed title "Pan-regional ICD for Oceanic AIDC" is unacceptable as the ICD for AIDC is applicable for use by all ATS and ATM facilities in both oceanic, and continental areas within the Asia Pacific Region; and that the document should be titled as "Pan-Regional ICD for AIDC.	**Inform NATSPG through EUR Office**	**ICAO APAC Office**	**ICAO ERU Office and NATSPG informed**	**November 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/27	**Inter-regional ad hoc SATCOM Task Force**	That, a) the Terms of Reference of the inter-regional ad hoc Satellite Voice Communication (SATCOM) Task Force adopted by NAT System Planning Group as provided at Appendix J to the Report on Agenda Item 3.4 be endorsed; and b) the outcome of the task force should be coordinated with the CNS/MET Sub-group of APANPIRG.	**Inform ICAO EUR Office and CNS/MET SG**	**ICAO APAC Office**	**ICAO EUR Office and** **CNS/MET SG informed**	**December 2010** **July 2011**
C 21/28	**Regional HF Management Guidance Material**	That, the HF Management Guidance Material for the South Pacific as provided in the Appendix K to the Report on Agenda Item 3.4 be adopted as Part One of Asia/Pacific Regional Guidance Material for HF Management.	**Notify States**	**ICAO APAC Office**	**State Letter and GM on the website**	**December 2011**
D 21/29	**PBN Task Force Tasks List**	That, the PBN Task Force Tasks List provided at Appendix L to the Report on Agenda Item 3.4 be adopted.	**Notify PBN TF**	**ICAO APAC Office**	**Paper prepared and PBNTF informed**	**March 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/30	**Limitation of Older Generation FMS**	That, ICAO (IFPP, PBNSG) be invited to note, once again, the importance of the limitation of older generation FMS in storing multiple procedures for the same type of navigation system for a runway. This limitation occurs when pilots attempt to select a specific approach that is not stored in the FMS navigation database. ICAO is requested to consider establishing additional guidance, supplementing existing PANS provisions and to explore solution(s).	**Prepare Issue Form**	**ICAO APAC Office**	**Issue Form sent to HQ**	**October 2010**
C 21/31	**Revised APAC Regional PBN Implementation Plan**	That, the revised APAC Regional PBN Implementation Plan Version 2.0 provided in Appendix M to the Report on Agenda Item 3.4 be adopted.	**Notify States**	**ICAO APAC Office**	**State Letter**	**October 2010**
C 21/32	**Develop State PBN Implementation Plan**	That, the States, which have not developed their State PBN Implementation Plans so far, be urged to develop the plan in accordance with the Asia/Pacific Regional PBN Implementation Plan at the earliest and advise the Regional Office of the impediments in the implementation of PBN.	**Urge State and identify impediments**	**ICAO APAC Office** **States**	**State Letter** **Impediments in the implementation of PBN informed**	**March 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/33	**Aircraft Equipage Requirements**	That, ICAO provides guidance on aircraft that do not have a lateral and vertical readout on the navigation display, but do display the lateral and vertical profile on the navigation equipment, which could be considered as an alternate means of compliance, if supplemented by appropriate flight crew training for RNP value of 0.3 RNP or greater.	**Prepare Issue Form**	**ICAO APAC Office**	**Issue Form sent to ICAO HQ and Required guidance provided**	**March 2011**
D 21/34	**PBN Task Force continuation**	That, the PBN Task Force be continued.	**Notify PBN TF**	**ICAO APAC Office**	**Paper prepared and the Task Force informed**	**March 2011**
C 21/35	**Slow Progress of PBN Implementation**	That, ICAO highlights the slow progress and impediments in PBN implementation at the upcoming 47th DGCA Conference for their support to expedite implementation.	**Prepare paper for DGCA Conf/47**	**ICAO APAC Office**	**Paper prepared and issues highlighted**	**October 2010**
C 21/36	**Progress of GNSS Implementation & Awareness of GNSS Manual**	That, ICAO a) highlight the slow progress of GNSS implementation in the aviation field at forums such as the coming 47th DGCA Conference in October in Macao, China; and b) raise the awareness of existence of the GNSS Manual among the aviation community.	**Prepare paper for DGCA Conf/47**	**ICAO APAC Office**	**Paper prepared and issues highlighted**	**October 2010**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
D 21/37	**Subject/Tasks List of ADS-B Study and Implementation Task Force**	That, the Subject/Tasks List for ADS-B Study and Implementation Task Force provided in Appendix N to the Report on Agenda Item 3.4 be adopted.	**Notify ADS-B SITF**	**ICAO APAC Office**	**Paper prepared and the Task Force informed**	**April 2011**
C 21/38	**Guidance Material on Processing and Display of ADS-B Tracks on Air Traffic Controller Positions**	That, the Processing and Display of ADS-B Tracks on Air Traffic Controller positions provided in Appendix O to the Report on Agenda Item 3.4 be adopted.	**Notify States**	**ICAO APAC Office**	**State Letter** **The GM available on the Website**	**December 2010**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/39	**Template for promulgation of ADS-B Avionics Equipage Requirements**	That, based on APANPIRG Conclusion 20/54, States intending to implement ADS-B based surveillance service for a defined airspace and having not published regulations be urged to promulgate mandating rule for ADS-B Avionics Equipage Requirements as soon as possible using the following template: *On and after dd/mm/yyyy, if an aircraft operates on airways (insert routes)……..…at or above FLXXX……..(or in defined airspace boundaries …….…….. at or above FLXXX):* *a) the aircraft must carry serviceable ADS-B transmitting equipment that has been certificated as meeting EASA AMC 20-24, or meets the equipment configuration standards in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia; and* *b) the aircraft operator must have the relevant operational approval from the State of Registry.*	**Notify States**	**ICAO APAC Office**	**State Letter**	**November 2010**
C 21/40	**Guidelines for Airworthiness and Operational Approval for ADS-B Avionics Equipage**	That, States be advised to use the guidelines provided in Appendix P to the Report on Agenda Item 3.4 for Airworthiness and Operational Approval for ADS-B Out Avionics Equipage.	**Notify States**	**ICAO APAC Office**	**States informed**	**January 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/41	**Revised Regional Surveillance Strategy for Asia and Pacific Regions**	That, the revised Regional surveillance strategy for Asia and Pacific Regions provided in Appendix Q to the Report be adopted.	**Notify States**	**ICAO APAC Office**	**State Letter** **And revised strategy available on the website**	**January 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/42	**Rule on Misleading ADS-B Transmissions**	That, States where ADS-B may be used, even voluntarily, promulgate rule for ADS-B Avionics Equipage Requirements consider publishing additional provisions for misleading ADS-B transmission as follows: *After <insert earliest date that ADS-B may be used for any relevant operational purpose> if an aircraft carries ADS-B transmitting equipment which does not comply with* *a) EASA AMC 20-24, or* *b) the equipment configuration standards in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia.* *the aircraft must not fly unless the equipment is:* *(a) deactivated; or* *(b) set to transmit only a value of zero for the NUCp or NIC.*	**Notify States**	**ICAO APAC Office**	**State Letter**	**November 2010**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
		Note: *1. It is considered equivalent to deactivation if NUCp or NIC is set to continually transmit only a value of zero.* *2. Regulators should take appropriate action to ensure that such regulations are complied with.* *3. ATC systems should discard ADS-B data when NUC or NIC=0*				
C 21/43	**Preparation for WRC – 2012**	That, a) States be urged to have the designated contact person closely involved in the preparatory work for WRC – 2012 at the national level in close coordination with the contact points designated by respective telecommunication regulators; b) Make necessary arrangements for the designated contact persons to attend the APT APG meetings and WRC – 2012 Conference to protect aviation interests; and c) Reference to APANPIRG Conclusions 19/41, 20/58 and DGCA Conference Action Item 46/8 may be used to support these efforts.	**Notify States and necessary arrangement**	**ICAO APAC Office and** **States**	**States Letter** **Take necessary action to support ICAO Position for WRC2012**	**July 2012**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/44	**Visibility of ICAO Position on WRC – 2012 Agenda Items**	That, ICAO be urged to improve visibility to ICAO Position on WRC-2012 Agenda Items of critical interest to civil aviation on the ICAO website.	**Prepare Issue Form**	**ICAO APAC Office**	**Visibility of ICAO position for WRC2012 on ICAO Website**	**July 2012**
C 21/45	**Transition to WAFS Internet File Service (WIFS) from ISCS-G2**	That, a) The ISCS Provider State will work with States, in cooperation with the ICAO Secretariat and Asia and Pacific Regional Office, to assist States with the implementation of WIFS by March 2012; b) States to update Points of Contact in Appendix R to this Report and submit the WIFS registration form; and c) ICAO Asia and Pacific Regional Office to request States to advise on the status of their implementation of WIFS by March 2011. *Note 1: The data currently being provided by ISCS satellite service will only be available via the WAFS Internet File Service (WIFS) after June 30 2012.* *Note 2: WIFS commenced operation in May 2010.*	**Assist in WIFS implementation** **Update POC of ISCS/WIFS users and encourage WIFS registration** **Inquire with States on status of WIFS implementation**	**ISCS Provider State** **RO MET** **RO MET**	**Regional Implementation of WIFS** **State letter** **State letter**	**Mar 2012** **Dec 2010** **Dec 2010**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/46	**Improvements to WAFS Implementation**	That, the WAFSOPSG is invited to discuss and consider the following improvement measures in WAFS implementation: a) the WAFC Provider States inform users in advance about forthcoming changes to the contents of the WAFS forecasts; and b) further guidance be provided regarding the specific actions to be taken by the MET service providers and all relevant end users of WAFS upon receiving the administrative message. *Note: Guidance should also include any requirement for a user State to generate its own administrative message for a product affected by a received administrative message.*	**Determine changes, if necessary, to the WAFS change bulletin notice** **Determine further guidance, if necessary, for users of WAFS administrative messages**	**WAFSOPSG/6 (March 2011)** **WAFSOPSG/6 (March 2011)**	**Update WAFS bulletin notice, if required** **Update guidance on WAFS administrative messages, if required**	**July 2011** **July 2011**
C 21/47	**Improvements to VA and TC advisories**	That, The IAVWOPSG consider including the file name of the graphical advisories, if issued, under "Remarks" of the corresponding textual advisories.	**Determine if link between graphical and textual advisories is necessary**	**IAVWOPSG/6 (September 2011)**	**Update relevant standards (Am 76 to Annex 3) and/or guidance material if necessary**	**2013**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/48	**Update of SADIS and ISCS User Guide**	That, the SADISOPSG and WAFSOPSG consider the need to update the SADIS and ISCS User Guides by aligning with regional Meteorological Watch Offices requirements (Regional FASID Tables) *Note: To achieve this, the following steps should be taken in time for the regional SIGMET advisory trial (1 April 2011)* *a) Regional amendment proposals on FASID Table MET 1B;* *b) Develop global database based on Regional requirements in a); and* *c) Consider global database on SIGMET requirements for use in SADIS and ISCS User Guides*	**Amendment Proposals to Tables in the Regions, where necessary** **HQ IT develop global database of FASID Table MET 1B** **Incorporate SIGMET requirements in SADIS Users Guide (as a link to the global database)**	**RO MET** **MET/AIM (HQ)** **WAFSOPSG/6 (March 2011)** **SADISOPSG/15 (May 2011)**	**Up-to-date FASID Tables MET 1B for all Regions** **Global MWO database** **Provide link to global database for SIGMET requirements (may still maintain snapshot of reception)**	**Dec 2010** **Mar 2011** **Apr 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/49	**Implementation of OPMET reception**	a) IATA be invited to conduct another period of OPMET monitoring for reception of METAR and TAF at SADIS and ISCS and provide the Regional Office with a list of AOP and non-AOP aerodromes by State whose OPMET data are not available at SADIS and/or ISCS as well as a list of AOP aerodromes by State that distribute FC TAF; and	**IATA to monitor OPMET availability at SADIS/ISCS**	**IATA**	**List of aerodromes by State whose OPMET not received at SADIS/ISCS**	**Feb 2011**
		b) the Regional Office urge States containing AOP aerodromes whose OPMET is not received at SADIS and/or ISCS to comply to the Regional Air Navigation Plan (RANP); and	**Inform States**	**RO MET**	**SL**	**Apr 2011**
		c) the Regional Office encourage States containing non-AOP aerodromes whose OPMET is not received at SADIS/ISCS to provide OPMET data as already agreed upon; and	**Inform States**	**RO MET**	**SL**	**Apr 2011**
		d) the Regional Office inform States that FC TAF is no longer disseminated internationally in accordance with the RANP; and	**Inform States**	**RO MET**	**SL**	**Apr 2011**
		e) the slower transmission times and missing OPMET data associated with ISCS in relation to SADIS be investigated by RODBs Tokyo and Singapore;	**Investigate SADIS/ISCS transmission time differences**	**RODBs Singapore & Tokyo**	**Reduce OPMET transmission time to ISCS**	**May 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
		f) the Regional Office inform States of OPMET observation, filing and transmission times as described in the ROBEX Handbook section 7.5; and g) the Regional Office inform States of OPMET availability and regularity as defined in the Regional Air Navigation Plan and ROBEX Handbook. *Note: this Conclusion is intended to assist in achieving the OPMET data availability goals (95% AOP aerodromes and 90% non-AOP aerodromes) described in APANPIRG/20 Conclusions 20/63 and 20/64)*	**Inform States** **Inform States**	**RO MET** **RO MET**	**SL** **SL**	**May 2011** **May 2011**
C 21/50	**MET/ATM Seminar**	That, ICAO in coordination with WMO conduct a MET/ATM Seminar in early 2011. *Note: This draft Conclusion reinstates APANPIRG Conclusion 19/53.*	**HQ consider inviting WMO as partner in MET/ATM Seminar**	**MET/AIM Section**	**Invitation Letter**	**Dec 2010**
D 21/51	**Performance Framework Forms (PFFs)**	That, updated performance Framework Forms (PFFs) of CNS and MET fields as contained in Appendix S to the report on agenda item 3.4 be adopted.	**Notify CNS/MET SG**	**ICAO APAC office**	**Paper prepared and SG notified**	**July 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
D 21/52	**Updated Subject/Tasks List of the CNS/MET Sub-group**	That, the updated Subject/Tasks List of the CNS/MET Sub-group provided in Appendix U to the report on agenda item 3.4 be adopted.	**Notify CNS/MET SG**	**ICAO APAC office**	**Paper prepared and SG notified**	**July 2011**
C 21/53	**Elimination of ATM Air Navigation Deficiencies**	That, States concerned a) be urged to take urgent actions to correct the deficiencies in the ATM/AIS/SAR fields identified in Attachment A to the Report on Agenda Item 4 ; b) notify details of the problems/difficulties to the Regional Office; and c) designate a point of contact in each State to deal with deficiencies and provide details to the Regional Office by 22 October 2010.	a) take actions to correct deficiencies b) notify details of difficulty c) designate point of contact	States	a) less deficiencies b) remedial actions c) point of contact	Ongoing Ongoing 22 October 2010
C 21/54	**Aerodrome deficiencies**	That, the States concerned be urged to validate and provide corrective action plan for the elimination of aerodrome deficiencies identified in Appendix B1 to the Report on Agenda item 4 of APANPIRG/21;	**Notify concerned States**	**ICAO APAC office**	**State letter**	**February 2011**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
C 21/55	**Removal of the APANPIRG Air Navigation Deficiency AP-MET-13**	That, the air navigation deficiency AP-MET-13 be removed from the APANPIRG air navigation deficiencies list.	**Remove deficiency from database**	**RO AGA**	**Updated deficiency database**	**Dec 2010**
C 21/56	**Cost Recovery Guidance Material Update**	That, ICAO be invited to consider updating the cost recovery guidance material that would take into account States whose air traffic volume is not sufficient in obtaining the cost recovery for the necessary MET services required in Annex 3 and consider shared services in airspace blocks that are based on the number flights needed in obtaining the necessary cost for the services required for that airspace block.	**HQ to consider updating cost recovery guidance material**	**MET/AIM Section**	**Updated Guidance Material (Doc 9161) if deemed necessary by ATB**	**2012**

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date
D 21/57	**APANPIRG Contributory Bodies Structure Review Task Force (ABSRTF)**	That, a) APANPIRG Contributory Bodies Structure Review Task Force with members consisting of Sub-group chairpersons, vice-chairpersons and voluntary members nominated by States be established; and b) In coordination with ICAO Regional Office, the Task Force undertakes a review of the Terms of Reference and activities of the APANPIRG contributory bodies and proposes rationalization of their structures to APANPIRG/22 to meet the changing environment.	**Notify States to nominate voluntary members.** **Establish ABSRTF** **Review structure and develop proposals for contributory bodies**	**ICAO APAC Office** **ABSRTF**	**State Letter** **ABSRTF established** **Paper prepared with proposals.**	**November 2010** **February 2011** **June 2011**
C 21/58	**Establishment of RASGs – Consequent revision to TOR of APANPIRG**	That meeting adopt the revised terms of reference of APANPIRG as shown in the Appendix A to the Report on Agenda Item 6.	**Notify States**	**ICAO APAC office**	**State letter**	**March 2011**
C 21/59	**Development of New RANP**	That, ICAO be invited to review the regional air navigation plan structure, processes and contents to incorporate them in to e-ANP and expedite its provision for use.	**Prepare Issue Form**	**ICAO APAC Office**	**Issue form prepared**	**December 2010**

*** Note:** ICAO has established the following Strategic Objectives for the period 2005-2010:

A: Safety - *Enhance global civil aviation safety*; **B: Security** - *Enhance global civil aviation security*; **C: Environmental Protection** - *Minimize the adverse effect of global civil aviation on the environment*; **D: Efficiency** - *Enhance the efficiency of aviation operations*; **E: Continuity** - *Maintain the continuity of aviation operations;* **F: Rule of Law** - *Strengthen law governing international civil aviation.*