INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE SIXTEENTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/16)

BANGKOK, THAILAND — 22 – 26 AUGUST 2005

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/Pacific Regional Office

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PART I - HISTORY OF THE MEETING

PART I - HISTORY OF THE MEETING

1.1 Introduction

1.1.1 The Sixteenth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/16) was held in Bangkok, Thailand from 22 to 26 August 2005 at the Kotaite Wing of the ICAO Asia/Pacific Regional Office.

1.2 Attendance

1.2.1 The meeting was attended by 95 participants from all 17 Member States, 8 other Asia/Pacific States and 3 International Organizations: IATA, IFALPA and IBAC.

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. L.B. Shah, Regional Director, ICAO Asia/Pacific Office

1.3.1 Mr. L.B. Shah welcomed the participants from the APANPIRG member States, non-member States and the International Organizations to the ICAO Asia/Pacific Regional Office. He expressed deepest gratitude to the Royal Government of Thailand for the continuous support to the Regional Office and for providing the excellent facilities in the Conference building.

1.3.2 Mr. Shah acknowledged the presence of several Directors General, Secretary, Chairmen and Chief Executives who were attending APANPIRG/16, thus enhancing the value of the proceedings. With regard to International Organizations, he welcomed the presence of IATA and IFALPA, and acknowledged the presence of the Director General of IBAC. He also extended a warm welcome to the Chief of Regional Affairs Office of ICAO Headquarters.

1.3.3 Mr. Shah drew the attention of the delegates to some figures indicating the steady growth of the aviation industry, including the existence of 812 air carriers worldwide by the end of 2004, and a growth of about 32% in the last ten years in terms of aircraft numbers. The financial commitment in terms of jet aircraft orders placed with major aircraft manufacturers in 2004 was estimated to be about $US 65 billion. But these figures were very conservative compared to industry predictions – the Boeing projection was that the next 20 years would see a $US 2.1 trillion market with Asia/Pacific region enjoying the largest share of 36%. He also stressed that the trend of air transport liberalization continued in response to the increasing competitive environment and globalization challenges.

1.3.4 The strong recovery of the air transport industry in 2004 and a sustained level of growth predicted for rest of the decade would produce increasing demands on the global air navigation system, already operating at full capacity in many parts of the world. The pressure to perform has seldom been greater.

1.3.5 Mr. Shah recalled the Strategic Objectives of ICAO: Safety, Security, Environmental protection, Efficiency, Continuity, and Rule of Law. These Strategic Objectives, approved by the Council in 2004, were shaping ICAO's work programme. He outlined some important developments towards meeting these objectives, as follows:

- With regard to ICAO USOAP, 181 States, 2 SARs and 3 State territories have been audited with follow-ups in 162 States. Significant progress has been achieved in implementing State corrective action plans;

- As decided by the 35th Assembly, the Comprehensive System Approach on Safety Audit was fully operational. By the end of 2005 ICAO would have trained close to 160 auditors. It was expected that ICAO would have 70-75 approved Safety Oversight auditors eventually;

- With greater emphasis being put on implementation rather than on promulgating SARPs, ICAO Secretariat was working to ensure that Panels make every effort to formulate provisions that were performance-based, capable of meeting qualitative and/or quantitative goals; and

- As of July 2005, a total of 84 security audits have been conducted. Currently, ICAO has on its roster a total of 120 aviation security experts representing 63 States from all ICAO regions.

1.3.6 Turning to Asia/Pacific Region, Mr. Shah noted that, while reviewing APANPIRG/15 report, the ANC and the Council appreciated the initiative of APANPIRG in taking up the task of reviewing ATS Routes, specifically noted the task on Regional Strategy for air-ground data link, congratulated APANPIRG for developing the 12th edition of the ROBEX Handbook, and complimented APANPIRG for finalizing the Supplement to the Uniform Methodology on Deficiencies.

1.3.7 In many activities of the Region, States continued to demonstrate the excellent collaboration and cooperation in effecting safety, security and air navigation efficiencies in the Region. However, the real tasks confronting APANPIRG in terms of scope, complexity and time are enormous.

1.3.8 Mr. Shah noted further that that the ICAO family has grown larger with Timor Leste having deposited the instrument of adherence to ICAO on 4 August 2005. Thus, Timor Leste would become the 189th ICAO Contracting State in September 2005. On behalf of the meeting, Mr. Shah heartily welcomed the new member of the Asia/Pacific family and assured that all cooperation and assistance would be provided for development of the civil aviation in Timor Leste.

1.3.9 Mr Shah thanked Japan for very kindly contributing a model of the MTSAT satellite for display in the exhibition room of the Regional Office.

Opening remarks by Mr. W. L. Wong, DGCA Singapore and Chairman of APANPIRG

1.3.10 The Chairman, Mr. W.L. Wong in welcoming the delegates to APANPIRG/16, noted that rising fuel cost remains a concern to airlines, which are hard pressed to remain competitive. The tragic 26 December 2004 Tsunami event has harmed lives and hurt tourism in many places. Thus the pressure is on for air traffic service providers and airlines to work closely together to achieve greater efficiencies without compromising safety.

1.3.11 Mr. Wong appreciated that through the able leadership of ICAO and commitment of States, APANPIRG and its contributory bodies (Sub-Groups and Task Forces) have made notable progress in many areas. It was not possible to go through every one of them, so he briefly outlined some milestones:

- In August 2004, States concerned agreed to establish 2 uni-directional routes to cater for traffic flows between Jakarta and Hong Kong. The northbound route, M772 and the southbound route, L644 were established on 20 January 2005. This had reduced travelling distance between the two countries and saved fuel for the airlines;

- In early 2004, P628 was extended from ASOPO to Rahim Yar Khan. In November 2004, Rahim Yar Khan was further extended to Kandahar and this made P628 a viable alternative to the popular L759. Europe-bound flights were more spread out and the ground delays situation at many airports had improved;

- RVSM has been implemented in November 2003 across the Bay of Bengal, India and Arabian Sea. The consequent increase in airspace capacity and efficiency was immediately noticeable. Another feather in the cap of the task force would be the implementation of RVSM operations over Incheon, Naha and Tokyo domestic airspace in September 2005;

- Work in progress to develop an air traffic flow management (ATFM) tool over the Bay of Bengal. Users have re-iterated the need for this system particularly during peak period to reduce ground delays and re-routing of flights due to congestion. Further developments in this area were anticipated;

- Arising from APANPIRG 14, the Regional Airspace Safety Monitoring Advisory Group (RASMAG) was established. The role of RASMAG would not only facilitate the implementations of RNP, ADS/CPDLC, RVSM, etc, but would ensure continuous monitoring of safety requirements associated with these initiatives. This was indeed a major step forward for the Region in embracing new technology in connection with ICAO's CNS/ATM initiatives; and

- The Deficiency Review Task Force has developed additional procedures to address the outstanding deficiencies. The Task Force's new supplementary procedures to complement ICAO's Uniform Methodology would be effective in this regard.

1.3.12 Mr. Wong added that more still needed to be done. For example, implementation of RNP routes and ADS-Broadcast, and handling of deficiencies. These and other issues were to be addressed by the Meeting. He wished all participants a fruitful meeting with fresh ideas on tackling the expected traffic growth without compromising on safety and efficiency.

Remarks by Mr. Vladimir Zubkov, Chief, Regional Affairs Office

1.3.13 Mr. Zubkov extended to the delegates attending APANPIRG/16 the greetings and best wishes from the President of the Council and the Secretary General of ICAO. He recalled that the Assembly approved the budget for the 2005-2007 triennium which has led to serious reductions in the staffing of the Regional Offices as well as in the Headquarters. The Secretary General and the whole Senior Management Team responded to this challenging situation by identifying ways of increasing the efficiency and effectiveness of the Organization. The lead for this was provided by the six Strategic Objectives recently approved by the Council, as follows:

- ***Global Aviation Safety.*** One of the main goals of this Strategic Objective was in shifting the focus from development to implementation. Over the years thousands of SARPs have been developed; it was very important to make sure that they work towards enhancement of aviation safety.

- ***Global Aviation Security*** objective reflected the challenge to maintain the public confidence in security of international civil aviation.

- ***Environmental Protection.*** The goal was to reduce the adverse effect of aviation on the environment.

- ***Efficiency of Aviation Operations.*** PIRGs and Regional Offices were well placed to make a noticeable contribution to achieving this objective. The need to establish a set of regional efficiency targets and address technical and economic issues that limit the efficient development of the global aviation system was emphasized.

- ***Maintain the Continuity of Aviation Operations.*** States should be enabled to take preventive and corrective measures to mitigate the effect of natural and human events that may disrupt air traffic services.

- ***Rule of Law.*** This strategic Objective reflected the need for ICAO to develop, maintain and update the international air law instruments in light of evolving needs of the international aviation community. It was also necessary to achieve increased cooperation of States in the ratification and usage of air law instruments.

1.3.14 Mr. Zubkov informed further that, in performing the tasks of its Work Programme, benefit would be achieved if ICAO Secretariat started validating them against the Strategic Objectives. The PIRGs were to approach their activities in a similar manner and ensure that their programmes fit into the Strategic Objectives. This would create an excellent opportunity to increase the efficiency of what was being done in the Regions.

1.4 **Officers and Secretariat**

1.4.1 Mr. W. L. Wong, DGCA, Singapore as Chairperson of the Group presided over the first day of the meeting. Due to personal reasons, Mr. Wong had to urgently leave the meeting, and Mr. M. Faletau, second Vice-Chairman of APANPIRG chaired the rest of the meeting.

1.4.2 Mr. Lalit B. Shah, ICAO Regional Director, Asia/Pacific Office, was the Secretary of the meeting, assisted by Mr. D. H. Ivanov, Regional Officer/MET. Mr. Vladimir Zubkov, Chief of Regional Affairs Office, ICAO Headquarters, was advisor to the meeting.

1.4.3 The meeting was also assisted by Mr. Shaukat A. Ali, Deputy Regional Director, Mr. H.V. Sudarshan, Regional Affairs Officer, ICAO Headquarters, Mr. Andrew Tiede and Mr. Kyotaro Harano, Regional Officers/ATM, Mr. K.P. Rimal and Mr. Li Peng, Regional Officers/CNS, Dr. Paul Hooper, Regional Officer/AT and Ms. Sarangtip Sundarachampaka, Regional Officer/Administration from the ICAO Asia/Pacific Regional Office. Mr. David Moores, former Regional Officer/ATM and currently conducting an ICAO Special Implementation Project, also provided part time assistance to the meeting.

1.5 **Agenda of the Meeting**

1.5.1 The meeting adopted the following agenda:

Agenda Item 1 Review of Council and ANC actions on APANPIRG/15 Report

Agenda Item 2 ASIA/PAC Air Navigation System and Related Activities

2.1 ATM/AIS/SAR Matters

2.2 CNS/MET Matters

2.3 ATS Co-ordination Groups' Activities

2.4 Other Air Navigation Matters

Agenda Item 3 CNS/ATM Implementation and Related Activities

Agenda Item 4 Deficiencies in the Air Navigation Field

Agenda Item 5 Review of Outstanding Conclusions and Decisions of APANPIRG

Agenda Item 6 Develop Future Work Programme

Agenda Item 7 Any other business

1.6 **Working Arrangements, Language and Documentation**

1.6.1 The Group met as a single body throughout the meeting. The working language of the meeting was English inclusive of all documentation and this Report. Information Papers (IPs) and Working Papers (WPs) presented at 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-7 to i-9.

1.8 **Terms of Reference of APANPIRG**

1.8.1 The Terms of Reference of APANPIRG approved by the Council of ICAO (6th Meeting of its 171st Session on 27 February 2004) are as follows:

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.

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.

List of Conclusions

Conclusion 16/2	**–**	**Funding arrangements for regional airspace safety monitoring**
Conclusion 16/3	**–**	**Large Height Deviations – Western Pacific/South China Sea area**
Conclusion 16/4	**–**	**Traffic Sample Data Collection**
Conclusion 16/5	**–**	**Non-implementation of reduced separation unless compliant with Annex 11**
Conclusion 16/6	**–**	**Non-provision of safety related data by States**
Conclusion 16/7	**–**	**Deletion of ATS Routes from the APANPIRG List of Deficiencies**
Conclusion 16/10	**–**	**Review of ATS Route Catalogue by States**
Conclusion 16/12	**–**	**Implementation of 30/30 NM Separation Minima**
Conclusion 16/13	**–**	**ATM Contingency Planning for Volcanic Ash Cloud avoidance**
Conclusion 16/15	**–**	**Special Implementation Project for Development of a State Contingency Plan**
Conclusion 16/17	**–**	**Equitable Sharing by Civil and Military Users**
Conclusion 16/18	**—**	**Assistance to States to develop safety management systems**
Conclusion 16/19	**–**	**Study of States' preparedness to implement safety management systems**
Conclusion 16/20	**–**	**Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region**
Conclusion 16/21	**–**	**Status of compliance with Language Proficiency requirements**
Conclusion 16/22	**–**	**Recommendations of the ICAO SAR Seminar and SAREX held at Chennai, India**
Conclusion 16/23	**–**	**Special Implementation Project International Seminar and SAREX**
Conclusion 16/24	**–**	**ATN Documents**
Conclusion 16/25	**–**	**ASIA/PAC AMHS Naming Plan**
Conclusion 16/26	**–**	**ASIA/PAC AMHS Naming Registration Table and Contact List**
Conclusion 16/27	**–**	**Amendment to the ASIA/ PAC CNS FASID Table CNS-1D-AIDC**
Conclusion 16/28	**–**	**AFTN performance reports**
Conclusion 16/29	**–**	**Strategy for Implementation of ATN in the Asia/Pacific Region**

Conclusion 16/32	**–**	**Strategy for implementation of the air-Ground data link in the Asia/Pacific region**
Conclusion 16/33	**–**	**Revision of the Strategy for the implementation of GNSS Navigation Capability in the Asia/Pacific Region**
Conclusion 16/34	**–**	**Amendment Table CNS-3 - Radio Navigation Aids**
Conclusion 16/35	**–**	**ADS-B Data Exchange format**
Conclusion 16/36	**–**	**ADS-B Implementation and Operational Guidance Document (AIGD)**
Conclusion 16/37	**–**	**Amendment to Table CNS-4–Surveillance System**
Conclusion 16/39	**–**	**Fostering transition to SADIS 2G service in the Asia/Pacific Region**
Conclusion 16/40	**–**	**Long-term planning of SADIS development**
Conclusion 16/41	**–**	**Long-term planning of the WAFS implementation**
Conclusion 16/42	**–**	**Guidance on the use of WAFS products in the flight documentation**
Conclusion 16/43	**–**	**Special air-reports**
Conclusion 16/44	**–**	**Amendment of the OPMET related regional procedures in ASIA/PAC Basic ANP and FASID, Doc 9673**
Conclusion 16/46	**–**	**Facilitating the implementation of SIGMET provisions**
Conclusion 16/47	**–**	**Production of SIGMET posters**
Conclusion 16/48	**–**	**Amendment of the regional procedures related to SIGMET and advisories in ASIA/PAC FASID**
Conclusion 16/49	**–**	**Revision to the Annex 3 Template for Aerodrome Warnings**
Conclusion 16/50	**–**	**Extending the Provision of Automated Aircraft Observations for Wind Shear Warning Application**
Conclusion 16/51	**–**	**Guidance on implementation of D-ATIS**
Conclusion 16/52	**–**	**Air-Ground Data Link Supporting Graphical Meteorological Information Uplink**
Conclusion 16/53	**–**	**Regional Contingency Arrangement in support to continuity of aviation operations in the events of natural disasters or other crisis situations**
Conclusion 16/56	**–**	**Amendment to Surveillance Part of revised BORPC**
Conclusion 16/57	**–**	**Workshop on Fuel Savings Measures**
Conclusion 16/61	**–**	**UAV Operation**
Conclusion 16/62	**–**	**State focal point for safety-related activities**

List of Decisions

Decision 16/1 – Safety Monitoring Agency (SMA)

Decision 16/8 – To Discontinue the Development of ATS Route Master Database

Decision 16/9 – Acceptance of the Asia/Pacific ATS Route Catalogue

Decision 16/11 – To Disband the ARNR Task Force

Decision 16/14 – Contingency Plans on ATS Coordination Group Agendas

Decision 16/16 – Civil Military Coordination

Decision 16/30 – Dissolution of the ATN Transition Task Force

Decision 16/31 – Establishment of an ATN Implementation Co-ordination Group

Decision 16/38 – ADS-B Study and Implementation Task Force Subject/Tasks List

Decision 16/45 – Terms of reference and work programme of OPMET/M TF

Decision 16/54 – Updated Subject/Tasks List of the CNS/MET Sub -Group

Decision 16/55 – Revised Statement of BORPC for regional air navigation planning and implementation

Decision 16/58 – Amendment to the Regional Plan for the CNS/ATM System to include ADS-B

Decision 16/59 – Review of the Regional Plan for the New CNS/ATM System

Decision 16/60 – Correlation of Aircraft Identification

PART II - REPORT ON AGENDA ITEMS

AGENDA ITEM 1: REVIEW OF COUNCIL AND ANC ACTIONS ON APANPIRG/15 REPORT

Agenda Item 1: Review of Action taken by Air Navigation Commission and the Council on the Report of APANPIRG/15 Meeting

1.1 The meeting reviewed the actions taken by the ANC and the Council on the Report of the Fifteenth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/15) held in Bangkok from 23 to 27 August 2004. The meeting noted them, as well as the follow-up actions by the States and Secretariat on Conclusions and Decisions of the meeting as contained in **Appendices A and B** to the Report on Agenda Item 1.

1.2 With respect to Conclusion 15/9 calling on ICAO to review the airspace classification provisions in Annex 11 — *Air Traffic Services* so as to specify the class of airspace appropriate for RVSM and RNP operations, the meeting noted that the Commission was of the view that it would not be appropriate to amend the classification of airspaces in Annex 11 to exclude VFR flight from RNP airspace. However, it was agreed that further guidance on how to classify and designate airspace wherein RVSM and RNP was implemented, would be useful to States. The meeting noted that the Commission accordingly requested the Secretary General to examine the *Manual on Required Navigation Performance (RNP)* (Doc 9613) with a view to providing guidance on the application of airspace classifications in airspace where RVSM and RNP were implemented.

1.3 The meeting was informed that the Commission noted the establishment of a task to develop a regional strategy for implementation of air-ground data link in the Asia/Pacific Region. (paragraph 2.2.47 of the meeting report refers).

1.4 The meeting was apprized that the Commission complimented APANPIRG for developing a fully revised 12th edition of the ROBEX Handbook as well as a new (third) edition of the ASIA/PAC Interface Control Document (ICD) for access to the operational meteorological information (OPMET) databanks (Conclusion 15/36 refers).

1.5 The meeting noted that the Council concurred with APANPIRG (Conclusion 15/39 refers) and called upon the Secretary General, to study, in coordination with the WMO, the feasibility of developing provisions for Annex 3 for the introduction of a TAF with a 30-hour period of validity in view of the new requirements for very long haul flights.

1.6 On the subject of deficiencies, the meeting noted that the Council congratulated APANPIRG for developing the Asia/Pacific Supplement to the Uniform Methodology which provides clear and concise procedures for the identification, assessment, prioritization, validation and action plan, monitoring, rectification and removal from list of deficiencies (Conclusion 15/54 refers).

1.7 Concluding the review, the meeting thanked the Council and Air Navigation Commission for their valuable guidance on various activities of the APANPIRG which would be taken into account in the development of ongoing action plan of the region.

1.8 Out of 37 Conclusions and 17 Decisions formulated by APANPIRG/15, the follow-up action on 47 items has been completed or closed, and action on 7 items was “on-going”. This resulted in 87 % of completion of the follow-up action, which was appreciated by the meeting as a very good achievement.

STATUS OF ACTION TAKEN ON CONCLUSIONS/DECISIONS OF APANPIRG/15 IN THE ATM/AIS/SAR & AOP FIELDS

(Reviewed by the ATM/AIS/SAR SG/15)

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
~~D15/1~~		~~**To dissolve the EMARSSH Task Force**~~ ~~That, as the EMARSSH Task Force has completed the EMARSSH project, and that all outstanding issues have been identified and follow up actions completed or assigned to ATS coordination groups as appropriate, the EMARSSH Task Force be dissolved.~~	~~ICAO Regional Office took follow-up action and referred outstanding matters to the respective ATS coordination groups~~	~~Completed~~
~~C15/2~~		~~**Capture and Circulate Lessons Learnt from EMARSSH Task Force**~~ ~~That, the valuable lessons learnt by the EMARSSH Task Force be highlighted to ICAO and States as beneficial in the conduct of project based Task Force activities.~~	~~ICAO Headquarters advised~~ ~~ATS Coordination Groups updated~~	~~Completed~~
~~C15/3~~	~~*ANC*~~	~~**Review of ATS Route Requirements**~~ ~~That, States and users undertake a thorough review of their ATS route requirements (including future requirements) and any changes that have been made to existing routes, and submit this information to the ATS Route Network Review Task Force meeting on 6-10 September 2004.~~ ~~*Noted the conclusion and called upon the Secretary General to monitor its progress*~~	~~ARNR/TF completed its task to review APAC ATS route requirements and incorporated these in an ATS Route Catalogue. ATS Route Catalogue accepted by APANPIRG/16 Decision 16/9~~ ~~APANPIRG/16 dissolved ARNR/TF under Decision 16/11.~~	~~Completed~~
~~D15/4~~		~~**Revision to the Terms of Reference of RASMAG**~~ ~~That the Terms of Reference and Task List of RASMAG be revised as shown in **Appendix C** to the Report on Agenda Item 2.1.~~	~~RASMAG updated~~	~~Completed~~

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
~~D15/5~~		~~**Adoption of the term Safety Monitoring Agency (SMA)**~~ ~~That, the term Safety Monitoring Agency (SMA) be used to describe an organization approved by regional agreement to provide airspace safety services for international airspace in the Asia/Pacific Region for implementation and operation of RNP, reduced horizontal separation and data link.~~	~~APANPIRG/16 accepted rewording of this Decision as proposed by RASMAG – Decision 16/1 refers~~	~~Completed~~
~~C15/6~~		~~**Designation of Airservices Australia to provide RMA and SMA services for the international airspace within the western part of the Melbourne and Brisbane FIRs**~~ ~~That, recognizing the safety management services provided by Airservices Australia for RVSM within the international airspace of the western part of the Melbourne and Brisbane FIRs, they be designated as the Regional Monitoring Agency for RVSM and as the Safety Monitoring Agency for RNP, data link services and related separation minima.~~	~~ICAO Regional Office updated RASMAG and States~~	~~Completed~~
~~C15/7~~		~~**FANS 1/A Operations Manual (FOM)**~~ ~~That, the FANS 1/A Operations Manual (FOM) be used by States and users in the Asia and Pacific Regions as a basis for operating automatic dependent surveillance (ADS) and controller pilot data link communications (CPDLC) in conjunction with Annex 10 – *Aeronautical Telecommunications* Volume II – *Communications Procedures* including those with PANS status, the *Procedures for Air Navigation Services – Air Traffic Management* (PANS–ATM. Doc 4444) and the *Guidance Material on CNS/ATM Operations in the Asia and Pacific Region*~~	~~ICAO Regional Office updated States and ATS coordination groups, FOM in use by Asia/Pacific States~~ ~~(Note: ICAO Headquarters developing global material based on the FOM and NAT document and regional guidance material to be reviewed in due course)~~	~~Completed~~

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C15/8	*ANC*	**Implementation of a 2 NM lateral offset procedures in the ASIA/PACIFIC Region** That, States in the Asia/Pacific Region implement the 2 NM lateral offset procedures to the right of centre line in accordance with ICAO guidance on a common AIRAC date to be coordinated by the ICAO Regional Office with States, ATS Coordination Groups and users concerned. *Noted the conclusion and called upon the Secretary General to monitor its progress, recalling that revised guidelines on the use of strategic lateral offsets, as approved by the Commission, had recently been circulated to States and that global provisions were under development.*	Generally implemented by affected APAC States on AIRAC 20 January 2005 and 17 March 2005. Other States advised to consider implementation. Note: APANPIRG/16 incorporated Conclusion 14/7 into Conclusion 15/8 and closed Conclusion 14/7. The following text was incorporated from Conclusion 14/7: *Based on the ICAO revised guidelines, States to promulgate in State AIPs the routes and airspace where offsets are authorized as required by Annex 2 (Chapter 3, 3.6.2.1.1).* :	On-going
~~C/15/9~~	~~*ANC*~~	~~**Review of Annex 11 airspace classification provisions for RVSM and RNP operations**~~ ~~That, ICAO review the airspace classification provisions in Annex 11 to clarify requirements for specifying the class of airspace appropriate for RVSM and RNP operations (where reduced horizontal separation was introduced based on safety assessments requiring a collision risk model to be carried out)~~ ~~*Noted the conclusion and requested the Secretary General to review the guidance material contained in the Manual on Required Navigation Performance (RNP) (Doc 9613) with a view to providing information on the application of airspace classifications in airspace where RVSM and RNP was implemented.*~~	~~ICAO Headquarters reviewing Annex 11 requirements, further action by ICAO Headquarters.~~	~~Closed~~

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
~~C15/10~~		~~**Amendment to the Terms of Reference of the ATM/AIS/SAR/SG**~~ ~~That, proposed amendments to the Terms of Reference of the ATM/AIS/SAR/SG as presented in Appendix G to the Report on Agenda Item 2.1 be adopted.~~	~~ICAO Regional Office updated ATM/AIS/SAR/15~~	~~Completed~~
~~D15/45~~		~~**Seminar on the operation of the New Larger Aircraft**~~ ~~That, a seminar be convened in 2005 to share the experiences by States in preparing for the operation of the Airbus A380 scheduled for commercial operation in 2006~~	~~Seminar held on 6-8 June 2005~~	~~Completed~~
D15/46		**Implementation of AN-Conf/11 (November 2003) Recommendations by APANPIRG** That, the following recommendations of AN-Conf/11 be studied by the concerned Sub-Groups, action taken to implement them, and the outcome presented to APANPIRG: Recommendations 1/1, 1/10, 1/13, 4/1, 4/2, 6/11 and 7/1: ATM/AIS/SAR/SG Recommendations 1/1, 1/10, 1/13, 4/1, 4/2, 6/11, 7/1 and 7/3: CNS/MET/SG Recommendations 4/8: DRTF	Included on ATM/AIS/SAR Sub-Group and CNS/MET Sub-Group Task Lists, reviewed by the Sub-Groups. To be further reviewed by Sub-Groups during 2006.	On-going
~~C15/47~~		~~**Implementation of AN-Conf/11 (November 2003) Recommendations by States**~~ ~~That, States of the Asia/Pacific Region take action to implement the following twenty-five recommendations of AN-Conf/11:~~ ~~1/1, 1/2, 1/7, 1/10,1/13, 1/15, 2/2, 2/3, 2/7, 2/8, 4/1, 4/2, 4/5, 4/6, 4/8, 4/9, 5/1, 6/1, 6/2, 6/9, 6/13, 6/14, 7/1, 7/2 and 7/3~~	~~APAC States informed to take action~~	~~Completed~~

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
~~C15/48~~		~~**Implementation of AN-Conf/11 (November 2003) Recommendations by international organizations**~~ ~~That, international organizations take action to implement the following twelve recommendations of AN-Conf/11:~~ ~~1/1, 1/7, 1/10, 1/13, 4/8, 5/1, 6/1, 6/2, 6/9, 6/13, 7/2 and 7/3~~	~~APAC International Organizations informed to take action~~	~~Completed~~
~~D15/49~~		~~**Assignment of new Tasks to the ATM/AIS/SAR and CNS/MET Sub-Groups**~~ ~~That, the following tasks be included in the Subject/Tasks List of the ATM/AIS/SAR and CNS/MET Sub-Groups:~~ ~~a) review key priorities for implementation of CNS/ATM systems for the ASIA/PAC region, identify new items as required and monitor implementation; and~~ ~~b) make recommendation aimed at improving ATM and CNS support for Terminal Area and Airport Operations, respectively.~~	~~Included on ATM/AIS/SAR Sub-Group and CNS/MET Sub-Group Task Lists, reviewed by the Sub-Groups.~~	~~Completed~~
~~D15/50~~		~~**Dissolution of the CNS/ATM Implementation Coordination Sub-Group**~~ ~~That, in consideration of optimizing the effectiveness and efficiency of the contributory bodies of APANPIRG and in accordance with the provisions of the APANPIRG Procedural Handbook, the CNS/ATM/IC/SG be dissolved~~	~~ICAO Regional Office advised all parties concerned~~	~~Completed~~
~~D15/51~~		~~**Dissolution of the Future Directions Task Force**~~ ~~That, the Future Directions Task Force, having completed its work programme as set out in its Terms of Reference, be dissolved.~~	~~ICAO Regional Office advised all parties concerned~~	~~Completed~~

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
~~D15/52~~		~~**Sub-Group Key Priority Lists**~~ ~~That, in order to identify priorities for CNS/ATM implementation programmes or highlight other critical functions of the Sub-Groups' work programmes, the CNS/MET and ATM/AIS/SAR Sub-Groups are to compile and evaluate Key Priority lists relevant to their activities for review by APANPIRG. Lists should be highly focused, fit the purpose intended and be time bounded.~~	~~ATM/AIS/SAR/SG/15 and CNS/MET/SG/9, developed Key Priority List related to their activities~~	~~Completed~~
~~D15/53~~	~~C~~	~~**Developments of simplified tools and associated guidance for estimating environmental benefits of CNS/ATM systems at the national level**~~ ~~That the ATS Route Network Review Task Force support CAEP in developing a simplified tool and associated guidance for estimating environmental benefits of CNS/ATM systems, and that the tool be applied in its task of route review to reflect environmental benefits accordingly.~~ ~~*Noted the decision and requested the Secretary General to:*~~ ~~a) *include the task of development of simplified tools and associated guidance for estimating environmental benefits of CNS/ATM systems at the national level in CAEP's work programme; and*~~ ~~*inform CAEP that it could enlist the support of APANPIRG in carrying out this task.*~~	~~ARNR/TF developed simplified tool and applied it where possible, incorporated analysis of environmental benefits in the Asia Pacific ATS Route Catalogue~~	~~Closed~~

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
~~C15/54~~	~~C~~	~~**Adoption of ASIA/PAC Supplement to the Uniform Methodology**~~ ~~That, the ASIA/PAC Supplement to the Uniform Methodology for the Identification, Assessment and Reporting of Air Navigation Deficiencies be adopted and circulated to States and International Organizations~~ ~~*Noted the conclusion and called upon the Secretary General to consider the applicability of this supplement to the remaining regional offices.*~~	~~ICAO regional office informed all parties concerned~~	~~Completed~~

- END -

STATUS OF ACTIONS TAKEN ON CONCLUSIONS/DECISIONS OF APANPIRG/15 IN THE CNS/MET FIELDS
(Reviewed by the CNS/MET SG/9)

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
~~C 15/11~~		~~**Conclusion 15/11 - Use of X.25 protocol**~~ ~~That, States continue using X.25 as recommended protocol to support implementation of ATN ground infrastructure in the short to medium term (5-10 years) and consider acquisition of sufficient spares for the service life of the equipment. States not implementing X.25 consider the use of emerging replacement technology.~~	~~States notified for implementation~~	~~Completed~~
~~C 15/12~~		~~**Conclusion 15/12 – Development of AMHS Addressing Scheme and PRMD value for Asia/Pacific region**~~ ~~That,~~ ~~i) Hong Kong, China be requested to develop a comprehensive draft of the AMHS Addressing Scheme and PRMD value for each State in the Asia/Pacific region with options of both XF and CAAS address and present it to the ATN Transition Task Force Working Group Meeting in September for review and comments; and~~ ~~ii) ICAO be requested to circulate the addressing scheme to States for consideration.~~	~~Completed Addressing Scheme was presented at the ATN Transition Task Force/7 Meeting.~~ ~~The addressing scheme was further updated and presented to the ATNTTF/7. Draft Conclusion 7/11 of the Task Force addresses this issue~~	~~Completed~~

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
~~C 15/13~~		**~~Conclusion 15/13 - AMHS Naming Registration Form~~** ~~That,~~ ~~a) the AMHS Naming Registration Form be reviewed and refined by the ATN Transition Task Force based on the result of trial operation; and~~ ~~b) ICAO be requested to circulate the form to Asia/Pacific States.~~	~~Action completed by ATN Transition Task Force/7 Meeting and Draft Conclusion 7/12 of the Task Force addresses this issue.~~	~~Completed~~
~~C 15/14~~	**~~ANC~~**	**~~Conclusion 15/14 -Use of AMHS over TCP/IP in the Asia/Pacific region~~** ~~That, Administrations within the Asia/Pacific region willing to pursue the implementation of the TCP/IP subnet as part of ATN may do so on a bilateral basis on the understanding that they may be required to make changes to their subnet if and when the TCP/IP is developed as a part of the ATN SARPS.~~ ~~*Noted the conclusion and requested ACP to take relevant regional implementation activities into account in its current work on the subject, the outcome of which is expected by middle 2005.*~~	~~States were made aware of it.~~	~~Completed~~

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
~~(para. 2.2.47)~~	~~**ANC**~~	~~**Development of a regional strategy for implementation of air-ground data link in the ASIA/PAC Regions.**~~ ~~*Noted the paragraph and that the strategy is expected to be developed by July 2005 and called upon the Secretary General to monitor its progress.*~~	~~Strategy was developed by the Task Force and presented to the CNS/MET SG/9 for endorsement.~~	~~Completed~~
(para. 2.2.87)	**C**	**Preparation for World Radiocommunication Conference – 2007 (WRC-2007)** *Noted the paragraph and requested the Secretary General to continue encouraging the States to participate at various levels in different fora to provide support for the ICAO position at the forthcoming WRC-2007 so as to protect aeronautical frequency spectrum.*	First RPG Meeting was held in February 2005. Preliminary ICAO Position for WRC-2007 was presented at APG 2007-2 Meeting in February 2005.	On-going
C 15/15		**Conclusion 15/15 – A sia/Pacific regional ATN Implementation System Management Operational** That, the Asia/Pacific regional ATN Implementation System Management Operational Procedures be published to assist States in implementation of the ATN ground infrastructure in the Asia/Pacific region.	Considered premature due to lack of experience in operational aspect to develop a manual procedure. This task can be addressed only after gaining sufficient operational experience of AMHS.	On-going

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
~~C 15/16~~		~~**Conclusion 15/16 – Table CNS-1D - AIDC**~~ ~~That,~~ ~~a) ICAO be requested to circulate Table CNS-1D provided in **Appendix A** to the Report on Agenda Item 2.2 to Asia/Pacific States to specify operational requirements for AIDC; and~~ ~~b) provide results to the next meeting of the ATN Transition Task Force for appropriate action.~~	~~Circulated~~ ~~Result provided to the Task Force.~~	~~Completed~~
~~C 15/17~~		~~**Conclusion 15/17 – Amendment Table CNS-1C – ATSMHS Implementation Plan**~~ ~~That, the sample Table CNS-1C – ATSMHS Implementation Plan provided in ASIA/PAC FASID, Part IV CNS be replaced with the Table CNS-1C shown in Appendix B to the Report on Agenda Item 2.2 through the established procedure.~~	~~Amendment proposal circulated to States. States notified of approval.~~	~~Completed~~
~~C 15/18~~		~~**Conclusion 15/18 – Amendment to Table CNS-1B – ATN Router Plan**~~ ~~That, the existing Table CNS-1B provided in ASIA/PAC FASID, Part IV CNS be replaced with an updated Table contained in **Appendix C** to the Report on Agenda Item 2.2.~~	~~Amendment proposal circulated. States notified of approval.~~	~~Completed~~

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
~~C 15/19~~		~~**Conclusion 15/19 – Amendment of the Table CNS-1A – AFTN Plan**~~ ~~That, the Table CNS-1A – AFTN Plan and Chart CNS-1 reflected in Part IV CNS of the ASIA/PAC FASID be replaced with an updated Plan provided in **Appendix D** to the Report on Agenda Item 2.2. in accordance with established procedure.~~	~~Amendment proposal circulated. States notified of approval.~~	~~Completed~~
~~C 15/20~~		~~**Conclusion 15/20 – Procedure for calculation of AFTN circuit loading statistics**~~ ~~That, the guidelines for calculation of AFTN circuit loading statistics contained in Attachment A to ASIA/PAC FASID Part IV CNS be amended to add the maximum number of bytes transmitted/received on 9600 bps and 64 Kbps, X.25, AFTN circuits.~~	~~Amendment proposal circulated to States. States notified of approval.~~	~~Completed~~
~~D 15/21~~		~~**Decision 15/21 – Subject/Tasks List of the ATN Transition Task Force**~~ ~~That, the updated Subject/Tasks List of the ATN Transition Task Force provided in **Appendix E** to the Report on Agenda Item 2.2.be adopted.~~	~~Task Force notified of the approval of the Tasks List.~~	~~Completed~~
D 15/22		**Decision 15/22 – Assignment of new tasks** That, the ATN Transition Task Force be tasked to: i) develop ATN/AMHS performance characteristics as soon as possible to meet the target date of implementation of 2005; and	The Seventh Meeting of the ATN Transition Task Force (ATNTTF/7) recognized that the AMHS description document and the performance document adopted by the Task Force would provide	On-going

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
			adequate guidance on performance. In its Conclusion 7/18 the Task Force has addressed this issue and has tasked its WG to review and consider development of such document.	
		ii) establish a sunset date for AFTN service to be reflected in Part IV of the ASIA/PAC FASID.	The ATNTTF/7 considered that it would be premature at this stage to establish the sunset date for AFTN in view of the current lack of maturity and operational experience of AMHS implementation.	Closed.
C 15/23		**Conclusion15/23- Revision of the Strategy for Precision Approach and Landing Guidance Systems and the Strategy for the Implementation of GNSS Navigation Capability in the Asia/Pacific region** That, the updated Strategy for Precision Approach and Landing Guidance Systems and the Strategy for the Implementation of GNSS Navigation Capability in the Asia/Pacific region provided in **Appendices F and G** respectively, to the Report on Agenda Item 2.2 be adopted.	Strategy adopted and posted.	Completed
C 15/24		**Conclusion 15/24 - Revision of FASID Table CNS-3 by States** That, States review and revise FASID Table CNS-3 to reflect comprehensive descriptions of the future provision of radio navigation aids and that the revised entries be provided to the Regional Office by the end of May 2005.	States were requested to review and update the Table CNS-3. Response received from States is consolidated and presented to the meeting for review.	Completed

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
~~C 15/25~~		~~**Conclusion 15/25 - Airlines plan for the deployment of ADS-B**~~ ~~That, IATA be requested to conduct a survey of its member airlines' plan for the deployment of ADS-B in the Asia/Pacific region and provide result to the ADS-B Task Force Working Group to be held on 14-15 October 2004.~~	~~IATA provided information to the Task Force~~	~~Completed~~
~~C 15/26~~		~~**Conclusion 15/26 – Exchange of ADS-B surveillance data with neighbours**~~ ~~That, States be encouraged to share ADS-B surveillance data with neighbouring States and to develop mechanisms to achieve this as ADS-B ground infrastructure requirements are being identified during the design phase.~~	~~States were made aware of the need to exchange ADS-B data and are expected to consider data exchanges upon implementation of ADS-B.~~	~~Completed~~
~~D 15/27~~		~~**Decision 15/27 – Subject/Tasks List of ADS-B Study and Implementation Task Force**~~ ~~That, the Subject/Tasks List of the ADS-B Study and Implementation Task Force provided in Appendix H to the Report on Agenda Item 2.2 be adopted.~~	~~The updated Task List was brought to the attention of the Third meeting of the ADS-B Study and implementation Task Force.~~	~~Completed.~~
~~C 15/28~~		~~**Conclusion 15/28 – SADIS Internet-based FTP Service**~~ ~~That, in parallel with the satellite broadcast, the SADIS Provider State be invited, as of 1 July 2005, to make WAFS forecasts and OPMET data available, as a primary component of the SADIS service, in accordance with the SADIS User Guide, through the Internet-based FTP service.~~	~~Action taken by SADIS Provider State~~	~~Completed~~

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
	~~**ANC**~~	~~Note 1. - The development and management of this service will be overseen by the SADISOPSG and its work programme will be amended accordingly.~~ ~~Note 2. - The SADIS Cost Recovery Administrative Group (SCRAG) will be informed of the planned date of implementation.~~ ~~*Noted the conclusion and that the planned implementation date of the Internet-based FTP service, as a primary component of SADIS service, is on July 2005.*~~		
~~C 15/29~~		~~**Conclusion 15/29 – SADIS strategic assessment tables**~~ ~~That, the Asia/Pacific SADIS strategic assessment tables, as given in Appendix I to the report on this agenda item, be adopted and forwarded to the SADISOPSG for planning the future SADIS bandwidth requirements.~~	~~Tables forwarded to SADISOPSG~~	~~Completed~~
C 15/30		**Conclusion 15/30 - State's migration plans for the transition from 1G to 2G SADIS service** That, the SADIS user States in the Asia/Pacific region be encouraged to commence planning for transition from SADIS 1G to 2G to ensure that the transition can be achieved well within the agreed time scale, i.e. before the termination of the 1G service on 31 December 2008.	State letter sent to States. SADIS 2G Seminar planned for July 2006.	On-going

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
		Note: ICAO Regional Office to inform the SADIS user States by a State letter (4th quarter of 2004) and keep record of the progress of the transition to SADIS 2G.		
~~C 15/31~~		~~**Conclusion 15/31 - Annual survey of the ISCS/2 operational efficacy and nomination of ISCS Focal Points**~~ ~~That,~~ ~~a) the ISCS provider State be invited to conduct, in coordination with the ICAO Regional Office, annual surveys of the operational efficacy of the ISCS/2 in the Asia/Pacific region, starting with a survey for 2004-2005; and~~ ~~b) the ISCS user States in the Asia/Pacific region be invited to nominate operational personnel to act as an ISCS focal point to facilitate coordination of ISCS implementation matters.~~ ~~Notes:~~ ~~(1) The survey will be carried out through a survey questionnaire circulated to the ISCS user States by the ICAO Regional Office; the survey results will be analyzed by the ISCS provider State and reported to the CNS/MET Sub-group of APANPIRG.~~ ~~(2) The format of the annual survey questionnaire and summary report will be similar to those for SADIS operational efficacy in order to allow inter comparison.~~	~~Survey documentation has been prepared and coordinated with the ISCS Provider State~~ ~~First survey carried out in May/June 2005~~	~~Completed~~

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
~~C 15/32~~		~~**Conclusion 15/32 — Limited extension of the availability of WAFS forecasts in chart form beyond 1 July 2005**~~ ~~That, the WAFSOPSG be requested to consider, as a matter of urgency, the continuation of the issuance of WAFS SIGWX forecasts in a chart form, for a limited period of time after 1 July 2005 to ensure that the WAFS users be prepared to operationally use BUFR-coded WAFS products in SIGWX chart production.~~	~~Action taken by WAFSOPSG/2 meeting with Conclusion 2/12; availability of SIGWX charts extended to 1 December 2006.~~	~~Closed~~
~~C 15/33~~		~~**Conclusion 15/33 — States' actions for the migration to the operational use of GRIB and BUFR coded WAFS products**~~ ~~That, the Asia/Pacific States~~ ~~(a) be urged to complete, as a matter of urgency, the necessary preparations for the migration to the operational use of GRIB and BUFR coded WAFS products, if they have not already done so, prior to the target date for final migration to GRIB and BUFR-coded WAFS products, 1 July 2005;~~ ~~(b) be urged to review the GRIB and BUFR visualization software evaluation results available on the WAFSOPSG and SADIS websites and ensure that software packages capable of producing WAFS forecast charts fully compliant with Annex 3 are acquired; and~~ ~~(c) arrange for appropriate personnel to attend the training on the operational production of WAFS charts from GRIB and BUFR coded WAFS products provided conjointly for the SADIS and ISCS user States to be held in the Asia/Pacific region in January 2005.~~	~~States have been advised by State letters.~~ ~~Second training seminar held in January 2005.~~	~~Completed~~

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
~~C 15/34~~		~~**Conclusion 15/34 — Automatic depiction of SIGWX forecast in chart form from BUFR-coded WAFS products**~~ ~~That, the WAFSOPSG and SADISOPSG be invited to consider, as a matter of urgency, the requirement for eliminating the need for human intervention with regard to the depiction of SIGWX forecast in chart form from BUFR-coded WAFS products.~~	~~Action taken by WAFSOPSG/2 meeting with Conclusion 2/9~~	~~Closed~~
~~D 15/35~~		~~**Decision 15/35 – Terms of reference and work programme of OPMET/M TF**~~ ~~That, the terms of reference, work programme and composition of the OPMET management Task Force be amended as shown in Appendix J to this agenda item of the Report.~~	~~ToRs and work programme of OPMET/M TF have been updated~~	~~Completed~~
~~C 15/36~~		~~**Conclusion 15/36 – 12th edition of the ROBEX Handbook and 3rd edition of the ASIA/PAC ICD**~~ ~~That, ICAO Regional Office publishes the new 12th edition of the ROBEX Handbook and the new 3rd edition of the ASIA/PAC Interface Control Document for Access to the Regional OPMET Data Banks (RODB), in accordance with the established procedures.~~	~~ROBEX Handbook, 12th edition and ASIA/PAC ICD, 3rd edition published and disseminated in hard copy in November 2004; both documents available on ICAO APAC web site~~	~~Completed~~
~~C 15/37~~		~~**Conclusion 15/37 – Fostering the standardization of OPMET information in the Asia/Pacific region**~~ ~~That, the States in the Asia/Pacific region be urged to fully implement the provisions related to the format~~	~~State letter circulated~~	~~Completed~~

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
		~~of the METAR, SPECI and TAF messages and bulletins specified in the Annex 3 and in WMO Manual on Codes (WMO No. 306).~~		
~~C 15/38~~	~~C~~	~~**Conclusion 15/38 – New data type designators for bulletins containing special air-reports**~~ ~~That, in order to facilitate the exchange of the special air-reports, WMO be invited to designate a new data type designators (T1T2) for the WMO abbreviated headings of the bulletins containing special air-reports and, in particular, for special air-reports for volcanic ash.~~ ~~*Noted the conclusion and called upon the Secretary General, to invite WMO to assign, at their earliest convenience, a new data-type designator to bulletins containing special air-reports in order to ensure their proper exchange.*~~	~~Matter forwarded to WMO as the organization responsible for the aeronautical meteorological codes~~	~~Closed~~
~~C 15/39~~	~~C~~	~~**Conclusion 15/39 – Feasibility of extending the validity of TAF to 30 hours**~~ ~~That, ICAO be invited to study, in coordination with the WMO, the feasibility of the introduction of a TAF with a period of validity of 30 hours in view of the new requirements for very long haul flights.~~ ~~*Noted the conclusion and called upon the Secretary General, to study, in coordination with the WMO, the feasibility of developing provisions for Annex 3 for the introduction of a TAF with a 30-hour period of validity in view of new requirements for very long haul flights.*~~	~~Report on the trials between USA and Singapore presented at CNS/MET SG/9 meeting. Further action to be taken by the AMOS Study Group.~~	~~Closed~~

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
D 15/40		**Decision 15/40 – Planning for migration to BUFR-coded aeronautical meteorological messages** That, a) the ATN Transition Task Force and the OPMET Management Task Force be tasked to address the issues related to the transition to BUFR-coded aeronautical meteorological messages by conducting studies, as necessary; b) the two Task Forces develop in coordination a regional plan for migration to BUFR-coded aeronautical meteorological information by the end of 2005.	The matter has been addressed by the OPMET/M TF/3 meeting, March 2005 and the ATN Transition TF meeting in April 2005; joint meeting of the two groups planned for 2006.	On-going
C 15/41		**Conclusion 15/41– Designation of State volcano observatories** That, the Asia/Pacific States that maintain monitoring of active volcanoes, be invited to designate, based on the principles formulated by the IAVWOPSG/1 meeting, selected volcano observatories for inclusion in the new FASID Table MET 3C of the ASIA/PAC FASID (Doc 9673).	State letter issued. The new FASID table has been prepared. Amendment proposal to be circulated for consultation	On-going

Report Ref. Deci/Concl No. APANPIRG/15	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
~~C 15/42~~		~~**Conclusion 15/42 – Conducting SIGMET tests in the Asia/Pacific region**~~ ~~That, ICAO Regional office invite all TCAC and VAAC Provider States in the Asia/Pacific region, and all Asia/Pacific States with MWOs responsible for issuance of SIGMET for volcanic ash and/or tropical cyclones, to take part in the SIGMET tests to be carried out according to procedures developed by the VA/TC Implementation Task Force.~~	~~Two separate SIGMET tests have been conducted. The results reported at CNS/MET SG/9 meeting.~~	~~Completed~~
~~C 15/43~~		~~**Conclusion 15/43 – Improvement of issuance of SIGMET for tropical cyclones**~~ ~~That, the Asia/Pacific States be urged:~~ ~~a) in preparing SIGMET for tropical cyclone to pay due attention to the TC advisories issued by the responsible TCACs; and~~ ~~b) to provide feedback on the availability and the quality of the TC advisories provided by the responsible TCACs in order to assist in eliminating any deficiencies.~~	~~State letter circulated.~~	~~Completed~~
~~D 15/44~~		~~**Decision 15/44 - Updated Subject/Tasks List of the CNS/MET Sub-group**~~ ~~That, the updated Subject/Tasks List of the CNS/MET Sub-group presented in Appendix K to the Report on Agenda Item 2.2.be adopted.~~	~~Subject/Tasks List updated.~~	~~Completed~~

AGENDA ITEM 2: ASIA/PACIFIC AIR NAVITATION SYSTEM AND RELATED ACTIVITIES

AGENDA ITEM 2.1: ATM/AIS/SAR MATTERS

Agenda Item 2: Asia/Pacific Air Navigation System and Related Activities

2.1 **ATM/AIS/SAR Matters**

2.1.1 The meeting reviewed the report of the Fifteenth Meeting of the APANPIRG Air Traffic Management/Aeronautical Information Services/Search and Rescue Sub-group (ATM/AIS/SAR/SG/15), which was held at the ICAO Asia/Pacific Regional Office, Bangkok, Thailand from 25 to 29 July 2005. A full copy of the meeting report is available on the web site of the ICAO Asia/Pacific Office - http://www.icao.int/apac/. The meeting expressed its appreciation for the many tasks that had been addressed by the Sub-Group since reporting to APANPIRG/15 last year.

Terms of Reference of the ATM/AIS/SAR/SG

2.1.2 ATM/AIS/SAR/SG/15 reviewed its Terms of Reference (TOR) as amended by APANPIRG/15 (APANPIRG Decision 15/19 refers), based on the recommendation of ATM/AIS/SAR/SG/14 in respect of the dissolution of the CNS/ATM/IC Sub-Group, and agreed that these satisfactorily covered the work programme of the Sub-Group.

RVSM Implementation

2.1.3 The meeting reviewed the work of the RVSM Task Force (RVSM/TF) established by APANPIRG to implement and follow-up on implementation of RVSM in the Asia/Pacific Region. Five Task Force meetings, two special coordination meetings and one RVSM seminar had been held since the activities of the RVSM/TF were reported to APANPIRG/15 (August 2004), as shown below:

a) Special ATS Coordination Meeting: 5 - 7 July 2004, Bangkok, Thailand
(RVSM Implementation in the Incheon, Naha and Tokyo FIRs)

b) RVSM/TF/22: 20 - 24 September 2004, Bangkok, Thailand
(Review of flight level orientation schemes - FLOS)

c) RVSM/TF/23: 18 - 22 October 2004, Bangkok. Thailand
(RVSM Implementation in the Incheon, Naha and Tokyo FIRs)

d) RVSM/TF/24: 8 - 12 November 2004, Bangkok. Thailand
(One-year Review of Bay of Bengal and Beyond Implementation)

e) Sixth RVSM Seminar: 21 - 22 March 2005, Incheon, Republic of Korea

f) RVSM/TF/25: 23 - 25 March 2005, Incheon, Republic of Korea
(RVSM Implementation in the Incheon, Naha and Tokyo FIRs)

g) Special ATS Coordination Meeting: 29 – 30 May 2005, Kunming, China
(RVSM procedures between China and Myanmar)

h) RVSM/TF/26: 4 - 8 July 2005, Tokyo, Japan
(Go/No-go Decision for the Incheon, Naha and Tokyo FIRs)

2.1.4 It was anticipated that during 2006 RVSM/TF meetings would be required to address the 90-day review of the Japan/Republic of Korea implementation (January/February), the Western Pacific/South China Sea (WPAC/SCS) Flight Level Orientation Scheme (FLOS) review (approximately April), and the one-year review of the Japan/Republic of Korea implementation (approximately September).

Special ATS Coordination Meeting (SCM) – Japan/Republic of Korea

2.1.5 The SCM was convened from 5 to 7 July 2004 to assist Japan and Republic of Korea in their RVSM implementation planning for the Incheon FIR and the domestic airspace of the Naha and Tokyo FIRs. As the Pacific Aircraft Registry and Monitoring Organization (PARMO) was occupied with preparations for the implementation of RVSM in the domestic airspace of the United States, and in view of the urgency to progress the readiness and safety assessment for the Incheon FIR, the Monitoring Agency for Asia Region (MAAR) agreed to undertake the operational readiness and safety assessment work involved.

RVSM/TF/22 – Review of the Flight Level Orientation Scheme (FLOS) for the West Pacific/South China Sea (WPAC/SCS) area

2.1.6 RVSM/TF/22 (September 2004) reviewed the operation of RVSM in the airspace concerned and the effects of applying different FLOS, thus requiring transition areas to be operated. Recognizing the need to maintain safety, efficiency and regularity of operations in the WPAC/SCS area, RVSM/TF/22 developed a provisional revised plan based on proposals submitted by the Philippines and Thailand to revise the assignment of levels and corresponding No-Pre-Departure Coordination (No-PDC) procedures.

2.1.7 Subsequent to RVSM/TF/22, as a result of some States not providing the agreed safety related data to MAAR in time to complete a safety assessment, a follow-up meeting had to be postponed and has been tentatively rescheduled in April 2006 after implementation of RVSM by Japan and Republic of Korea. This would lead to a 12 month delay before implementing the revised FLOS arrangements in the WPAC/SCS as identified by RVSM/TF/22.

RVSM/TF/23 – Japan/Republic of Korea

2.1.8 RVSM/TF/23 (October 2004) progressed the implementation plan for the Incheon, Naha and Tokyo FIRs and reviewed the readiness of Japan and the Republic of Korea to implement RVSM. Both States reported that preparations for the introduction of RVSM were progressing well. RVSM/TF/23 agreed that an RVSM seminar should be held to provide operators and ATS providers with information on the requirements for RVSM operations, and the Republic of Korea offered to host the seminar at Incheon, Republic of Korea in conjunction with the RVSM/TF/25.

RVSM/TF/24 – One Year Review Bay of Bengal

2.1.9 RVSM/TF/24 (November 2004) carried out the one-year review of RVSM operations in the Bay of Bengal and Beyond, following implementation on 27 November 2003. MAAR presented the annual report of airspace safety review of RVSM implementation and operations in the Bay of Bengal and Beyond area, and RVSM/TF/24 noted that the results of the risk calculations were well within the agreed Target Level of Safety (TLS).

2.1.10 RVSM/TF/24 reviewed the completion of tasks relating to the implementation of RVSM in the Bay of Bengal and Beyond area, and all the tasks were successfully completed and closed, or reassigned appropriately. Accordingly, RVSM/TF/24 declared full RVSM capability in the Bay of Bengal airspace.

RVSM/TF/25 – Japan/Republic of Korea Implementation

2.1.11 RVSM/TF/25 (March 2005) progressed RVSM implementation in the Incheon, Naha and Tokyo FIRs. Following further discussions on the flight level allocation for A593 and B576,

Japan and the Republic of Korea reached agreement to implement RVSM based on the current flight level allocation system and include RVSM levels on ATS Routes A593 and B576.

Sixth Asia/Pacific RVSM Seminar

2.1.12 The Sixth Asia/Pacific RVSM Seminar (RVSM Seminar/6) was held on 21 and 22 March 2005 at Incheon, Republic of Korea in conjunction with RVSM/TF/25. The Seminar highlighted the need for States to undertake due diligence in regard to the safety management requirements established by ICAO for RVSM.

Special ATS Coordination Meeting (SCM) – China/Myanmar

2.1.13 The SCM China/Myanmar (May 2005) conducted a post implementation review in relation to the implementation of a revised operational letter of agreement (LOA) between Kunming ACC and Yangon ACC. The transition procedures had been improved by removing the double transition between RVSM to CVSM to China metric levels and vice versa to permit transition directly between RVSM and China metric flight levels. China and Myanmar signed a Supplement to the Operational LOA and a Memorandum of Understanding between the parties to record and implement the procedures agreed during the SCM.

RVSM/TF/26 − Japan/Republic of Korea Go/No Go Meeting

2.1.14 RVSM/TF/26 reviewed the results of readiness assessments and noted that approximately 75 percent of aircraft operations would be conducted by State RVSM approved operators and aircraft. RVSM/TF/26 noted that approximately 92 percent of aircraft operations would be RVSM approved by 29 September 2005.

2.1.15 RVSM/TF/26 noted that the risk calculation undertaken by MAAR for the RVSM implementation by Japan and ROK would exceed the agreed overall TLS due to a single Large Height Deviation (LHD) event of long duration. In light of the preventive actions subsequently taken by Japan and the fact that it was an isolated case, RVSM/TF/26 agreed that this LHD occurrence could be excluded in the risk calculation.

2.1.16 Accordingly, based on the updates provided by Japan and the Republic of Korea as well as the safety assessments completed by MAAR, RVSM/TF/26 agreed to switchover from CVSM to RVSM in the Incheon, Naha and Tokyo FIRs at 1900 UTC on 29 September 2005.

RVSM Issues

Assessment of Non-Approved Operators Using Pacific RVSM Airspace

2.1.17 PARMO briefed ATM/AIS/SAR/SG/15 (July 2005) in respect to a comprehensive study that they had undertaken into the identification of non-RVSM approved operators using Pacific airspace where the RVSM is applied. As a result of the study, PARMO had identified a number of potentially non RVSM approved aircraft that had been operating in RVSM exclusive airspace and had comprehensively summarized all cases of the identified operators and aircraft types.

2.1.18 The meeting endorsed PARMO's proposal that a copy of the study be provided to the appropriate Asia and Pacific State civil aviation authorities (CAAs), and that the CAAs investigate the RVSM approval status of the identified operators and aircraft that were under their jurisdiction.

Formation Flights in RVSM Airspace

2.1.19 The United States Department of Defense (DoD) advised ATM/AIS/SAR/SG/15 of action taken in the United States to accommodate formation flights of military aircraft that were RVSM compliant in RVSM airspace. The Unites States informed that the RVSM separation standard was applied to a formation flight which consists of all RVSM approved aircraft based on an FAA Notice (7110.406, effective 12 May 2005) but did not apply to RVSM compliant aircraft conducting aerial refueling.

2.1.20 The meeting noted the procedures developed and applied by the United States for formation flights in RVSM airspace. To date, these procedures had not been adopted by ICAO for universal application and individual States would need to consider the applicability of applying such procedures in their domestic airspace.

Regional Airspace Safety Monitoring Advisory (RASMAG)

2.1.21 The meeting recalled that the establishment of RASMAG resulted from the initiatives of APANPIRG under Decision 14/48 in addressing the inclusion by ICAO of safety management provisions in Annex 11 -*Air Traffic Service* and the extensive implementation of reduced separation applications. The RASMAG/2 meeting was held in October 2004 and RASMAG/3 in June 2005, and a 3-day ATS Safety Management Seminar was conducted in conjunction with RASMAG/3.

APANPIRG/15 Review

2.1.22 In reviewing the work of APANPIRG/15 (August 2004), RASMAG/2 noted APANPIRG Decision 15/5 to adopt the term safety monitoring agency (SMA) for safety monitoring of horizontal separation applications. Upon reviewing Decision 15/5, RASMAG/2 identified a need to amend the wording. Accordingly, the meeting adopted the following Decision:

Decision 16/1 – Safety Monitoring Agency (SMA)

That, the term Safety Monitoring Agency (SMA) be used to describe an organization approved by regional agreement to provide airspace safety monitoring and implementation services for international airspace in the Asia/Pacific region for implementation and operation of reduced horizontal separation.

Funding arrangements for regional airspace safety monitoring

2.1.23 The meeting noted the emphasis placed by RASMAG/3 on addressing how States could best organize and finance the safety monitoring services necessary for the international airspaces in the region, such as for the application of RVSM and reduced horizontal separation. The meeting further observed that the expertise required for safety monitoring activities was not readily available in each State, requiring States to collaborate in the provision of safety services and to work towards establishing suitable mechanisms for the funding of multinational infrastructure and services.

2.1.24 In discussing experiences in establishing safety monitoring services on a regional basis, it was observed that progress was being made to provide for CRA services for the Bay of Bengal. The meeting was advised that the funding model developed for the CRA had limited applicability and was designed specifically to meet an urgent need to engage highly specialized expertise required to perform the service on behalf of the participating States as the ADS/CPDLC operational trials had already commenced in February 2004.

2.1.25 The meeting was advised by Thailand that MAAR would be willing to accept the responsibility of additional safety management tasks in the areas they are currently appointed as RMA, specifically in the role of an organization approved by regional agreement to provide airspace safety services in international airspace in the Asia/Pacific Region for implementation and operation of reduced horizontal separation. Noting that Thailand would need the support of other States in financing any such expansion, Thailand was urged to develop its proposal further.

2.1.26 It was noted that the United States had informed ISPACG/19 that the FAA would discontinue funding of the ISPACG CRA in September 2005 and other funding arrangements would be necessary. The Secretariat also drew attention to the serious concerns that had been expressed recently by ICAO in respect of the non-availability of RVSM safety monitoring services in the Middle East (MID) Region. This situation in the MID Region had led the Secretary General of ICAO to notify MID States, via State Letter, that unless a concrete action plan was developed by affected States, the withdrawal of RVSM operations from the MID Region would be considered by ICAO. Subsequent actions by MID States had now averted this scenario.

2.1.27 Notwithstanding the difficulties involved, the meeting recognized the urgent need to develop feasible and sustainable funding solutions for regional safety monitoring so that on-going initiatives to carry out trials and to implement CNS/ATM systems in Asia/Pacific would not be delayed and that safety and efficiency were not compromised. Recalling that APANPIRG's CNS/ATM technical experts had previously found it difficult to resolve the complex legal, financial and organizational issues involved in establishing a regional safety monitoring agency, the meeting considered that this matter should be addressed by States' experts in these specialist fields.

2.1.28 In light of the foregoing, the meeting agreed to the following Conclusion:

Conclusion 16/2 – Funding arrangements for regional airspace safety monitoring

That, a study group be convened to develop a feasible and sustainable proposal to equip States to organize and finance necessary safety monitoring mechanisms for the provision of safety services for the international airspaces in the Asia/Pacific region and that States be represented at that meeting by their appropriate legal, financial and organizational experts who would be best equipped and empowered to resolve any difficulties. The study group should report to RASMAG not later than the end of June 2006.

Report of Australia's RMA activities

2.1.29 Australia reported that, for RVSM operations, overall assessed risk during 2004 did not meet the Target Level of Safety (TLS). The operational errors recorded in the 12 month period to December 31, 2004 resulted in an estimate of risk due to operational errors that exceeded the TLS in both Australian domestic RVSM airspace and Indian Oceanic RVSM airspace.

2.1.30 Australia confirmed to RASMAG/3 that although the TLS had been exceeded in the Australian FIRs during 2004, an inspection of the operational error data indicated that this was a direct consequence of three or four large height deviations (LHD - vertical excursion of 300 ft or more). Airservices Australia had investigated the circumstances surrounding these incidents by formal process, with the result that specific recommendations and actions had been identified and were being implemented in an effort to reduce the likelihood of similar incidents occurring in the future.

2.1.31 The meeting was informed that since RASMAG/3, a follow up safety assessment using data post December 2004 had been completed by Airservices Australia. The follow up safety assessment results satisfied the TLS and this was expected to be maintained.

Report of PARMO's RMA activities

2.1.32 The PARMO briefed RASMAG/3 in respect of their activities and presented their quarterly report for review by the meeting. The report detailed safety monitoring outcomes for the Pacific RVSM airspace over the first quarter of 2005. RASMAG/3 was advised that while most States involved had provided the necessary data to enable suitable safety analysis, some States had not provided any data. RASMAG/3 noted with concern the lack of routine provision of LHD reports from some States (including 'NIL' reports) and the fact that 2 States had not reported any data since April 2004.

2.1.33 PARMO informed RASMAG/3 that the analysis indicated that the overall RVSM vertical collision risk for the Pacific was approximately 67 percent below the TLS.

Report of MAAR's RMA activities

Bay of Bengal

2.1.34 MAAR presented a report to RASMAG/3 on their review of airspace safety for the RVSM implementation in the Bay of Bengal (BOB) area. MAAR noted that there were a number of instances where some States had not provided the required data for analysis. However, MAAR considered that the lack of data, while of note, did not impact significantly on the review in a statistical sense. MAAR reported that the Bay of Bengal airspace overall risk satisfied the TLS.

Western Pacific/South China Sea (WPAC/SCS)

2.1.35 MAAR informed RASMAG/3 that in the case of the WPAC/SCS airspace there were significant issues regarding the lack of data provision by States which directly impacted on the level of confidence that could be placed in the results of the safety assessment.

2.1.36 The WPAC/SCS review showed an increase in LHD since 2003, and MAAR noted that 85 percent of the reports related to issues with ATC-unit to ATC-unit transfer/transition messages. MAAR reported that the overall risk for the WPAC/SCS area was provisionally assessed as 4.9×10^{-9}, compared to the required TLS of 5×10^{-9} fatal accidents per flight hour. MAAR was significantly concerned that the TLS may have been exceeded given the calculated high risk value and the fact that there was a significant amount of data unavailable from some States.

2.1.37 In considering the information provided by MAAR in respect of the LHDs occurring in the WPAC/SCS area, the meeting agreed with the strong concern that had been expressed by MAAR, RASMAG/3 and the ATM/AIS/SAR/SG/15 and agreed to the following Conclusion:

Conclusion 16/3 – Large Height Deviations – Western Pacific/South China Sea area

That, in noting the prevalence of RVSM large height deviation occurrences in the Western Pacific/South China Sea area, the Regional Office draw the attention of all States concerned to identify and put in place remedial actions to mitigate such significant errors on an urgent basis.

What is meant by a Target Level of Safety (TLS)?

2.1.38 In view of the fact that the TLS had been exceeded in areas under the jurisdiction of the Australian RMA and in the WPAC/SCS area as reported by MAAR, RASMAG/3 considered the question of what the term TLS actually meant and the action to be taken if the outcomes of airspace safety monitoring determined that the TLS had been exceeded.

2.1.39 RASMAG/3 reviewed references in Annex 11, the *Air Traffic Services Planning Manual* (Doc 9426) and the *Manual on Airspace Planning Methodology for the Determination of Separation Minima* (Doc 9689) in this respect, noting guidance in respect to the derivation and application of TLS.

2.1.40 Accordingly, RASMAG/3 considered that a single event, in which airspace safety monitoring identified that the TLS had been exceeded, was not sufficient cause to cease the application of the separation minimum. However, it would be important to continue closely monitoring and re-assessing the safety level on a regular basis to ensure that there was not an unsafe trend. RASMAG/3 recognized the importance of providing guidance to States in respect of the TLS issues discussed above and agreed to add an item to the RASMAG Task List in this regard, for future action.

Annual December Traffic Sampling Requirements

2.1.41 In considering the requirements for routine safety assessments, RASMAG/2 agreed that an annual provision by States of traffic sample data as well as LHD and Gross Navigational Error (GNE) reports was sufficient for vertical and horizontal analysis. RASMAG/2 agreed that as the month of December routinely experienced high traffic levels, this should be adopted as the standard sample period for traffic sample data collection, commencing from December 2005.

2.1.42 Data should be sampled and recorded in accordance with the requirements, as amended from time to time, of regional safety monitoring agencies, including RMAs, during December every year and as required for specific purposes. In endorsing the use of a standardized approach to the sampling of vertical and horizontal traffic data, the meeting drafted the following Conclusion:

Conclusion 16/4 – Traffic Sample Data Collection

That, States be advised by the Regional Office that December every year had been adopted for the routine collection of 30 days of traffic sample data to satisfy airspace safety monitoring requirements.

Safety assessment for RNP10 Operations in the SCS area

2.1.43 RASMAG/3 recalled that a safety analysis had been carried out by Airservices Australia prior to the implementation in November 2001 of the revised South China Sea route structure based on RNP 10. The safety assessment results were below the required TLS of 5×10^{-9} fatal accidents per flight hour and, accordingly, the SCS route network was implemented.

2.1.44 At subsequent reviews by the SCS/TF/7 (January 2002) and SCS/TF/8 (December 2002), it was agreed that a further safety assessment for RNP 10 operations in the revised South China Sea ATS route structure based on the actual traffic movement should be conducted. Accordingly, SEACG/11 (May 2004) agreed to update the safety assessment and also noted that RASMAG/1 had identified a need for a safety monitoring group to be responsible for safety assessment activities, and that there would be a need to designate such a safety organization for the SCS area.

2.1.45 SEACG/12 (May 2005) noted the delays in updating the safety assessment, acknowledging that as no updated safety assessment had been undertaken since before the implementation of the route system in November 2001, a review of the safety assessment was long overdue. SEACG/12 noted the very limited number of parties that could undertake this complex assessment work and requested the assistance of RASMAG in solving the issue.

2.1.46 RASMAG/3 agreed that, with three parties Australia, Japan and Thailand (MAAR) potentially able to undertake the services on behalf of affected States, it was likely that the next RASMAG meeting scheduled in October 2005 would be in a position to be updated as to the capabilities of each party and make decisions accordingly.

2.1.47 The Regional Office noted that the selection of a person or agency that was able to conduct the safety assessment was step one of a two step process. The second step required the provision of suitable data on which to base the safety assessment and this would require affected South China Sea States to undertake traffic sample data collection in accordance with the parameters specified by the party that would be completing the safety assessment work. Although the safety assessment was already long overdue, the meeting considered that it was appropriate that RASMAG be involved in the process and, as the selection of the party to undertake the safety assessment would be addressed at the October meeting of RASMAG, collection of suitable traffic sample data could be accomplished in December in accordance with the standardized sampling period established by RASMAG.

Delay to the Review of FLOS in the WPAC/SCS Area

2.1.48 The meeting was informed that during the review by RVSM/TF/22 (September 2004) of the regional flight level orientation schemes (FLOS) issues, States agreed to a work programme aimed at reviewing and amending the modified single alternate FLOS presently in use in the WPAC/SCS areas. This became necessary due to difficulties being experienced with transition procedures at the interface with the modified single alternate FLOS arrangements in use in the WPAC/SCS area after implementation of RVSM in the Bay of Bengal and Beyond area in November 2003 using a single alternate FLOS

2.1.49 In spite of frequent reminders by MAAR and a State letter issued by the Regional Office, several States responsible for significant portions of the airspace in the WPAC/SCS area failed to submit the required data in time for MAAR to complete the safety assessment in time for the FLOS review meeting scheduled April 2005. In the absence of the MAAR safety assessment, no change to the existing FLOS arrangements could be authorized and the April 2005 FLOS review meeting was postponed. The earliest date at which the meeting could be scheduled was April 2006.

2.1.50 RASMAG/3 recognized that the non provision of safety data by some States and consequent delay to completing the safety assessment would lead to a deferment of at least 12 months in the implementation of any proposed changes to the SCS FLOS.

2.1.51 In recalling the large number of LHDs occurring in the WPAC/SCS, the meeting expressed very strong concerns that arrangements agreed at RVSM/TF/22 were expected to assist in reducing the numbers of LHDs and therefore should be progressed with the minimum of delay.

Non Submission by States of Safety Related Data

2.1.52 RASMAG/2 (October 2004) was concerned that some States had failed to fulfill their obligations towards ICAO safety requirements for ongoing operation of RVSM, noting a number of disturbing issues that had been identified by MAAR and PARMO that required urgent follow up:

a) missing traffic sample data;

b) missing large height deviation reports;

c) incomplete and non-reporting of State RVSM approvals registry data; and

d) incomplete information on follow-up monitoring of aircraft height-keeping performance in accordance with the minimum monitoring requirements.

2.1.53 On the recommendation of RASMAG/2, the Regional Office issued a letter during early December 2004 to 13 States of the Asia/Pacific Region who had not submitted data required to MAAR and PARMO, and requested immediate submission of safety data. Whilst many States provided safety data in response to the letter, some States have still not provided data.

2.1.54 In accordance with the concerns raised by RASMAG/2 in respect of the non provision of data by States, the Regional Office had presented a discussion paper during the 41st Conference of the Director Generals of Civil Aviation of the Asia/Pacific Region held in Hong Kong, China during November 2004. In respect of this discussion paper, RASMAG/3 noted that the Report of the 41st DGCA's Conference recorded the concerns that had been raised by RASMAG under Action Item 41/6:

DGCA Action Item 41/6

Recognizing the ICAO provisions on implementing Safety Management Systems, the Conference urged all Administrations in the Asia/Pacific Region to fully support the APANPIRG Regional Airspace Safety Monitoring Advisory Group (RASMAG)

Action on Safety Deficiencies

2.1.55 The Regional Office informed RASMAG/3 that the follow up actions continually undertaken by the Regional Office and regional RMAs in an effort to ensure States provided suitable safety data in respect of their safety monitoring responsibilities under Annex 11 were excessive and could not be sustained.

2.1.56 RASMAG/3 had also expressed significant concern in respect of the non-provision of data, drafting the following statement for consideration by APANPIRG/16:

RASMAG is aware that despite efforts to encourage States to provide data to enable the assessment of mandated safety targets for the implementation of reduced separation minima, some States have not met their responsibilities.

RASMAG considers that the failure of some States to provide monitoring data as required in accordance with Annex 11 provisions and Regional Supplementary Procedures (Doc 7030), has led to an inability to update required safety assessments. This leads to a lack of confidence in the safety of the operating system, in particular with respect to reduced separation applications i.e. an inability to demonstrate whether target levels of safety are being achieved.

2.1.57 The meeting considered the draft conclusions proposed by RASMAG in this respect and agreed to the following:

Conclusion 16/5 – No implementation of reduced separation unless compliant with Annex 11

That, recognizing that some States had not adequately complied with safety management provisions, the Regional Office advise States of the Asia/Pacific Region that further regional implementation of reduced separation minima should only proceed in circumstances where implementing States can demonstrate an ability to comply with Annex 11, Chapter 2, safety management provisions for the continuous monitoring and regular assessment of the safety level achieved.

Conclusion 16/6 – Non Provision of safety related data by States

That the Regional Office advise that States not providing safety related data to approved regional safety monitoring agencies, including RMAs, in accordance with the requirements of safety monitoring agencies will be included in the APANPIRG List of Deficiencies in the ATM/AIS/SAR fields.

Approval of Amendment 43 To Annex 11 and complementary amendments to Annex 6

2.1.58 The meeting was informed of amendments to Annex 11 – *Air Traffic Services* and Annex 6 − *Operation of Aircraft*, with applicability date 24 November 2005, introducing a Standard that required States to establish a monitoring programme for aircraft height keeping performance in RVSM airspace. Complementary provisions have been added to Annex 6, which specify the responsibility of the relevant State authority to take prompt and appropriate action if the monitoring results indicate that the height keeping performance of a particular aircraft or an aircraft type group exceeded prescribed limits.

RASMAG ATS Safety Management Seminar

2.1.59 A 3-day RASMAG ATS Safety Management Seminar was conducted by RASMAG from 8 to 10 June 2005 at the Asia/Pacific Regional Office. The objective of the seminar was to raise the awareness of States in the Asia/Pacific Region in relation to the ICAO provisions regarding safety management systems, with emphasis on compliance with Annex 11 provisions regarding the implementation of systematic and appropriate ATS safety management programmes.

2.1.60 In convening the seminar, RASMAG/3 noted that the original proposal had included provision for the seminar material to form the basis for a small team of experts to travel to States and provide on site safety management training. RASMAG/3 was informed that, despite the generous commitment of IATA to assist with travel arrangements, the concept of presenting a traveling safety workshop to States of the region could not proceed as a result of the resource limitations of the Regional Office and some of the States involved.

2.1.61 The Regional Office would distribute the seminar presentations on a CD-ROM to States. However, whilst recognizing the value of a CD-ROM, RASMAG/3 acknowledged that simply reading the material on the CD would be of significantly less value than hearing the commentary that went with the CD presentations and proposed that arrangements be made to produce a video or DVD of the seminar. As it was too late to make these arrangements for this seminar, the meeting elected to pursue the idea further at a later time. The matter was included in the RASMAG task list.

Implementation of ATS Routes in the Asia/Pacific Region,

2.1.62 The meeting reviewed progress by the ARNR/TF to undertake the review of the Asia/Pacific ATS route network called for under APANPIRG/14 (August 2003) Conclusion 14/5. APANPIRG/14 agreed that there was a need to thoroughly review and update the Asia/Pacific Basic Air Navigation Plan (Doc 9673), prepare a master database of the routes that had been implemented, update the five-letter name-codes and co-ordinates that had been assigned to the significant points on the ATS routes, and undertake a study of future route requirements.

2.1.63 In regard to the outstanding routes in the BANP that had been agreed to by the Third Asia/Pacific Regional Air Navigation Meeting (RAN/3) in 1993 and not implemented, these routes were included on the APANPIRG List of Deficiencies. APANPIRG/15 (August 2004) had agreed that these would be included in the ARNR/TF review.

First Meeting of the ATS Route Network Review Task Force (ARNR/TF/1)

2.1.64 ARNR/TF/1 (September 2004) noted that there was an urgent need to update the *Air Navigation Plan – Asia and Pacific Regions* (Doc 9673), Volume I, Basic Air Navigation Plan (BANP) to include a large number of changes to the ATS routes in the region that had occurred after the First Edition of the BANP in 2000 was compiled. To date, the ANP has not been published but was expected to be issued by ICAO in late 2005. In order to establish a regular process for reviewing the ATS route network in the region, ARNR/TF/1 agreed to establish the *Asia/Pacific ATS Route Catalogue*. The draft Catalogue was developed to include five chapters as follows:

Chapter 1: Routes in BANP − Implemented

Chapter 2: Routes in BANP − Not Implemented

Chapter 3: Routes Implemented − Not in the BANP/or not in accordance with the BANP

Chapter 4: Future Requirements − States

Chapter 5: Future Requirements − Users

2.1.65 In considering the future role of the Task Force, ARNR/TF/1 recognized that the primary work would be to update the ATS routes requirements in the BANP, the route designators and five-letter name-code database, and identify and process State and user requirements for future routes. ARNR/TF/1 considered the Task Force's role in regard to implementation of routes and,, as this was the primary responsibility of States, agreed ARNR/TF would not be required to undertake the implementation work as it would overlap with the responsibility of the States and ATS Coordination Groups.

2.1.66 ARNR/TF/1 also initiated the review of the APANPIRG/15 List of Deficiencies with regard to ATS routes with the information that was provided by States on action taken so far as well as proposed remedial actions. It was further noted that the APANPIRG/15 List of Deficiencies contained a number of routes that could not be implemented.

Second Meeting of the ATS Route Network Review Task Force (ARNR/TF/2)

2.1.67 ARNR/TF/2 (February 2005) continued the review of the APANPIRG List of Deficiencies in respect to ATS routes. ARNR/TF/2 reviewed the route requirements submitted by States and users, identified and progressed route improvements, and updated the Catalogue

accordingly. The Catalogue was further improved and expanded in light of discussions. ARNR/TF/2 adopted Version 0.1 of the Catalogue as updated and raised a significant number of BANP amendment proposals in respect of route implementation.

2.1.68 ARNR/TF/2 recognized that as the ATS route network in the region had been reviewed and revised, which has been reflected in the ATS Route Catalogue, ARNR/TF considered that the status of a number of routes as shown in the deficiency list was no longer applicable and hence they could no longer be termed a deficiency.

Third Meeting of the ATS Route Network Review Task Force (ARNR/TF/3)

2.1.69 ARNR/TF/3 (May 2005) continued its work to update and finalized the layout and content structure of the Catalogue, and to review the route requirements of States and users. All material in Chapters 1, 2 and 3 of the ATS Route Catalogue was in respect to the BANP, and would be developed and amended in accordance with established ICAO procedures. In regard to material in Chapters 4 and 5, this would require some additional prior approval processes and could not simply be submitted to the Regional Office on an ad hoc basis by the originator.

2.1.70 ARNR/TF/3 noted that States would submit their route proposals in accordance with established ICAO procedures. In the case of route proposals by IATA member airlines, these would be submitted to IATA for processing in accordance with their established practices. ARNR/TF/3 adopted Version 0.2 of the Catalogue to be presented to ATM/AIS/SAR/SG/15 for further updating, endorsement and presentation to APANPIRG/16.

2.1.71 ARNR/TF/3 recalled that APANPIRG/15 had tasked ARNR/TF to prepare a master database of the routes that had been implemented. ARNR/TF/3 agreed that, as the data required was now provided in the Catalogue, there was no longer a need for the Regional Office to compile and maintain a separate master database, and therefore it should be discontinued. In addition, data was available from State AIPs and data services providers in respect of additions to the Catalogue.

2.1.72 In reviewing its work to date, the ARNR/TF/3 agreed that the ARNR/TF had met the Terms of Reference established by APANPIRG/14, that its work had been substantially completed and outstanding issues had been assigned to the ATS Coordination Groups as appropriate.

Developments by the ARNR Task Force

2.1.73 The meeting reviewed the above information provided by ARNR/TF and ATM/AIS/SAR/SG/15. In particular, the meeting noted the discussion regarding the ATS routes contained on the APANPIRG List of Deficiencies that were no longer applicable as a result of the revision of ATS routes undertaken by ARNR/TF. Accordingly, the meeting adopted the following conclusion:

Conclusion 16/7 – Deletion of ATS Routes from the APANPIRG List of Deficiencies

That, the ATS routes in the APANPIRG List of Deficiencies, which are no longer applicable to the List as a result of revision of ATS route network and have been incorporated in the *Asia/Pacific ATS Route Catalogue*, be deleted from the APANPIRG List of Deficiencies in the ATM/AIS/SAR fields.

2.1.74 The meeting considered the position that the Regional Office did not need to compile and maintain a separate ATS route master database and that this work should be discontinued. Accordingly, the meeting decided that:

Decision 16/8 – To Discontinue the Development of ATS Route Master Database

That, as the ATS route data required was provided in the *Asia/Pacific ATS Route Catalogue* and was available from other sources, the development of the ATS Master Database by the Asia and Pacific Regional Office be discontinued.

2.1.75 The meeting considered that the intent of the ARNR/TF and the ATM/AIS/SAR/SG/15 in regard to the status and effective use of the ATS Route Catalogue would be captured in the terms of the following Decision:

Decision 16/9 – Acceptance of the Asia/Pacific ATS Route Catalogue

That, the *Asia/Pacific ATS Route Catalogue* as shown in **Appendix A** to the Report on Agenda Item 2.1 be accepted as a regional planning tool and be maintained and updated on regular basis.

2.1.76 The meeting considered that the ongoing work to implement routes was a high priority of States and users and therefore developed the following Conclusion:

Conclusion 16/10 – Review of ATS Route Catalogue by States

That, the States concerned study the routes in the *Asia/Pacific ATS Route Catalogue* in respect to the feasibility of the route requirements, in order to consider their implementation with appropriate priorities, and to raise route implementation proposals at relevant ATS Coordination Meetings in the Asia/Pacific Region.

2.1.77 The meeting noted that ATM/AIS/SAR/SG/15 and ARNR/TF/3 had considered that the Task Force had successfully met its Terms of Reference established by APANPIRG/14 and should be disbanded. The meeting, on reviewing the outcomes of the ARNR/TF, agreed to disband the ARNR/TF. Accordingly, the following Decision was formulated:

Decision 16/11 – To Disband the ARNR Task Force

That, as the ARNR/TF had completed the tasks assigned by APANPIRG/14, and all outstanding issues have been identified and follow up actions completed or assigned to other ATS coordination groups as appropriate, the ARNR Task Force be disbanded.

Simplified Tool for Assessing Environmental Emissions

2.1.78 In undertaking its work in regard to the review of the regional ATS route network, ARNR/TF recalled that APANPIRG/15 had been updated in regard to the work of the Committee on Aviation Environmental Protection (CAEP) and that the Council of ICAO had considered recommendations in relation to engine emissions arising from CAEP/6 (February 2004). APANPIRG/15 was appraised of the considerable effort that had been made by CAEP to estimate the impact of aviation emissions and to develop sophisticated emissions models, however noted the advice of CAEP that a more practical tool would be necessary to respond to specific needs at the national level.

2.1.79 In considering an appropriate simplified tool for use by ARNR/TF in estimating the environmental benefits of variations to ATS route structures, ARNR/TF reviewed available guidance

material, including IATA's *Guidance Material and Best Practices for Fuel and Environmental Management* (1st Edition, December 2004). Subsequently, ARNR/TF developed, and applied where possible, a simplified tool that utilised the average emissions from an average jet engine in cruise configuration at high level to approximate the savings in undesirable emissions that were expected to be achieved. Given the wide variety of aircraft types operated in the Asia/Pacific Region, the emissions calculations contained in the ATS Route Catalogue utilized the following average figures, which approximate those of a B777 in cruise flight:

- 1 minute of flight = 8 NM = 130 kg of fuel; and
- 1 kg of fuel produces 3.07 kg of CO_2

2.1.80 The meeting noted that by adapting the simplified approach adopted by ARNR/TF, cost benefit analyses could readily be undertaken by applying the track distance and associated fuel savings against the current costs of aviation fuel. The meeting recognized that CAEP would ultimately be able to input the track distance savings identified by the Task Force and recorded in the ATS Route Catalogue into more complex emissions models if required.

Designators for ATS Routes

2.1.81 The meeting was informed that, on reviewing amendment proposals submitted to the Regional Office, a number of cases of non-compliance with Annex 11, Appendix 1 in regard to the assignment of ATS route designators had been identified. In some cases, a letter had been added as a suffix to the designator to indicate a flight direction of "N", "E", "S" or "W", e.g. R460E and R460W. Also, there were cases where another letter was added as a suffix to indicate a branch route, e.g. B465A.

2.1.82 The meeting agreed that States should comply with ICAO provisions and change non-compliant route designators accordingly. The Regional Office maintains a list of unique ATS route designators available for assignment to States in the Asia/Pacific Region. This avoids duplication with other regions and States were requested to coordinate with the Regional Office to change designators as necessary.

Realignment of ATS routes A1 and P901 in the Sanya AOR

2.1.83 China informed ATM/AIS/SAR/SG/15 that they had completed a major study to realign A1 and P901 in the southwest area of the Sanya AOR, which took into account requirements for the route protected area, adjustment of the danger areas and the operating requirements of the new route.

2.1.84 The meeting supported the need for improvements in relation to flight operations on A1 and P901. ATM/AIS/SAR/SG/15 had discussed the route realignment proposal, which should be progressed as soon as possible. Further coordination with the States, ICAO and users concerned would be necessary to finalize the route and implementation details.

Traffic saturation on L642 and M771 – South China Sea Route Parallel Structure

2.1.85 Singapore alerted ATM/AIS/SAR/SG/15 to the dramatic increases in traffic volume that had been experienced on ATS routes L642 and M771 in the South China Sea parallel route structure. Singapore considered that there was already an urgent need for increased capacity on these routes and expected the situation to worsen significantly in light of the increased traffic volumes that were forecast for the region.

2.1.86 Singapore noted that the South China Sea routes were using 80 NM or 10 minute longitudinal spacing for RNP 10 operations and that urgent consideration should be giving to reducing the longitudinal spacing to 50 NM available for RNP 10 operations. ATM/AIS/SAR/SG/15 agreed that affected States, including Japan, and International Organizations should collaborate to form a Task Force, which would operate with minimal resources from the Regional Office and report to ICAO through the South-East Asia ATS Coordination Group (SEACG).

2.1.87 The Regional Office confirmed that as a result of resource limitations, it would be unable to assist with the establishment and operation of such a Task Force. In light of this, Singapore generously offered to provide a Chairman for this Task Force and would assist its operation in terms of leadership and meeting arrangements. Singapore undertook to coordinate arrangements to establish the Task Force and would keep the Regional Office apprised of developments.

2.1.88 IATA agreed with the issues raised by Singapore and thanked them for their leadership in chairing and coordinating Task Force arrangements. IATA considered that the problem was much bigger than just the two routes previously mentioned, involving the majority of the routes in the South China Sea parallel route structure and general implementation of RNP 10, and agreed to work off line with Singapore to draft suitable objectives and terms of reference for the Task Force and an agenda for the first meeting.

Himalayan Routes via Nepal

2.1.89 Nepal reported to the meeting that they were adopting CNS/ATM technologies including the establishment of possible FANS routes through Nepalese airspace to cope with the growth of air traffic throughout Asia/Pacific Region. Nepal was of the view that as a solution to the congestion of the westbound traffic flow across the Bay of Bengal, the Himalayan Routes initially proposed in the EMARSSH project as Himalaya-1 (Nepalgunj − Indek), Himalaya-2 (Kunming − Katmandu), Himalaya-3 (Katmandu – Nepalgunj − Delhi) were still valid, albeit with some modifications. In addition to the Himalayan Routes, Nepal had also proposed the route BB17 (now L507) to streamline the route from Kolkata onwards to Nepalgunj – Islamabad.

2.1.90 The meeting noted ATS Route B345 had been established between Kathmandu and Lhasa via NONIM. The route had opened prospects for developing a Trans Himalayan Route from Beijing to Delhi and beyond. The meeting was informed that Civil Aviation Authority of Nepal (CAAN) and General Administration of Civil Aviation of China were in the process of signing a Letter of Agreement on ATS Coordination Procedures. CAAN and Airport Authority of India were also coordinating to finalize the establishment of ATS Route L626 (Kathmandu – Mahendranagar – Pantanagar – Sikandarabad - Delhi) as an RNP 10 route.

Regional Office Seminar Activities

2.1.91 Since APANPIRG/15, the ICAO Asia/Pacific Regional Office had conducted six seminars in the ATM field, as described below.

a) 15-19 November 2004 – Air Traffic Management Safety Management Seminar, Beijing, Peoples Republic of China;

b) 14-17 December 2004 – Civil/Military Seminar, Asia/Pacific Office, Bangkok, Thailand;

c) 7-11 March 2005 – Search and Rescue Seminar, Chennai, India;

d) 21-22 March 2005 – Sixth Asia/Pacific RVSM Seminar, Incheon, Republic of Korea;

e) 18-20 April 2005 – ADS/CPDLC Seminar, Asia/Pacific Office, Bangkok, Thailand; and

f) 8-10 June 2005 – RASMAG ATS Safety Management Seminar, Bangkok, Thailand.

2.1.92 China and Thailand had commented to ATM/AIS/SAR/SG/15 that the availability and conduct of seminars of this nature was very beneficial to States and, although recognizing the resource limitations at the Regional Office, expressed a very strong position that the seminars should be available on an ongoing basis to assist States in understanding and implementing ICAO provisions.

Implementation of 30 NM Lateral and Longitudinal Separation

Tasman Sea

2.1.93 On 20 January 2005, following satisfactory completion of the safety review, 30 NM lateral and 30 NM longitudinal separation minima (30/30) based on RNP 4 and ADS-C were introduced by the States concerned across the Honiara FIR (Solomon Islands); Nauru FIR (Republic of Nauru); and the Tasman Sea area, which includes portions of the Brisbane FIR (Australia); Nadi FIR (Fiji); and Auckland FIR (New Zealand). ATM/AIS/SAR/SG/15 was informed of the planning and implementation activities for 30/30 that had been carried out by the Informal South Pacific ATS Coordination Group (ISPACG) through its 30/30 Working Group.

2.1.94 To implement 30/30 separation, the following major activities had been undertaken by the ISPACG 30/30 Working Group:

- Creation of the Implementation Working Group task list
- Conducted Safety Assessment (Hazard Identification workshop)
- Determination of Airborne and Ground system Requirements
- Conducted Rulemaking
- Performed Industry, Defence and Internal coordination
- Conducted International coordination
- Developed Pilot procedures
- Conducted Training Needs Analysis
- Performed Initial System Verification
- Conducted system verification of navigation deviation incidents and events
- Conducted Target Level of Safety calculations for the airspace
- Established a monitoring procedure of post implementation system performance:
    - AGDP (Brisbane TAAATS)
    - OCS (Auckland Oceanic)
    - SITA (Data link Service Provider)
- Conducted investigation of delayed ADS-C reports
- Established an ongoing monitoring program for navigation deviations
- Established an ongoing monthly reporting of all data link communication delays

2.1.95 The meeting recognized the comprehensive manner in which ISPACG had undertaken this important implementation project, which was the first time 30/30 separation had been

implemented. IFALPA commented on the very positive aspects of their involvement with the 30/30 Working Group, noting the good quality outcomes that had been achieved by way of international collaboration between the many parties involved.

2.1.96 In putting into effect the relevant ICAO SARPs and guidance material, there were important lessons to be learnt from the methodology and implementation planning processes developed by ISPACG, especially in regard to the safety management practices adopted. In light of the foregoing, APANPIRG/16 adopted the following Conclusion:

Conclusion 16/12 – Implementation of 30/30 NM Separation Minima

That, recognizing the comprehensive planning and implementation processes, especially in regard to safety management practices, adopted by ISPACG to implement 30 NM lateral and 30 NM longitudinal separation minima in specific airspace in the Pacific Region, States be advised by letter from the Regional Office to use this as a model in implementing reduced separation applications.

Implementation of 30/30 NM separation by the United States

2.1.97 The United States advised the meeting that the FAA planned to implement 30/30 throughout oceanic airspace where the U.S. provides ATS, beginning with operational trials in portions of Oakland's oceanic airspace then expanding, as appropriate, throughout the U.S.-controlled Pacific and North Atlantic FIRs. A Task Force had been formed and the methodology adopted by ISPACG would also be taken into account. The safety assessment being undertaken by the FAA William J Hughes Technical Center would be submitted to ICAO. An operational trial was scheduled to commence in late 2005.

State Contingency Plans

Survey of State Contingency Planning Arrangements

2.1.98 ATM/AIS/SAR/SG/15 reviewed progress by States in the Asia/Pacific Region to put in place contingency measures for application in the event of disruptions to ATS and associated services in accordance with ICAO SARPs. In this regard, APANPIRG/15 had taken action to initiate the survey of State contingency plans first raised by APANPIRG/12 (August 2001) under Conclusion 12/6.

2.1.99 The Asia/Pacific Regional Office had conducted the survey of Asia/Pacific States during March 2005 (ICAO State Letter AP029/05 (ATM) refers). ATM/AIS/SAR/SG/15 was advised of the results of the survey and the poor response from States received by the 30 June 2005 response date. As of 16 July 2005, the Regional Office had only received responses from 12 States and of these, a number had indicated that plans were still under development with expected completion dates in late 2005. In some instances, State responses did not fully address the parameters required by the survey.

2.1.100 APANPIRG/16 requested the Regional Office to continue with the survey and undertake follow up actions with States that had not responded to the survey request. A summary of the survey outcomes would be presented to APANPIRG/17 for consideration. APANPIRG/16 urged States to continue to address their responsibilities in regard to contingency planning, in accordance with the provisions of Appendix D to Annex 11.

Contingency Planning for Volcanic Ash

2.1.101 IATA drew the attention of the meeting to other situations that could lead to contingency circumstances, including the presence of volcanic ash and medical circumstances precipitated by pandemics like SARS or avian influenza, which threatened the continuity of civil aviation services.

2.1.102 In respect of volcanic ash, the meeting noted that an ad-hoc Europe/North Atlantic Volcanic Ash Working Group (VAWG) had been established with the goal to study the effect of potential volcanic ash eruptions and their effect on the air traffic flows, and to develop appropriate ATM contingency procedures. Information on the work done in European region was included in the ICAO Journal, Vol. 60, Number 3, 2005 (available on-line on: http://www.icao.int/icao/en/jr/2005/6003.djvu).

2.1.103 The meeting noted the lack, in some States, of specific ATM contingency plans and procedures providing adequate reaction to the volcanic ash occurrences. In recognizing this circumstance, APANPIRG/16 formulated the following Conclusion:

Conclusion 16/13 – ATM Contingency Planning for Volcanic Ash Cloud avoidance

That, Asia/Pacific States be urged by State Letter from the Regional Office to amend or develop ATM contingency plans, as necessary, that would:

a) provide Air Traffic Management policy and coordination procedures that ensure safe and orderly flow of air traffic around areas of volcanic ash;

b) promulgate the status of active volcanoes via the colour code system as specified in Annex 15, Aeronautical Information Service, and the Handbook on the International Airways Volcano Watch (Doc 9766); and

c) provide templates and a rapid means of disseminating volcanic Ash SIGMETs, ASHTAM's, NOTAM's, Volcanic Ash Advisories and other flight information.

Special Implementation Project - Contingency Planning

2.1.104 In considering contingency matters further, views were expressed that developing a State contingency plan to meet ICAO requirements could be very complex and involve a wide range of issues, such as delegating responsibility to another State for provision of ATS and associated legal, financial and technical issues, the involvement of many government agencies, and developing operational procedures and training for pilots and controllers. It would also be necessary to address different issues related to national and international airspace. For some States, these matters could be difficult to overcome and take a considerable time.

2.1.105 In this regard, it was suggested that an ICAO special implementation project (SIP) may be a suitable means to develop a contingency plan for one State, which could then be used as a model for other States. The SIP would address the provisions of APANPIRG Conclusion 13/8 in respect of the continuity of service over the high seas. In addition to implementing the contingency provisions of Annex 11, Appendix D, the SIP could be used to identify and prioritize other contingency factors that could impact the continuity of civil aviation operations, with a view to using the output of the SIP in a workshop or seminar format to assist other States of the Region.

2.1.106 APANPIRG/16 agreed that a SIP proposal should be prepared by the Regional Office and the subject of Contingency Planning should be included on the agenda of State ATS coordination meetings. The meeting adopted the following Decision and Conclusion in this respect:

Decision 16/14 – Contingency Plans on ATS Coordination Group Agendas

That, the development of State Contingency Plans be included as an item on the agenda of State ATS coordination meetings.

Conclusion 16/15 – Special Implementation Project for Development of a State Contingency Plan

That, in order to provide a model for States of the Asia/Pacific Region in preparing their national contingency plans, ICAO undertake a special implementation project (SIP) during 2006 to assist a State of the Region to prepare and implement a contingency plan in accordance with Annex 11, Appendix D, and in line with APANPIRG Conclusion 13/8. The SIP should also identify and prioritize other contingency circumstances that may affect civil aviation operations in the ATM context and make recommendations accordingly.

Civil/Military Seminar

2.1.107 Pursuant to the requirements of APANPIRG Conclusion 13/34, the Regional Office held a 4-day ICAO Civil/Military Co-ordination Seminar at the Asia and Pacific Regional Office from 14 to 17 December 2004. The purpose of the seminar was to forge closer understanding and cooperation between Civil and Military authorities in the Asia/Pacific Region to enhance safety, security and efficiency of international civil aviation.

2.1.108 The seminar noted the importance of ICAO documentation relating to the provision of Civil/Military coordination. In particular, the seminar noted Recommendation 1/2 of the 11th Air Navigation Conference in respect of coordination with military authorities and Resolution 35/14, Appendix P, of the 35th Assembly of ICAO in respect of the common use of airspace and facilities by civil and military authorities. The seminar acknowledged the significant role played by the military in regard to humanitarian missions worldwide, noting the substantial access required by the military to civil airspace in order to perform these missions. In this regard, effective cooperation and coordination was essential and the seminar adopted the principle of the equitable sharing of both convenience and inconvenience in gaining access to airspace and facilities by civil and military users.

2.1.109 The meeting considered, in light of APANPIRG Conclusion 13/34, that Civil/Military Coordination arrangements would be enhanced by including an item in relation to Civil/Military Coordination on the agendas of regional ATS coordination groups. The meeting also endorsed the principle of equitable sharing adopted by the seminar and formulated the following Decision and Conclusion in this respect:

Decision 16/16 – Civil Military Coordination

That, "Civil Military Coordination" be included as an item on the agendas and/or task lists of regional ATS Coordination Groups.

Conclusion 16/17 – Equitable Sharing by Civil and Military Users

That, noting that effective coordination between civil and military agencies was essential, States of the Asia Pacific Region be advised by State Letter on the need to adopt the principle of the ***equitable sharing of both convenience and inconvenience*** in the use of airspace and facilities by civil and military users.

Proficiency in non-radar Approach Control

2.1.110 The meeting was informed that India had brought to the attention of ATM/AIS/SAR/SG/15 difficulties they had experienced in meeting the requirements of ICAO SARPs in regard to Approach radar controllers keeping their ratings current for non-radar Approach Control in high density Terminal Control Centers. The meeting agreed that making use of appropriate hi-fidelity simulator based training was the most effective method in overcoming this problem and ICAO would also be requested to consider an amendment to Annex 1 to include simulator training as a means to meet the on-the-job training requirement. The Regional Office would undertake coordination with Headquarters in this regard.

South-East Asia - ATS Safety Management SIP

2.1.111 The meeting was informed regarding a SIP approved by the Council of ICAO that had been undertaken by the Regional Office during August 2005 to Cambodia, Indonesia, Philippines and Viet Nam, with a focus on ATS safety management. A similar SIP conducted in 2004 had covered a number of States in the Bay of Bengal area and included consideration of operational safety matters.

2.1.112 The main objective of the SIP was to ensure that all concerned States had established appropriate mechanisms to ensure the safe implementation and operation of RVSM and reduced horizontal separation in accordance with Annex 11 provisions, and to assist States as necessary to draw up an action plan with a view to meeting their obligations thereto.

2.1.113 The mission, in its discussions with the States concerned, noted that the ICAO recommended safety management systems had not been fully implemented by any of the four States visited and they were at various stages of developing their strategy and implementing changes to their existing safety management practices. The mission considered that, had systematic and appropriate safety programmes been in place, significant safety benefits would have been achieved. However, in most cases, the State civil aviation authorities lacked funding, human resources and expertise to develop and operate ICAO compliant safety management systems.

2.1.114 There was in general, a need for close cooperation between non-government ATS providers and State civil aviation authorities to combine their resources and work closely together to put in place common safety management systems. In all the States, the civil aviation regulations required amending and these were are various stages of development. None of the States had met the ICAO requirement to establish acceptable levels of safety for the provision of ATS within airspaces and at aerodromes since the applicability date of 27 November 2003. To achieve this, the States would require further guidance and assistance. In this regard, a lack of published ICAO guidance material was making it difficult for States to overcome this problem as they were required to follow ICAO provisions and guidance. Some States had taken action to contact other administrations to seek assistance.

2.1.115 The SIP mission reported that the pending USOAP audits were a strong motivation to progress this matter and all States were keen to demonstrate that they had established ICAO compliant safety management programmes. The situation would be improved if a concerted effort were made to

provide more training and information through ICAO workshops and seminars. Also, States who have the expertise and operate ICAO compliant safety management systems should be encouraged to consider ways to provide assistance to those States with the greatest need. This matter should be considered in depth by the APANPIRG contributory bodies.

2.1.116 In light of the above, the following conclusions were formulated:

Conclusion 16/18 — Assistance to States to develop safety management systems

That, recognizing that many States in the Asia/Pacific Region require assistance to implement safety management programmes in accordance with Annex 11, States with expertise in implementing and operating ICAO compliant safety management systems inform ICAO by end of 2005 of their willingness to participate in a series of seminars/workshops to be arranged by ICAO during 2006-2007 to assist States.

Conclusion 16/19 – Study of States' preparedness to implement safety management systems

That, a study of States' preparedness to implement ICAO safety management systems in accordance with Annex 11 be undertaken by the Asia/Pacific Regional Office in conjunction with the ATS coordination groups and RASMAG by the first quarter of 2006, and a plan of action developed to be reported to APANPIRG/17 in September 2006.

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

2.1.117 The meeting reviewed the *Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region* that had been prepared by RASMAG. The guidance material was intended 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-1/A Interoperability/Implementation Team (FIT) and Central Reporting Agency (CRA).

2.1.118 In its review of the material, ATM/AIS/SAR/SG/15 had noted that the draft guidance material had also been reviewed by the FIT-BOB, FIT-SEA, IPACG and ISPACG forums and enhancements had been incorporated based on the experience of these groups. Noting the maturity of the material, ATM/AIS/SAR/SG/15 submitted it to APANPIRG/16 for adoption as regional guidance material.

2.1.119 After reviewing the *Guidance Material* and noting the history of its development under the auspices of RASMAG, including the reviews that had been undertaken by the specialist FIT Groups and ATM/AIS/SAR/SG/15, the meeting adopted the following Conclusion:

Conclusion 16/20 – Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region

That the *Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region*, as shown in **Appendix B** to the Report on Agenda Item 2.1, be circulated as regional guidance material by the Regional Office, in accordance with established procedures.

Update on CNS/ATM System in India

2.1.120 India provided information to the meeting in respect of the implementation and proposed implementation of CNS/ATM system and facilities in India. This included details of plans during 2005 to enhance voice and data communication among all the airports and aeronautical communication stations in India using satellite links, implement its SBAS known as GPS Aided GEO Augmented Navigation (GAGAN) during 2006, implement six additional enroute surveillance radars and network all radar systems, commence operational trials of ADS/CPDLC at Mumbai and Delhi in addition to the existing trials at Kolkata and Chennai and install two ADS-B systems at Chennai and Delhi to evaluate technical performance and define operational procedures.

2.1.121 India has also been fully supporting the ATFM/TF in the development and implementation of suitable ATFM arrangements for traffic flow towards Afghanistan airspace and has offered to host the automated ATFM system. India has extended all possible assistance and support to Afghan authorities to re-establish Airport and ATS infrastructure in Afghanistan. Indian experts are working in Afghanistan on the reconstruction activities and a number of Afghan ATCOs have been trained by India at the Civil Aviation Training College, Allahabad, India.

2.1.122 Ongoing work includes the continuous planning and implementation of ATS routes and India will manage upper airspace by establishing upper sectors in the high density ACCs at Mumbai, Delhi, Kolkota, Ahmedabad and Nagpur. In addition India has completed all necessary regulatory framework and documentation required to meet the forthcoming ICAO USOAP audit scheduled in fourth quarter 2006 and an ATS Safety Management System will be established by November 2005.

Enhancement of HF Communication in Mumbai FIR

2.1.123 India informed the meeting in regard to measures that had been taken to enhance HF communication in Mumbai FIR. The Indian Regulator had authorized use of new frequencies 10084 & 3443 kHz and is working towards allocating 6661, 4675, 4657& 3476 kHz for HF/MWARA. All transceivers have since been shifted to a suitable new location, additional transceivers have been provided and a reliable optical fibre cable has been installed between the new equipment station and the ATS complex.

RNAV Implementation Plan for Japan (JCAB RNAV Roadmap)

2.1.124 Japan informed the meeting that in order to provide safer and more efficient operation and to accommodate growing traffic, the Civil Aviation Bureau of Japan (JCAB) developed the *RNAV Roadmap for Japan.* The JCAB had established a Steering Committee and RNAV Planning Group in 2004 with the aim of developing an RNAV implementation plan for Japan.

2.1.125 Japan informed that the *RNAV Roadmap for Japan* was approved and released in April 2005 and that in order to implement RNAV and RNP procedures for each flight phase in accordance with the Roadmap, during October 2005 JCAB would establish a special team, including operators, for implementation of RNAV and RNP.

ICAO Language Proficiency Requirements

2.1.126 The meeting was presented with information on the new ICAO language proficiency provisions in Annexes 1, 6, 10 and 11, requiring that as of 5 March 2008 pilots, aeronautical station (radio) operators and air traffic controllers shall demonstrate the ability to speak and understand the language used for radiotelephony communications to the level specified in the language proficiency

requirements of ICAO documentation. The minimum level that must be achieved by this group is Level 4; the criteria applicable to ICAO Level 4 have been reproduced in **Appendix C** to the Report on Agenda Item 2.1.

2.1.127 ICAO published the *Manual on the Implementation of the ICAO Language Proficiency Requirements* (Doc 9835-AN/453) in September 2004 addressing the various training and evaluation issues related to the implementation of ICAO language proficiency provisions, to assist States to comply with the provisions.

2.1.128 In implementing the language proficiency provisions, Asia/Pacific States should consider aspects of:

- mechanisms to identify current proficiency levels amongst operational staff;
- mechanisms for the provision of language enhancement training;
- whether to establish in-house programs for assessment and enhancement training, or utilize external language services providers;
- if using external language services providers, mechanisms to identify appropriate providers;
- numbers of pilots or controllers that can be simultaneously taken off line, and for what period of time, for assessment and/or enhancement training;
- contingency considerations in the event that insufficient staff attain Level 4 proficiency; and
- whether language proficiency tests should be introduced as part of the initial recruiting process.

2.1.129 The meeting recognized the high stakes involved in implementing the language proficiency SARPs, with particular regard to the potential loss of careers of industry participants that, although having worked operationally for many years, were unable to reach the operational Level 4 requirements.

2.1.130 One of the difficulties was in relation to the current lack of definition of the size and location of the problem. No regional research had yet been undertaken to establish the magnitude and complexity of the language proficiency problem. Accordingly, the meeting considered that the most effective strategy that could be adopted would be to attempt to clearly define the problem in a regional sense, with the expectation that once a clear understanding of the problem was established suitable mechanisms could then be identified and put in place to address the problem.

2.1.131 In order to define the problem, information was required from States in respect to their particular circumstances. Mindful of the relatively limited time available prior to March 2008 in which to assess and, if applicable, provide language training to staff, the meeting considered that a regional survey should be undertaken as soon as possible. The survey should consider, among others what action (if any) had already been taken by a State, an estimate by the State of the percentage of operational staff that were likely to be at or below the margin of Level 4 competency, whether a State preferred to adopt a national approach to resolution or whether the preference was for each agency, airline, etc. of the State to conduct its own localized language activities, what type of assistance would benefit a State, and whether a State was in a position to offer assistance to others. With this in mind, the meeting formulated the following conclusion:

Conclusion 16/21 – Status of compliance with Language Proficiency requirements

That, the Regional Office urgently conduct a survey of all Asia/Pacific States for the purposes of ascertaining States' circumstances in respect of compliance by March 2008 with ICAO provisions in respect of Operational Level 4 language proficiency.

2.1.132 The meeting stressed that the survey should be completed as soon as possible and the results analyzed and distributed as appropriate. As such, it would not be appropriate to wait for the annual meeting cycle of the ATM/AIS/SAR Sub-Group and APANPIRG and, accordingly, the outcomes of the survey should be circulated by Regional Office correspondence. It was likely that the survey results would identify the need to assist some States in the Asia/Pacific Region and this could be considered for an appropriate special implementation project proposal.

Language Proficiency Improvements – Republic of Korea

2.1.133 Republic of Korea informed the meeting that the Civil Aviation Safety Authority (CASA) of the Republic of Korea had established an aviation English proficiency plan for the testing and training of air traffic controllers nationwide, in association with the International Aviation English Service (IAES) and TELPA (Test of English Language Proficiency for Aviation) testing service.

2.1.134 During December 2004, an initial group of 371 ATCOs had been assessed under the 9 part (30 minute) TELPA and subsequent aviation English training courses had been conducted in April and July 2005. Each course was of 4 weeks duration and comprised approximately 120 hours of training. The first course provided aviation English only and the second course was divided into aviation and general English classes. Trainees from the second course showed more satisfaction and higher levels of achievement.

2.1.135 Further details in regard to the CASA program should be obtained from

Web site: http://ais.casa.go.kr

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MET/ATM Coordination Seminar

2.1.136 The meeting was informed that as a follow-up of APANPIRG Conclusion 14/45, a MET/ATM coordination seminar for the Asia/Pacific Region had been under preparation. CNS/MET/SG/9 (July 2005) and ATM/AIS/SAR/SG/15 (July 2005) had jointly adopted a tentative programme (Appendix O to the Report on Agenda Item 2.2 refers) for the seminar, and considered that the seminar would provide a forum for the MET and ATM experts to exchange views and ensure better mutual understanding.

2.1.137 The meeting agreed that a 3-day MET/ATM Seminar was appropriate and tentatively scheduled the seminar for 8 – 10 February 2006. The Regional Office was requested to make the arrangements.

ICAO Runway Safety Toolkit

2.1.138 Delegates to the meeting were provided with a copy of the *"Runway Safety Toolkit",* which was produced by ICAO and Embry-Riddle Aeronautical University, Florida, United States as part of a continuing effort to assist States in the implementation of runway incursion prevention programmes. The toolkit is the compilation of best available material, obtained over a period of several years, and also makes use of information and knowledge obtained during a series of ICAO seminars on the subject of runway safety, held between October 2002 and October 2004.

2.1.139 In addition, a runway incursion prevention manual is under development with the assistance of several States and organizations. It is expected that the seminars, the tool kit and the manual will assist States in reducing the incidence of runway incursions and improve overall runway safety. APANPIRG/16 delegates were encouraged to share the material within their respective areas of accreditation.

Tower Siting visibility analysis

2.1.140 The United States had provided information to ATM/AIS/SAR/SG/15 on an illustrative example of how human factors research and engineering impacts the return on investment of FAA projects. The objective of the Human Factors Tower Siting Project was to incorporate human vision capability and limitation considerations (for object detection and airport surface viewing perspective) in the tower siting process and in the revised order (FAA Order 6480).

2.1.141 A revised FAA Tower Siting Policy had been released for comment and interim use (06/2005). It established requirements and criteria, as well as a tool that incorporated quantifiable human visual perspective and performance capabilities to support tower height and location decisions at least cost. The potential cost savings to the FAA were estimated at $5 million/year based on building an estimated average of 7 towers, as a result of the lower Tower Cab heights that were required in accordance with the results of this research.

Proposed change to ASIA/PAC FASID Table AOP 1

2.1.142 The United States provided information related to the closure of Pago Pago Air Traffic Control Tower in American Samoa. The FAA had completed an airspace and benefit/cost analysis for providing air traffic services at Pago Pago Airport, and determined the benefit/cost ratio was not at required levels to support construction of a new tower. Therefore the FAA had determined that the airspace would be classified as Class G, and only UNICOM services would be provided in the long term.

2.1.143 The United States would submit an amendment to the Asia/Pacific Facilities and Services Implementation Document (FASID) to update the information published in this respect.

The Australian Organised Track Structure (AUSOTS)

2.1.144 Australia planned to introduce Flex Track operations between Asia and Australia/New Zealand, based on the Australian Organised Track Structure (AUSOTS) which utilises the FAA's Dynamic Ocean Track System Plus (DOTS+) system technology. Initially, AUSOTS was being used to generate Flex Tracks for daily operations from Singapore to Brisbane, Melbourne and Sydney. In addition, other flights overflying the Singapore FIR may also benefit from the daily Flex Track (e.g. Bangkok to Sydney). In the medium term, other city pairs will be opened up for Flex Track operations and Airservices Australia is committed to working with other States, ANSPs and Operators to develop plans for the introduction of Flex Track operations across the broader Asia and Middle East regions.

ATC Quality Assurance Program – Republic of Korea

2.1.145 Republic of Korea provided information regarding the air traffic control quality assurance programme that had been implemented as one of the measures towards operating an ATS safety management system by the first half of 2006. The QA programme comprises 4 main activities Operational Error and Deviation Prevention, team work, communication, and feedback program. The programme includes training and discussion, quality assurance review, award for flight assist, ATS operational error and deviation investigation and incident investigation and reporting.

Aeronautical Information Service (AIS) matters

2.1.146 ATM/AIS/SAR/SG/15 was advised by the Secretariat that, regrettably, the reduced staffing circumstances resulting from ICAO budget restrictions had resulted in a need to reduce the ATM Section work programme, and AIS matters related to the region would have to be referred primarily to ICAO Headquarters for support. Therefore, without additional AIS expertise made available to the Regional Office, the AIS Implementation Task Force (AITF) reactivated by APANPIRG/14 (Conclusion 14/8 refers) would not be convened in 2005, and may have to be suspended for the foreseeable future.

2.1.147 However, ATM/AIS/SAR/SG/15 noted that AIS was an essential service that had safety implications and was crucial to the provision of ATS. It was noted that the AITF had not been held even though it had been re-directed and re-established by APANPIRG/14 and that AIS related issues had not been adequately addressed on a regional basis.

2.1.148 In view of the lack of resources at the Regional Office, States offered to provide support to the Regional Office by convening and operating the AITF whilst the Regional Office retained oversight of the activities. APANPIRG/16 noted that ATM/AIS/SAR/SG/15 had formulated a decision to this effect (Decision 15/8), noting that the ICAO AIS Implementation Task Force should be convened in late 2005 under guidance from States, including Japan. The Regional Office would assist where possible and be kept apprised of the outcomes of the Task Force.

Search and Rescue (SAR) Matters

ICAO SAR Seminar and SAREX

2.1.149 An ICAO SAR seminar had been held in conjunction with the Bay of Bengal SAREX at Chennai, India from 7 to 11 March 2005. The SAR seminar focused on the development of SAR cooperation and coordination and addressed ICAO requirements for States to provide SAR services and agreements in accordance with Annex 12.

2.1.150 The seminar, in its review of the information provided and discussions held, formulated a list of recommendations in relation to SAR issues. Upon reviewing the recommendations, APANPIRG/16 considered that they should be taken into account by States in the region when considering their SAR activities, and developed the following Conclusion:

Conclusion 16/22 – Recommendations of the ICAO SAR Seminar and SAREX held at Chennai, India

That, the recommendations made by the ICAO SAR Seminar and SAREX held at Chennai, India on 7-11 March 2005, as shown in **Appendix D** to the report on Agenda Item 2.1, be disseminated by ICAO Regional Office to the States and International Organizations of the Asia and Pacific Region.

2.1.151 The meeting was informed that ATM/AIS/SAR/SG/15, in noting the very successful outcome of the Bay of Bengal seminar and SAREX, agreed that it was highly desirable that these events should be held on a regular basis as they made an important contribution to ensuring continuity of SAR preparedness in the Region. At the Bay of Bengal event, a significant contribution was made by the invited international experts from ICAO and COSPAS-SARSAT.

2.1.152 New Zealand advised ATM/AIS/SAR/SG/15 that they would be willing to provide support to host an ICAO Seminar and SAREX aimed at providing support for Pacific island States and would be seeking international participation. ATM/AIS/SAR/SG/15 appreciated the offer made by New Zealand and strongly supported an ICAO Seminar and SAREX for the Pacific islands and that a SIP should be raised to assist in supporting the event. In this context, the meeting adopted the following Conclusion:

Conclusion 16/23 – Special Implementation Project International Seminar and SAREX

That, ICAO consider a proposal for an Asia/Pacific Special Implementation Project to be established with the primary objective to improve search and rescue services, coordination and cooperation between island States of the Pacific.

Update of the APANPIRG SAR Capability Matrix and List of State SAR Agreements

2.1.153 The meeting reviewed the SAR Capability Matrix Table, as updated by ATM/AIS/SAR/SG/15, which provides a comprehensive listing of the SAR Capability of ICAO States in the Asia/Pacific Region, and updated the Asia/Pacific register of SAR Agreements between States. The updated SAR Capability Matrix and the List of SAR Agreements have been included, respectively, as **Appendices E and F** to the Report on Agenda Item 2.1.

Indian Search and Rescue Update

2.1.154 India has a well established SAR organization which integrates maritime and aeronautical components to service a Search and Rescue Region (SRR) of 4.6 million square kilometers. The Indian National Maritime SAR Board was constituted in January 2002 and is actively involved in implementing its SAR charter as required by the International Maritime Organization's (IMO) SAR convention of 1979. The Airports Authority of India has established 4 Rescue Coordination Centres (RCCs), manned round the clock by trained personnel, at Delhi, Mumbai, Kolkata and Chennai.

2.1.155 The Indian SAR system is also supported by an efficient satellite based search and rescue system based at Bangalore which, in addition to India, provides COSPAS-SARSAT distress alerting services to seven neighboring countries: Bangladesh, Bhutan, Maldives, Nepal, Sri Lanka, Seychelles and Tanzania.

2.1.156 The Vikram Sarabhai Space Centre (VSSC) of India has undertaken the development of a low cost (estimated approximately US$200) personal SAR emergency beacon using commercial of the shelf components.

Updated Task List

2.1.157 The meeting reviewed the updated Task List for ATM/AIS/SAR/SG approved by APANPIRG/15, and further updated the Task List to reflect the information presented by the meeting. It was recalled that, as a result of the dissolution of the CNS/ATM/IC/SG, APANPIRG/15 had agreed

to include on the Task List additional items for environmental issues, training and business cases. In addition, APANPIRG/15 had included items in accordance with the outcomes of the Future Directions Task Force in respect of studying AN-Conf/11 recommendations, monitoring Terminal and Airport Operations and reviewing key priorities for CNS/ATM implementation.

2.1.158 The updated Task List is shown in **Appendix G** to the Report on Agenda Item 2.1.

ASIA/PACIFIC ATS ROUTE CATALOGUE

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC REGIONAL OFFICE

VER. 1

26 August 2005

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Foreword

The ICAO *Asia and Pacific Air Navigation Plan* (Doc 9673), Volume I, Basic ANP (BANP) contains ATS route requirements which were developed by the Third Asia and Pacific Regional Air Navigation Meeting (Bangkok, May 1993). The requirements have been revised (including additions and deletions) from time to time to reflect current operational needs. There is also an ongoing need to revise and update these requirements and amend the BANP.

The Fourteenth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/14, August 2004) under Conclusion 14/5 established the ATS Route Network Review Task Force (ARNR/TF) to review the Asia and Pacific ATS route network as contained in the BANP, determine present and future route requirements, and revise the BANP as appropriate. To facilitate the amendment process and keep track of route implementation and future requirements, and with the objective of providing more up to date information on route developments, the ARNR/TF prepared the *Asia/Pacific ATS Route Catalogue* as a supplement to the BANP.

APANPIRG/16 (August 2005, Bangkok), recognizing the value of a consolidated reference document for the regional ATS routes and future route requirements of States and airspace users, accepted the ATS Route Catalogue under Decision 16/3. This ATS Route Catalogue is intended to be a living document supplementing the BANP and to be maintained by ICAO Asia/Pacific Regional Office. Communication in relation to the ATS Route Catalogue should be made via email to the Asia/Pacific Regional Office at icao_apac@bangkok.icao.int.

The ATS Route Catalogue consists of five chapters as follows:

Chapter 1: Routes in BANP − Implemented

Chapter 2: Routes in BANP − Not Implemented

Chapter 3: Routes Implemented − Not in the BANP/or Not in Accordance with the BANP

Chapter 4: Future Requirements − States

Chapter 5: Future Requirements – Users

Chapter 1 lists ATS routes which have been implemented in accordance with the BANP. This chapter will be regularly updated as amendments to the BANP are approved and implemented.

Chapter 2 lists ATS routes which are contained in the BANP but have not been implemented in accordance with BANP requirements. This Chapter is intended for use as reference material to facilitate the resolution of any outstanding matters in order to fully implement or revise the routes.

Chapter 3 lists ATS routes which are not contained in the BANP but have been implemented by States. This Chapter contains information in relation to routes that have been subject to a BANP amendment proposal and implemented prior to the proposal being approved by ICAO. Routes are also included that have been implemented by States and not subject to an amendment proposal. The purpose of this Chapter is to temporarily record route information, and States

would be expected to take appropriate action to ensure alignment of implemented routes with the BANP.

Chapters 4 and 5 list ATS routes proposed by States and international organizations, respectively. These routes have not been included in the BANP or implemented. The material in these Chapters is intended to be used as a basis for developing BANP amendment proposals, and to provide information on route planning developments which would form the basis for future proposals.

The material in Chapter 4 is organized in two parts: Part A contains those routes that have been agreed among States concerned and to be processed as amendment proposals to the BANP. Part B provides information on States' route requests that would be subject to further coordination and agreement.

The material in Chapter 5 is organized in two parts: Part A contains those routes that have been agreed by States concerned and to be processed as amendment proposals to then BANP. Part B provides information on users' route requests that are subject to further coordination and agreement.

Note:— As the Asia and Pacific ATS Route Catalogue is intended for use as a supplement to the BANP, it does not replace the BANP nor should it be used as an operational document. Its primary purpose is to assist States and airspace users by providing more up to date information, to develop and maintain the ATS routes in the Asia and Pacific Region.

Amendments to the BANP and the ATS Route Catalogue

A Contracting State or qualifying international organization identifying a need for a new route requirement to be included in the BANP or to change an exisiting route contained in the BANP, may submit an amendment proposal to the Secretary General for approval by the President of the Council in accordance with established procedures summarized below.

Appropriately presented and documented proposals to amend the BANP are submitted to the ICAO Secretary General through the Regional Office and circulated to States and International Organizations for comment. Once all parties concerned agree to the proposal, the Secretary General will submit the proposal to the President of the Council for approval. The Regional Office will inform States and international organizations concerned of the approval and the BANP will be amended accordingly.

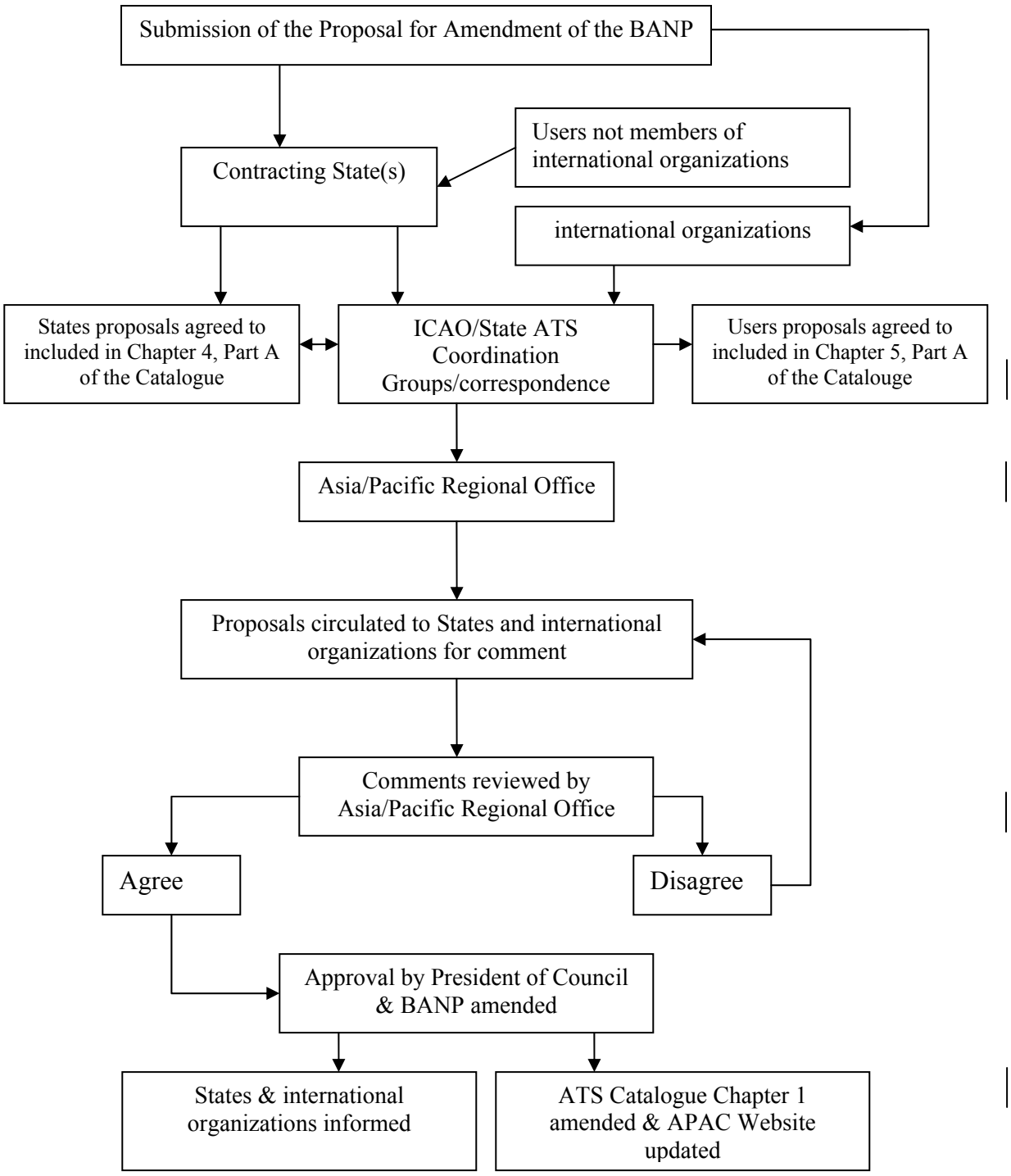
The Regional Office, which is responsible for maintaining the ATS Route Catalogue, will up date the Catalogue from time to time as amendment proposals are progressed and appproved, and include new route requirements of States and Users in the Catalogue.

Chapter 1 will be amended by the Regional Office subsequent to approval of an amendment to the BANP by the President of the Council. The amendment will be indicated by a vertical line in the margin of the Catalogue, and the revision number and date shown on the cover page of the catalogue, which is posted on the ICAO APAC website (http://www.icao.int/apac).

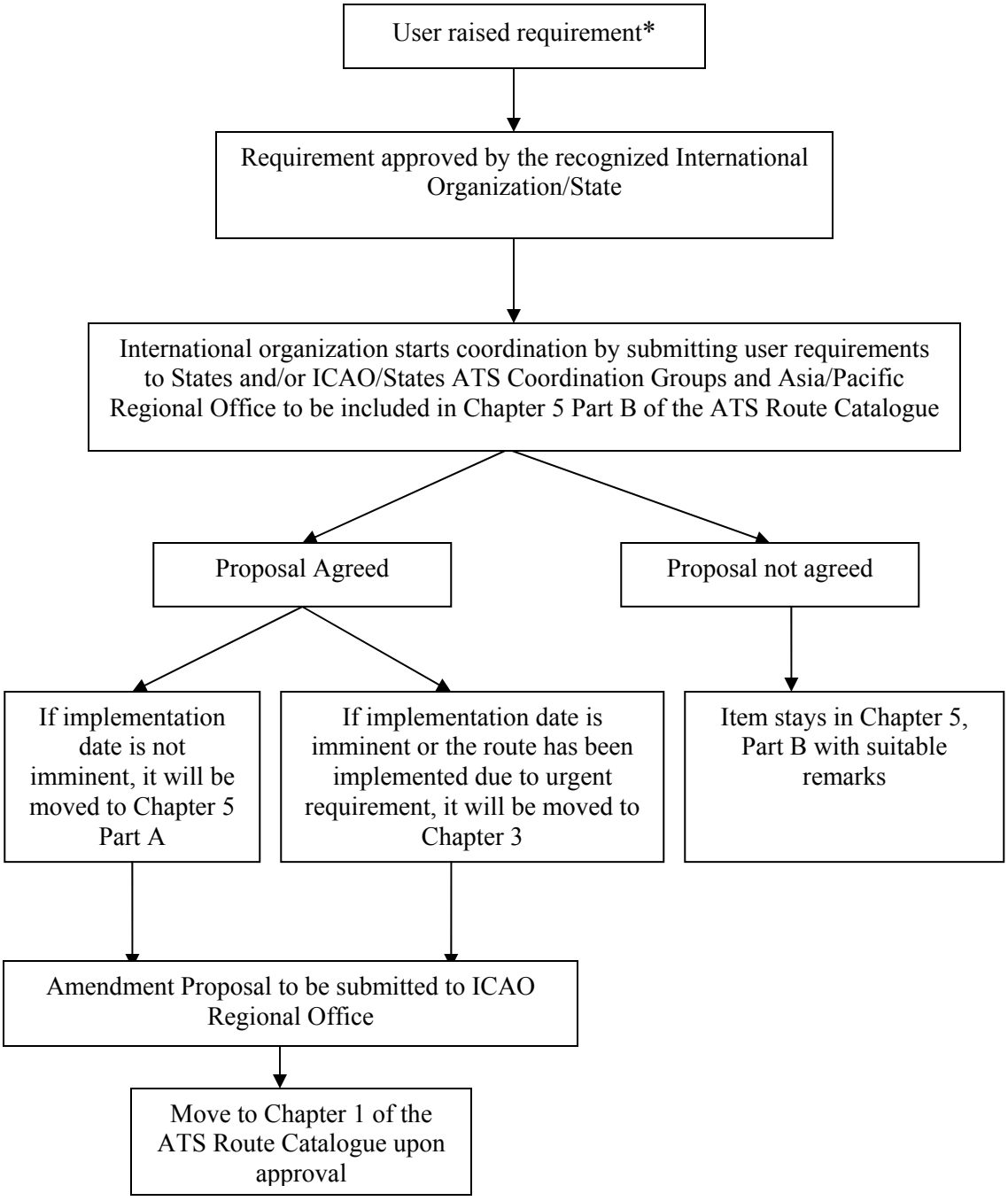
Chapters 4 and 5, Part A are amended based on route requirements submitted by States and international organizations that have been agreed by the parties concerned to be included in the BANP and are subject to amendment proposals. Upon approval by ICAO, the proposals to be incorporated in the BANP would be transferred to Chapter 1. Other route requests submitted by States and users that have not been agreed to and are subject to further coordination between the parties concerned, are contained in Part B to the respective Chapters. These routes are normally coordinated between States or through ICAO/State ATS Coordination Groups and/or by correspondence. Users who are not a member of a qualifying international organization should submit their route requests to the appropriate State(s) and these would be recorded in Chapter 4.

The flow charts below describe the processes for amending the BANP and the Catalogue. Communication in relation to the Catalogue should be made via email to the Asia/Pacific Regional Office at icao_apac@bangkok.icao.int.

BANP AMENDMENT PROCESS



FLOW CHART FOR CHAPTER 5



*Note: — * Users who are not a memberof a qualifying international organization submit route requests to the appropriate State(s) (see BANP Flow Chart).*

Amendment Record

Version/Amendment Number	Date	Amended by	Comments
0.1	14 February 2005	-	ARNR/TF/2 developed the draft version.
0.2	5 May 2005	ARNR/TF/3	Finalized the format following contribution from the members.
0.3	29 July 2005	ATM/AIS/SAR/SG/15	Sub-Group concluded that the Catalogue be adopted (Draft Conclusion 15/3).
1	26 August 2005	APANPIRG/16	APANPIRG/16 decided that the Catalogue be accepted (Decision 15/3).

Chapter 1: Routes in BANP − Implemented

APAC 99/1, 99/4, 00/1, 04/3 and 04/7, which have been approved but not incorporated in the First Edition of the BANP, are incorporated in this chapter.

The segments which have not been implemented are shown by **bold** significant points.

A1 **(DUBAI/SHARJAH)**
JIWANI
KARACHI
PRATAPGARH
CALCUTTA
BAGO
BANGKOK
UBON
DANANG
CAVOI 1713.5N 11000.0E
DAGON 1900.0N 11148.3E
HONG KONG
ELATO 2220.0N 11730.0E
MAKUNG
TAIBEI
KAGOSHIMA
MIYAKE JIMA

(Partially implemented. See Chapter 2.)

A201 LASHIO
AGARTALA
RAJSHAHI
MONDA 2521.00N 08626.25E
PATNA
LUCKNOW

A202 **CHITOSE**
NIIGATA
KAGOSHIMA
CHEUNG CHAU
SIKOU N2050.6 E11130.0
SAMAS N2030.3 E11029.7
ASSAD N182028 E1074053
XONUS N1804.2 E10714.0
DONGHOI
VILAO N1718.0 E10600.0
SAVANNAKET
KORAT
BANGKOK

(Partially Implemented. Chitose – Cheung Chau segment is proposed to be deleted. See Chapter 2.)

(A203 in Chapter 2)

A204 TESIO 4454.4N 14146.9E
REBUN
AKSUN 4545.1N 14054.3E
(SELTI) (4713.3N 14013.3E)

A209 ELATI 0200.0S 08957.7E
PORT HEDLAND

A211 TARAKAN
TAWAU

A212 PUPIS
PAGO PAGO
NIUE

A214 PEKANBARU
BUSUX 0355.0S 06000.0E
(PRASLIN)

A215 PORT MORESBY
MERAUKE
HASANUDDIN
KEVOK 0425.0S 11500.0E

A216 COOKTOWN
AKMIP 1200.0S 14448.6E
KIKORI
GUNNY 0500.00N 14400.00E
RICHH 1711.49N 14249.12E

A217 DOPID
JAMESHEDPUR

A218 **HARBIN**
(EKIMCHAN)
(MYS SHMIDTA)
BARROW

(Partially Implemented – See Chapter 2)

A219 KARACHI
NAWABSHAM
KALAT 2902.0N 06635.0E
SERKA 2951.0N 06615.0E
KANDAHAR
(TERMEZ)

A220 CLUKK 3605.0N 12450.0E
TAHITI

A221 GUAM
ROTA IS
TINIAN IS
SAIPAN

A222 GUAM
POHNPEI
KOSRAE
KWAJALEIN

(A223 in Chapter 2)

A224 JOHOR BAHRU
MERSING

A326 SHIGEZHUANG
OKTON 3911.2N 11653.5E
TIANJIN
MAKNO 3827.6N 12110.0E
SANKO 3814.2N 12228.4E
DONVO 3734.0N 12320.0E
AKARA 3130.0N 12330.0E

A327 PHUKET
KADAP 0200.0S 08409.6E
KALBI 0852.3S 07500.0E
(PLAISANCE)

A330 MEDAN
MADURAI
KAGLU 1231.2N 07200.0E

A331 ZIGIE 2419.0N 15717.5W
SEDAR 4530.4N 12643.0W

A332 APACK 2402.8N 15619.3W
AMITY 2626.0N 15229.0W
HEMLO 4318.2N 12640.8W

A334 HAT YAI
KOTA BHARU

A335 HOHHOT
TUMURTAI
ULAN BATOR
(IRKUTSK)

(Partially Implemented – See Chapter 2)

A337 ADKAK 3354.0N 14210.0E
TEGOD 2100.0N 14512.0E
JUNIE 1132.5N 14706.3E
KISME 0500.0N 14805.4E

A338 CHRISTCHURCH
APORO 5000.0S 17120.0E
BYRD

A339 PERTH
CURTIN
ELBIS 0905.9S 12743.7E
SHREE 0539.0N 13109.2E
KEITH 2100.0N 13456.8E
SABGU 2529.9N 13459.3E
MAKDA 2716.0N 13551.2E
TAXON 3000.0N 13714.5E
MIYAKE JIMA

A340 RAYONG
BISOR 1221.0N 10247.0E
PHNOM PENH

A341 KOTA KINABALU
SANDAKAN
ZAMBOANGA

A342 COLD BAY
OLCOT 5125.8N 16533.3E

A344 ROZAX 0245.6S 11140.0E
SUMBAWA

A345 PYONGYANG
GOLOT 4012.5N 12430.5E
FENGCHENG
KAIYUAN
HAILAR
KAGAK 4916N 11806E
MANLI 4935N 11727E
TELOK 4938N 11722E
(CHITA)

A346 HAMILTON IS

AUCKLAND

A348 MELBOURNE
EAST SALE
NISEP 4146.6S 15601.5E

A349 BANGKOK
PATHEIN
CALCUTTA

A364 SHACHE
KASHI
KURUM 4006.0N 07407.0E

A450 DENPASSAR
HASSANUDDIN
KOROR
YAP IS
GUAM
WAKE
KATHS 2104.6N 16123.4W

A451 (ADEN)
ANGAL 1614N 06000E
MUMBAI

A452 GOLEM 1157.6N 06722.2E
ELKEL 0149.0N 06911.0E
(DIEGO GARCIA)

A453 (KANDAHAR)
(ZAHEDAN)
(BANDER ABBAS)

A456 AMRITSAR
LAHORE
MOLTA 3012.0N 07236.2E
BINDO

A457 HAT YAI
TAMOS 0632.2N 10024.0E
ALOR SETAR
PENANG
KUALA LUMPUR
JOHOR BAHRU

A460 KUQA
REVKI 4232.5N 8013.2E
(KIRBALTABAY)

A461 DAWANGZHUANG
WEIXIAN
ZHOUKOU
HEKOU
LONGKOU
LILING
YINGDE
SHILONG
BEKOL 2232.6N 11408.0E
CHEUNGCHAU
NOMAN 2000.0N 11640.3E
MUMOT 1930.4N 11714.5E
AVMUP 1843.3N 11808.3E
SAN FERNANDO
CABANATUAN
MANILA
SAN JOSE
ZAMBOANGA
AMBON
DARWIN
ALICE SPRINGS
LEIGH CREEK

A462 CALCUTTA
DHAKA

A463 MADURAI
BIKOK 0817.0N 07836.0E
COLOMBO
COCOS IS
PERTH

A464 CHIANG MAI
BANGKOK
HAT YAI
IPOH
BATU ARANG
KUALA LUMPUR
SINGAPORE
TINDAL
TAROOM
LORD HOWE IS
AUCKLAND

A465 CALCUTTA
METIM 2055.0N 08750.0E
VISHAKAPATNAM
MADRAS
COLOMBO

A466 (KABUL)
SANAM 3305.0N 07003.0E
DERA ISMAIL KHAN
JHANG 3116.0N 07218.0E
SAMAR 3120.8N 07434.0E
ASARI 3048.3N 07509.6E
DELHI

A467 BIRATNAGAR
KATIHAR
CALCUTTA

(A469 in Chapter 2)

A470 HONG KONG
MAGOG 2217.3N 11549.4E
SHANTOU
XINGLIN
FUZHOU
YUNHE
TONGLU
HANGZHOU
LISHUI
BANTA
PIXIAN

A473 JALALABAD
NEPALGUNJ
KATHMANDU

(To be implemented as L626 in June 2005 − See Chapter 2)

A474 DELHI
BOMBAY
MURUS 0600.0S 06319.7E
(PLAISANCE)

A575 PYONGYANG
GOLOT 4012.5N 12430.5E
FENGCHENG
DONGYANGJIAO
DAHUSHAN
CHAOYANG
ANDIN 4106.0N 11843.5E
GUBEIKOU
FENGNING
EREN
INTIK 4341.5N 11155.0E
SAINSHAND
ULAN BATOR
(KYZYL)

A576 MEDAN
SINGAPORE
DENPASAR
CURTIN
ALICE SPRINGS
PARKES
SYDNEY

A577 SHIKANG
KADET 2100.0N 11934.0E

A578 TONIK 3200.0N 14600.0E
PHONPEI
NAURU
TARAWA
NADI
AUCKLAND

A579 SYDNEY
NADI
CARRP 1904.4N 15935.0W

A580 AUCKLAND
NAUSORI
APIA

A581 BAGO
CHIANG MAI
CHIANG RAI
PONUK 2018.8N 10023.0E
SAGAG 2111.5N 10137.4E
BIDRU
KUNMING
MAGUOHE
QIANXI
HUAYUAN

LINLI
WUHAN

A582 JOMALIG
CHINEN
KAGOSHIMA
IKISHIMA
PUSAN
SEOUL

A583 HONG KONG
SABNO 1859.1N 11550.7E
MAVRA 1814.4N 11615.1E
AKOTA 1706.6N 11651.6E
IBOBI 1354.4N 11832.6E
REKEL 1324.1N 11848.3E
LEGED 1301.9N 11859.6E
TOKON 1142.0N 11940.3E
ZAMBOANGA

A584 TONGA
NIUE
APIA
FUNAFUTI
NAURU
KOSRAE

(Partially Implemented. See Chapter 2.)

A585 PALEMBANG
JAKARTA
PORT HEDLAND
CEDUNA
ADELAIDE

A586 INTOS 3722.00N 13120.00E
PUSAN
CHEJU
ERABU
NAHA

A587 SUMBAWA
ALICE SPRINGS

A588 DALIAN
WAFANGDIAN
DAGUSHAN
DONGYANGJIAO
WANGBINGOU
KAIYUAN
CHANGCHUN
HARBIN

A590 MANILA
JOMALIG
MINAMI DAITO
MIYAKEJIMA
KAGIS 3549.0N 14234.0E
PABBA 3700.0N 14400.0E
PASRO 1417.1N 16040.5E
(AMOTT) 6054.0N 15121.6W

A591 QINDAO
XUEJIADAO
LATUX 3532.0N 12044.0E
MUDAL 3651.0N 12322.0E
AGAVO 3710.0N 12400.0E

A592 PUPIS 1000.0S 17105.5W
APIA
VAVA'U
TONGA

A593 TANGHEKOU
XILIUHETUN
SHIGEZHUANG
POTOU
PIXIAN
WUXI
SHANGHAI
NANHUI
FUKUE

A594 MALE 0028.7S 07800.0E
SUNAN 0200.0S 07927.1E
DADAR
PERTH

A595 FUKUOKA
IKISHIMA
CHEJU

A596 HUAIROU
HUAILAI
TIANZHEN
LIANGCHENG
BAOTOU
DENGKOU
YABRAI

A597 GOBOH
KUSHIMOTO
MONPI 2100.0N 14036.0E
GUAM
NOUMEA
AUCKLAND

A598 BRISBANE
HONIARA

NAURU
MAJURO

A599 CHITTAGONG
LINSO 2322.5N 09855.0E
GENGMA
KUNMING
LUXI
BOSE
LAIBIN
GAOYAO
PINGZHOU
ZHULIAO
WONGYUAN
NANXIONG
GANZHOU
NANFENG
SHANGRAO
TONGLU
NANXUN
SHANGHAI

B200 ENKIP 3547.0S 17730.0E
FICKY 3133.6N 12123.5W

(B201 in Chapter 2)

B202 UBON
PAKSE
PLEIKU

B203 KATHMANDU
BAGDOGRA
GUWAHATI
SILCHAR
IMPHAL
LASHIO

B206 FUKANG
ALETAI
GOPTO 4905.5N 08728.0E
(AKTASH)

B209 JAMSHEDPUR
KHAJURAHO
TIGER 2828.8N 07214.9E

B210 BHUBANESWAR
TASOP 2513.3N 07048.9E
NAWABSHAH

(B212 in Chapter 2)

B213 LHASA
CHENGDU

B215 DAWANGZHUANG
TAIYUAN
YINCHUAN
YABRAI
JIUQUAN
HAMI
FUKANG
URUMQI
KUQA
SHACHE
HONGQILAPU
PURPA 3656.5N 07524.5E
GILGIT
ISLAMABAD

B218 KUNMING
SIMAO 2243.1N 16058.2E
SAGAG 2111.5N 10137.4E
VIENTIANE

B219 PENANG
KOTA BHARU

B220 BRISBANE
PORT MORESBY

B221 NINAS 3100.0N 12215.0E
PINOT 3125.2N 12214.2E
SAGUT 3500.0N 12040.3E
XUEJIADAO

B222 VINIK 0838.6N 11613.8E
KOTA KINABALU

B223 HAILAR
QIAIHAR
HARBIN

B326 HONIARA
CHOKO 2022.6N 16053.0W

B327 KATCH 5400.0N 13600.0W
KODIAK
CAPE NEWENHAM
NULUK 5822.9N 17706.1W
BAMOK 5625.5N 17249.3W
(NIKOLSKOE)

B328 EREN
TAMURTAI
TIANZHEN
NANCHENGZI
WEIXIAN

B329 PHNOM PENH
PAKSE

B330 HONG KONG
TAMOT
PINGZHOU
GAOYAO
DOUJIANG
QUIANXI
FUJIACHANG
JINGTAI
YABRAI
MORIT 4202.0N 10249.0E
NIDOR 5029.4N 09125.8E
(LIKAR)

B331 CHEUNG CHAU
KAPLI 2110.0N 11730.0E
HENGCHUN

B332 SANKO 3814.2N 12228.4E
TOMUK 3843.0N 12400.0E
PYONGYANG
SINSONGCHON
SONDO 3947.0N 12713.6E
KANSU 3838.0N 13228.5E

B333 AUCKLAND
PORT MORESBY

B334 BEIJIN
TANGHEKOU
FENGNING
TONGLIAO

B335 KUALA LUMPUR
PEKANBARU
POSOD 0329.5S 09409.9E
PEDPI 1316.6S 07500.0E
(PLAISANCE)

B337 (TAKHTOYAMSK)
ANIMO 4508.3N 14337.8E
ASAHIKAWA

B338 MERSING
TEKONG
ANITO 0017.0S 10452.0E

B340 TRIVANDRUM
BIKOK 0817.0N 07836.0E
COLOMBO
LEARMONTH
MOUNT HOPE
ADELAIDE

B344 (PLAISANCE)
LELED 1116.5S 07500.0E
ELATI 0200.0S 08957.7E
KETIV 0042.0S 09200.0E
MEDAN

B345 KATHMANDU
BHARATPUR
BHAIRAHAWA
LUCKNOW

B348 HENGCHUN
POTIB 2100.0N 12045.5E
LAOAG
SAN FERNANDO
MANILA
TOKON 1142.0N 11940.3E
PUERTOPRINCESA
OSANU 0741.4N 11717.6E
KOTA KINABALU
BRUNEI
KAMIN 0235.1N 10855.7E
SABIP 0209.7N 10750.5E
TOMAN 0121.5N 10547.0E

B349 BALI
POTIP 2141.6S 12508.0E

B450 SYDNEY
LORD HOWE IS
NORFORK IS

B451 HARBIN
ASUKI 4318.0N 12946.0E
BISUN 4314.0N 13111.8E
(VLADIVOSTOK)
IGROD 4139.0N 13647.0E
KADBO 3914.0N 13745.0E

B452 TONIK 3200.0N 14600.0E
HONIARA
NADI

B453 MIDDLETON IS
KATCH 5400.0N 13600.0W
DAASH 4226.5N 12600.1W

B454 PAGO PAGO
RAROTONGA
TONYS 3019.9N 12249.2W

B455 VAVA'U
NISEX 1547.3S 17136.4W

B456 **MADANG**
WEWAK
VANIMO
JAYAPURA

(Partially Implemented. See Chapter 2.)

B457
(IZKI)
BELGAUM
BELLARY

B459
BOMBAY
CLAVA 0134.0N 06000.0E
(PRASLIN)

B462
MACKAY
HAMILTON IS.
PORT MORESBY
KADAB 0458.0S 14100.0E
BIDOR 0400.0S 13130.0E
TACLOBAN
MANILA
CABANATUAN
LAOAG
MIYAKO JIMA
OKINAWA

B463
KOTA BHARU
DAWEI
BAGO
MANDALAY
LASHIO

B465
CALCUTTA
CHITTAGONG
MANDALAY
LUANG PRABANG
HANOI

B466
JOHOR BAHRU
BATU ARANG
MADRAS
BOMBAY

B467
KANGWON
INTOS 3722.0N 13120.0E
KANSU 3838.0N 13228.5E
NULAR 4059.2N 13411.0E
(TEKUK) 4241.0N 13527.4E

B469
SINGAPORE
JAKARTA
CARNARVON
GERALDTON
PERTH
CAIGUNA
WHYALLA
GRIFFITH
SYDNEY

B470
SINGAPORE
PANGKALPINANG
JAKARTA

B472
LIPA
ILO ILO
COTABATO
SELSO 0400.0N 12616.0E
TOREX 0724.0N 13335.0E
GOVE
NORMANTON

B473
LIPA
ROXAS
CAGAYAN-DE-ORO
DAVAO
SADAN 0400.0N 12805.0E
CAIRNS

B474
SYDNEY
SANTO
NANUMEA
CHOKO 2022.6N 16053.0W

B480
(RAZDOLITE)
LETBI 5011.9N 10330.6E
BULGAN
MORIT 4202.0N 10249.0E

B575
AUCKLAND
TONGA
PAGO PAGO

B576
TAIBEI
CHEJU
SEOUL

B577
NADI
WALLIS IS
APIA
PAGO PAGO
FICKY 3133.5N 12123.5W

B578
BRISBANE
NOUMEA
TAHITI

B579
DELHI
NAGPUR
VISHAKHAPATNAM
PORT BLAIR
PHUKET
LANGKAWI

PENANG

B580 SYDNEY
NOUMEA
CHOKO 2022.6N 16053.0W

B581 NADI
FICKY 3133.5N 12123.5W

B583 BRUNEI
DARWIN

B584 DENPASAR
ELANG 0056.0S 11449.5E
KOTA KINABALU

B586 NOUMEA
SEKMO
KAPKI
PORT MORESBY
GUAM
OMLET 2100.0N 14259.2E
TATEYAMA

B587 ST GEORGE
KOWANYAMA
OPABA 0851.5S 13804.0E
TIMIKA
BIAK
RENAN 0330.0N 13416.6E
ENDAX 1415.0N 13000.0E
ATVIP 2100.0N 12422.0E
HUALIEN

B589 PORT MORESBY
KAPKI
KIRIWINA
BUKA
MAJURO

B590 NOUMEA
PORT VILA
NAURU

B591 **SHANGHAI**
TAIBEI
HENCHUN

(Partially implemented. See Chapter 2.)

B592 KOTA KINABALU
JAKART

B593 CALCUTTA
COMILLA
AGARTALA
GUWAHATI

B595 TAHITI
KONA

B596 RAROTONGA
DOVRR 1843.0N 15740.0W

B597 ERABU
TANEGASHIMA
SHIMIZU

B598 DARWIN
THURSDAY ISLAND
PORT MORESBY
KAPKI 1014.9S 14817.7E
HONIARA
PORT VILA
NADI
NAUSORI
TONGA
RAROTONGA

B599 NOUMEA
NADI
TAHITI

G200 CHRISTMAS IS.
COCOS IS
(PLAISANCE)

G202 (KANDAHAR)
ZHOB
RAHIM YAR KHAN

G203 MIHO
PUSAN

G204 ELNEX
SHENGXIAN
METAN
SHANGHAI

G205 HAMILTON IS.
GURNEY
JUNIE

G206 DILARAM
KABUL
SABAR
PURPA

G208 MUMBAI
KARACHI

PANJGUR
(ZAHEDAN)

G209 LAERMONTH
CHRISTMAS ISLAND
PALEMBANG

G212 (KHABAROVSK)
ARGUK 4753.5N 13439.4E
HAIQING
JIAMUSI
HARBIN
TONGLIAO
GUBEIKOU
QINBAIKOU
NANCHENGZI
TAIYUAN
YIJUN
SANYUAN
XIAOYANZHUANG
NINGSHAN
WUFENGXI
FUJIACHANG
WEINING
MAGUOHE
KUNMING

G213 BIAK
BEKUB 0350.0N 13845.0E
GUAM

G214 JIWANI
PANJGUR
RAHIM YAR KHAN
MOLTA 3012.0N 07236.2E

G215 DUTCH HARBOR
OLCOT 5125.8N 16533.3E

G219 VIRUT 0230.8N 10402.7E
TEKONG

G221 BAOLONG
HAIKOU
SAMAS
SIKOU

G222 SAPDA
BROOME
AYERS ROCK
PARKES

G223 TATEYAMA
TONIK 3200.0N 14600.0E
NAURU
NADI
NAUSORI
NIUE
AITUTAKI
TAHITI
(LIMA)

G224 NORFORK IS
NADI
PAGO PAGO
TAHITI
ISLA DE PASCUA
(SANTIAGO)

G325 COLOMBO
TIRUCHCHIRAPPALLI

G326 BALI
TENNANT CREEK
BRISBANE

G327 NANHUI
NINAS 3100.0N 12215.0E
AKARA 3130.0N 12330.0E

G329 BRISBANE
NORFORK IS

G330 SHANGHAI
POMOK
NANTONG
GURNI 3209.2N 12058.5E
PIMOL 3215.0N 11944.0E

G331 PHUKET
PADET
DAWEI

G332 TANGHEKOU
CHAOYANG

G334 KUALA LUMPUR
TIOMAM
BUNTO 0242.0N 10600.0E
DOTAS 0201.1N 10820.5E
SIBU

G335 KATHMANDU
JANAKPUR
PATNA

G336 DHANBAD
PATNA
SIMRA
KATHMANDU

G337 PERTH
CHRISTMAS IS
PEKANBARU

G339 PUSAN
FUKUOKA
KAGOSHIMA
TANEGASHIMA
PAKDO
GUAM

G340 QINGBAIKOU
HUAILAI

G341 CHANGCHUN
ASUKI 4318.0N 12946.0E

G342 CAIRNS
HONIARA

G344 COMFE 3624.0N 14618.0E
CUTEE 4624.9N 16218.6E
CUDDA 5647.9N 16018.1W

G345 UNTAN
CHANGZHOU
LISHUI

G346 KIMCHAEK
NULAR 4059.2N 13411.0E
IGROD 4139.0N 13647.0E

G347 AUCKLAND
POPIR 2500.0S 17804.8W
PADDI 1825.7N 15854.8W

G348 PARO
BAGDOGRA

G424 (DAR ES SALAAM)
VUTAS 0912.0N 06000.0E
ALATO 1340.7N 06344.0E

G450 (MOGADISHU)
BOMBAY
NAGPUR
CALCUTTA

G452 (ZAHEDAN)
RAHIM YAR KHAN
TIGER 2828.8N 07214.9E
DELHI

G453 KUALA LUMPUR
KOTA BHARU

G454 (PLAISANCE)
BOBOD 0600.0S 06941.1E
PADLA 0446.1N 07800.0E
COLOMBO

G455 SHANGHAI
PINOT 3125.2N 12214.2E
AKARA 3130.0N 12330.0E

G457 DOVRR 1843.0N 15740.0W
ELLMS 0500.0S 16704.1W
PAGO PAGO
FAROA 2500.0S 17502.3W
DIVSO 3452.3S 17624.5E

G458 BANGKOK
SURAT THANI
PHUKET

G459 CAIRNS
TIMIKA

G460 KUCHING
SIBU
BINTULU
BRUNEI

(G461 in Chapter 2)

G462 (IZKI)
TRIVANDRUM
COLOMBO
JAKARTA
INDRAMAYU
MADIN 0617.9S 11023.0E
CUCUT 0617.7S 11106.0E
SURABAYA
BALI
DARWIN

G463 RAJSHAHI
DHAKA
CHITTAGONG
BAGO
BETNO 1505.8N 09812.7E
BANGKOK

G464 PONTIANAK
ROZAX 0245.0S 11140.0E
BALI
KARRATHA
BALLIDU
PERTH

G465 (PRASLIN)
MALE
COLOMBO

PORT BLAIR
DAWEI
BANGKOK

G466 HO CHI MINH
PHUCAT
HENGCHUN

G467 LUBANG
JOMALIG
GUAM

G468 PENANG
MEDAN

G469 PORT HEIDEN
ST PAUL IS
NYMPH 5324.5N 16814.4E

G470 XIANYANG
FENGHUO
CHANGWU
JINGNING
JINGTAI

G471 SHILONG
LONGMEN
GANGZHOU

G472 KARACHI
AHMEDABAD
NAGPUR
BHUBANESHWAR
PATHEIN
BAGO

G474 BANGKOK
MENAM 1357.3N 10247.7E
SOURN 1345.5N 10600.0E
ANINA 1359.0N 10725.0E
PHUCAT

G575 TAHITI
RANGIROA
FICKY 3133.5N 12123.5W

G576 CHEER 5310.0N 14000.1W
SPONJ 4992.0N 13005.1W

G578 GURAG 2100.0N 12725.0E
DILIS 1431.0N 12600.0E
TACLOBAN
MACTAN
ZAMBOANGA
DENPASAR
PORT HEDLAND
PARABURDOOD
PERTH

G579 JAKARTA
PALEMBANG
SINGAPORE
JOHOR BAHRU

G580 TOMAN 0121.5N 10547.0E
NIMIX 0124.9N 10759.2E
ATETI 0125.7N 10830.1E
KUCHING
MIRI
BRUNEI
KOTA KINABALU

G581 HONG KONG
ELATO 2220.0N 11730.0E
HENGCHUN
MIYAKO JIMA
BISIS 2647.0N 12633.0E
ERABU
MIYAKE JIMA

G582 PUGER 0324.1N 10017.6E
BATU ARANG
PEKAN

G583 EMMONAK
BESAT 5945.0N 17925.1W
(UST-BOLSHERETSK)
BISIV 4456.3N 14412.3E
MONBETSU

G584 KUALA LUMPUR
PEKAN
KUCHING

G585 MIHO
POHANG
SEOUL

G586 YINGDE
ERTANG

G587 TAIBEI
PABSO 2538.0N 12252.0E
BULAN 2704.0N 12400.0E

G588 MOOREN
KHOVD
TEBUS 4725.1N 09027.7E
TESAN 4701.7N 08947.8E
FUKANG

(G589 in Chapter 2)

G590
SIMRA
VARANASI
KHAJURAHO
BHOPAL
INDORE
BODAR 2236.3N 07413.3E

G591
CAIRNS
NOUMEA
NORFORK IS
AUCKLAND

G593
FUNAFUTI
NAUSORI
NIUE
RAROTONGA

G594
TIAMU
TAHITI
RAROTONGA
AUCKLAND
SOLIT 2355.0S 07500.0E
(PLAISANCE)

G595
(TAHITI)
SYDNEY
MABAD 2648.4S 07500.0E
(PLAISNACE)

G597
DONVO 3734.0N 12320.0E
AGAVO 3710.0N 12400.0E
SEOUL
KANGNUNG
MIHO
OTSU
KOWA
OSHIMA
VENUS 3618.2N 14042.1E

G598
LUCKNOW
APIPU 2658.6N 08300.0E
SIMARU

G599
AUCKLAND
TAHITI

R200
PINGZHOU
LIANSHENGWEI
BIGRO
ZHANJIANG

R201
BANGKOK
UTAPAO

R203
COLOMBO
PHUKET

R204
KEITH 2100.0N 13456.5E
KALIN 0000.0N 14200.0E
LIDIT 0918.0S 14220.0E
HORN IS
CAIRNS

R205
ANARAK
BIRJAND

R206
PORT HEDLAND
CHRISTMAS IS
JAKARTA

R207
VIENTIANE
NAN
CHIANG MAI
MANDALAY

R208
KUALA LUMPUR
KUALA TRENGGANU
KANTO 0649.9N 10348.3E

R209
TATOX 0857.0N 09702.0E
LANGKAWI

R210
PORT MORESBY
CAIRNS

R211
KASMI 3601.3N 14040.3E
DAIGO
NIIGATA
KADBO 3914.0N 13745.4E
AVGOK 4336.0N 13815.0E
VELTA 4529.0N 13710.0E

R212
(DIEGO GARCIA)
GUDUG 0704.6S 07500.0E
PIBED 0520.2S 09044.0E

R215
CHIANG RAI
NAN
LUANG PRABANG

(R216 in Chapter 2)

R217
NODAN 4025.0N 14500.0E
SENDAI
NIIGATA

R219
(SHARJAH)
MAROB 2225.6B 06309.3E
BOMBAY

R220
DAIGO
IWAKI
NANAC 3854.2N 14313.9E
NIPPI 4942.6N 15920.8E

	NODLE	6117.0N 15200.0W
R221	MERSING	
	PULAU TIOMAN	
R222	AVGOK	4336.0N 13815.0E
	(YEDINKA)	
R325	KATHMANDU	
	JANAKPUR	
	DUMKA	2411.0N 08721.3E
	CALCUTTA	
	PHUKET	
	HAT YAI	
	IPOH	
	JOHOR BAHRU	
R326	NORFOLK IS	
	CHRISTCHURCH	
R327	GISBORNE	
	FAROA	
R328	KARACHI	
	MINAR	2350.0N 06800.0E
	SAPNA	2330.0N 06750.0E
	BILAT	2058.4N 06800.0E
	MUMBAI	
R329	KAGLU	1231.2N 07200.0E
	MALE	
	GAN	
	(DIEGO GARCIA)	
R330	SHEMYA	
	POWAL	5024.3N 16530.8E
R332	MAJURO	
	BONRIKI	
	AKUMO	0614.9S 17535.5E
	ROTUMA	
	NADI	
R333	**DODMI**	**2243.1N 11610.1E**
	AKERO	**2002.7N 11642.5E**
	(Proposed to be deleted. See Chapter 2.)	
R334	RAYONG	
	KOH KONG	
	PHNOM PENH	
R335	**MAGOG**	**2217.3N 11549.4E**
	MAKUNG	
	(Proposed to be deleted. See Chpater 2.)	
R336	ADAK	
	CARTO	4840.5N 16847.0E
R337	TACLOBAN	
	KOROR	
R338	NOME	
	NINNA	5455.7N 17158.8E
R339	**HONG KONG**	
	VICAP	**2131.3N 11332.0E**
	SIKOU	2050.6N 11130.0E
	ZHANJIANG	
	NANNING	
	BOSE	
	(Hong Kong – VICAP segment is proposed to be deleted. See Chapter 2.)	
R340	AMBON	
	WALGETT	
R341	KODIAK	
	NINNA	5455.7N 17158.8E
R342	MANADO	
	BONDA	0200.0N 12451.2E
	PEDNO	0400.0N 12521.0E
	GENERAL SANTOS	
	DAVAO	
R343	NANXIANG	
	WUXI	
	LISHUI	
	HEFEI	
	WUHAN	
	LONGKOU	
	LAOLIANGCANG	
	DARONGJIANG	
	LAIBIN	
	NANNING	
R344	KATHMANDU	
	BIRATNAGAR	
	KATIHAR	
	RAJSHAHI	
R345	**VIENTIEN**	
	TAKHAEK	
	PAKSE	
	STANG TRENG	
	REPED	**1111.0N 10548.2E**

(Not implemented. See Chapter 2)

R346 TOWNSVILLE
PORT MORESBY

R347 NIIGATA
SADO
EKVIK 3944.7N 13636.5E
IGROD 4139.0N 13647.0E
(VELTA) 4529.0N 13710.0E

R348 KADAP 0200.0S 08409.6E
LATEP 0610.3S 07500.0E
(DIEGO GARCIA)

R349 LEMOK 1000.0N 10302.2E
RASER 1000.0N 10506.0E
HO CHI MINH

R450 KIETA
HONIARA

R451 ADAK
OGDEN 4929.2N 16102.3E

R452 SONDO 3947.0N 12713.6E
HAMUN 3955.1N 12731.1E
KIMCHAEK
UAMRI 4217.6N 13041.8E
(TEKUK) 4241.0N 13527.4E

R453 NADI
APIA

R455 PONTIANAK
KUCHING

R456 (IZKI)
BOTAN 2006.6N 06021.8E
MALE
MABIX 0315.0N 09454.0E

R457 TRIVANDRUM
MALE

(R459 in Chapter 2)

R460 DELHI
LUCKNOW
VARANASI
GAYA
CALCUTTA

R461 BOMBAY
BELGAUM
COIMBATORE
COLOMBO
MEDAN
KUALA LUMPUR

R462 (SEEB)
DENDA 2442.5N 06054.8E
JIWANI
KARACHI
DELHI

R463 APACK 2402.6N 15619.2W
ALCOA 3750.0N 12550.0W

R464 BITTA 2332.0N 15529.0W
BEBOP 3700.0N 12500.0W

R465 CLUTS 2300.0N 15439.0W
CLUKK 3605.0N 12450.0W

(R466 in Chapter 2)

R467 KUALA LUMPUR
GUNIP 0429.9N 09931.9E

R468 BOMBAY
VISHAKHAPATNAM
BANGKOK
BOKAK 1257.5N 10230.0E
PHNOM PENH
SAPEN 1102.2N 10611.0E
HO CHI MINH

R469 PEKANBARU
SINGAPORE

R470 VIENTIANE
UDON THANI
KHON KAEN

R472 CALCUTTA
RAJSHAHI
GUWAHATI

R473 LILING
NANXIONG
WONGYUANG
ZHULIAO
PINGZHOU
TAMOT 2221.5N 11352.0E

R474 GAOYAO
NANNING
LONGZHOU
HANOI
VIENTIANE
BANGKOK

R576 DENNS 2222.0N 15353.0W

	DINTY	3329.0N 12235.0W
R577	EBBER	2143.0N 15309.0W
	ELKEY	3241.0N 12203.0W
R578	FITES	2049.0N 15300.0W
	FICKY	3133.5N 12123.5W

(R579 in Chapter 2)

R580	OATIS	3800.0N 14345.0E
	OMOTO	4859.7N 16000.7E
	AMOTT	6053.9N 15121.8W
R581	CALCUTTA	
	MONDA	2521.0N 08626.4E
	SIMARA	
R582	NORFOLK IS	
	RAROTONGA	
R583	TAIBEI	
	BISIS	2647.1N 12633.1E
	OKINAWA	
	MINAMIDAITO	
	SABGU	
	BUNGO	
R584	OKINAWA	
	KEITH	2100.0N 13456.5E
	GUAM	
	TRUK	
	POHNPEI	
	KWAJALEIN	
	MAJURO	
	JOHNSTON IS	
	CHOKO	2022.9N 16053.2W
R585	CITTA	2818.9N 14507.2W
	GATES	3412.7N 12303.9W
R587	BRISBANE	
	PORT VILA	
R588	PHUKET	
	RELIP	
	KAKET	
	PHNOM PENH	
	PLEIKU	
R590	AMBON	
	COTABATO	
R591	CAPE NEWENHAM	
	AKISU	4734.3N 16119.3E
	ABETS	3605.0N 14425.0E
R592	BALI	
	ONSLOW	
	PERTH	

(R593 in Chapter 2)

R595	ANPU	
	MIYAKO JIMA	
	KEITH	2100.0N 13456.5E
	GUAM	
R596	HENGCHUN	
	TIDEL	1912.2N 13000.0E
	GUAM	
R597	CABANATUAN	
	SARSI	1642.0N 12316.9E
	SKATE	1716.7N 12423.0E
R598	CALCUTTA	
	RAJSHAHI	
	SAIDPUR	
	COOCH BEHAR	
	BOGOP	
	PARO	
R599	KIETA	
	GIZO	
	HONIARA	
	PORT VILA	
	WHANGAREI	
	AUCKLAND	

RNAV ROUTES

UL425	(KUTVI)	
	ASPUX	1744.00N 06000.00E
	DONSA	1434.14N 06511.32E
	VANVO	1043.00N 07200.00E
L500	(SANTIAGO)	
	AUCKLAND	
L501	(RIO GALLEGOS)	
	AUCKLAND	
L502	ISLA DE PASCUA	
	(LOS ANGELES)	
L503	BRISBANE	
	IGEVO	3636.5S 16300.0E
	CHRISTCHURCH	
L508	CHRISTCHURCH	

	MELBOURNE	
L513	PERTH	
	HOBART	
	AUCKLAND	
L521	SYDNEY	
	AUCKLAND	
L625	LUSMO	0333.7N 10655.7E
	AKMON	0812.8N 11013.4E
	ALDAS	1056.9N 11212.3E
	ANOKI	1222.0N 11315.0E
	ARESI	1358.4N 11427.0E
	AKOTA	1706.6N 11651.6E
	AVMUP	1843.3N 11808.3E
	POTIB	2100.0N 12045.5E
L628	LUBANG	
	IBOBI	1354.4N 11832.6E
	GUKUM	1356.8N 11637.2E
	ARESI	1358.4N 11427.0E
	MESOX	1358.4N 11427.0E
	DAMEL	1358.7N 11130.6E
	VEPAM	1358.0N 11000.0E
	PHUCAT	
L629	PEKAN	
	DOLOX	0448.7N 10522.9E
L635	PEKAN	
	MABLI	0417.3N 10612.9E
L637	BITOD	0715.3N 10612.9E
	TANSONNHET	
L642	CHEUNG CHAU	
	EPDOS	1900.0N 11333.3E
	ENBOK	1833.4N 11329.5E
	EGEMU	1700.0N 11217.0E
	VEPAM	1358.0N 11000.0E
	PHANTHIET	
	CONSON IS	
	ESPOB	0700.0N 10533.4E
	ENREP	0452.4N 10414.8E
	MERSING	
L643	TANSONNHET	
	CONSON	
UM501	BHUBANESHWAR	
	PHUKET	
UM551	DONSA	1435.3N 06511.6E
	ANGAL	1614.1N 06000.1E
	(AVAVO)	1646.3N 05526.1E
M625	MELBOURNE	
	WELLINGTON	
M636	SYDNEY	
	WELLINGTON	
M639	IGEVO	3636.5S 16300.0E
	WELLINGTON	
M643	HOBART	
	CHRISTCHURCH	
M750	KILOG	2152.5N 11441.6E
	ENVAR	2159.5N 11730.0E
	MOLKA	2639.5N 12400.0E
	MOMPA	3050.5N 12955.1E
	MANEP	3242.9N 13340.0E
	KUSHIMOTO	
M751	MERSING	
	PEKAN	
	KOTA BHARU	
	REGOS	1200.0N 10035.1E
	BANGKOK	
M753	ENREP	0452.4N 10414.8E
	BITOD	0715.3N 10407.3E
	PHUQUOC	
	PHNOM PENH	
M754	BRUNEI	
	VINIK	0838.6N 11613.8E
	TENON	0915.3N 11616.5E
	LULBU	1104.7N 11624.4E
	NOBEN	1234.4N 11631.1E
	GUKUM	1356.8N 11637.2E
	AKOTA	1706.6N 11651.6E
M758	PEKAN	
	LUSMO	0333.7N 10655.7E
	TERIX	0415.4N 10934.7E
	OLKIT	0450.1N 11149.1E
	KOTA KINABALU	
M759	OLKIT	0450.1N 11149.1E
	BRUNEI	

M761 PEKAN
BOBOB 0222.1N 10706.1E
SABIP 0209.7N 10750.5E
AGOBA 0158.7N 10830.0E
KUCHING

M765 KOTA BHARU
IGARI 0656.2N 10335.2E
BITOD 0715.3N 10407.3E
CONSON
DAGAG 0927.8N 10826.5E
MAPNO 1013.1N 11020.1E

M767 JOMALIG
TOKON 1142.0N 11940.3E
TENON 0915.3N 11616.5E
TEGID 0857.2N 11551.6E
TODAM 0631.7N 11235.4E

M768 BRUNEI
DOGOG 0525.3N 11407.5E
ASISU 0559.9N 11319.6E
TODAM 0631.7N 11235.4E
LAGOT 0716.6N 11132.5E
AKMON 0812.8N 11013.4E
MAXON 0849.5N 10921.3E
DAGAG 0927.8N 10826.5E
TANSONNHAT

M771 MERSING
DOLOX 0448.7N 10522.9E
DUDIS 0700.0N 10648.7E
DAGAG 0927.8N 10826.5E
DOXAR 1220.0N 11022.7E
DAMEL 1358.7N 11130.6E
TERIX 0415.4N 10934.7E
BOBOB 0222.1N 10706.1E
TOMAN 0121.5N 10547.0E

N750 SYDNEY
CHRISTCHURCH

N759 MELBOURNE
AUCKLAND

M774 AUCKLAND
SYDNEY

N875 PONTIANAK
ARUPA 0031.7N 10848.7E
NIMIX 0124.9N 10759.2E
BOBOB 0222.1N 10706.1E
ENREP 0452.4N 10414.8E

N884 MERSING
LUSMO 0333.7N 10655.7E
LAGOT 0716.6N 11131.5E
LAXOR 0950.3N 11447.9E
LULBU 1104.7N 11624.4E
LEGED 1301.9N 11859.6E
LUBANG

N891 PAPA UNIFORM
ENREP 0452.4N 10414.8E
IGARI 0656.2N 10335.2E
SAMOG 0800.0N 13014.6E
RAYONG
BANGKOK

N892 HENGCHUN
KABAM 2100.0N 11925.7E
MUMOT 1930.4N 11714.5E
MAVRA 1814.4N 11615.1E
MIGUG 1516.4N 11400.0E
MESOX 1358.8N 11302.7E
MUGAN 1222.0N 11152.3E
MAPNO 1013.1N 11020.1E
MOXON 0849.5N 10921.3E
MELAS 0704.9N 10808.4E
MABLI 0417.3N 10612.9E
MERSING

Chapter 2: Route in BANP − Not Implemented

The segments which have not been implemented are shown by **bold** significant points, and indicated with coordinates and the FIR names.

ATS ROUTES	SIGNIFICANT POINTS	COORDINATES	FIR	REMARKS
A1 (partially implemented)	**(DUBAI/SHARJAH)** **JIWANI (JI)** **KARACHI (KC)** **PRATAPGARH (PRA)** **CALCUTTA (CEA)** **BAGO (BGO)** BANGKOK UBON DANANG CAVOI DAGON HONG KONG ELATO MAKUNG TAIBEI KAGOSHIMA MIYAKE JIMA	 2503.8N 06147.7E 2454.6N 06710.6E 2401.8N 07445.0E 2238.7N 08827.0E 1719.2N 09631.0E	 Karachi Karachi Mumbai Kolkata Yangon	
A202* (partially implemented. Amendment proposal APAC 05/18 has been submitted to delete the segment not implemented.)	**CHITOSE (CHE)** **NIIGATA (GTC)** **KAGOSHIMA (HKC)** **CHEUNG CHAU (CH)** SIKOU N2050.6 E11130.0 SAMAS N2030.3 E11029.7 ASSAD N182028 E1074053 XONUS N1804.2 E10714.0 DONGHOI VILAO N1718.0 E10600.0 SAVANNAKET KORAT BANGKOK	4242.0N 14141.2E 3757.5N 13906.9E 3141.8N 13035.0E 2213.2N 11401.8E	Tokyo Tokyo Tokyo Hong Kong	
A203* (Amendment proposal has been submitted to delete this route.)	**HONG KONG (CH)** **TAIBEI (APU)**	2213.2N 11401.8E 2510.6N 12131.3E	Hong Kong Taipei	
A218*	**HARBIN (HRB)** **(EKIMCHAN) (QA)** (MYS SHMIDTA) BARROW	4537.4N 12615.6E	Shenyang	
A223*	**RUSAR**	2951.7N 12750.4E	Naha	

	FUKUOKA (DGC)	3340.6N 13023.4E	Tokyo	
A335* (Amendment proposal has been submitted to delete the segment not implemented.)	HOHHOT **TUMURTAI (TMR)** **ULAN BATOR (UDA)** (IRKUTSK)	 4150.7N 11309.0E 4752.1N 10644.0E	 Beijing Ulan Batar	

ATS ROUTES	SIGNIFICANT POINTS	COORDINATES	FIR	REMARKS
A469* (Implemented as L643, pending BANP Amendment)	**HO CHI MINH (TSN)** **CONSON IS (CS)**	1049.0N 10638.7E 0843.8N 10637.9E	Ho Chi Minh Ho Chi Minh	
A473* (To be implemented in June 2005 as L626)	**JALALABAD (JAL)** **NEPALGUNJ (NGJ)** **KATHMANDU (KTM)**	2741.7N 07939.3E 2806.1N 08139.1E 2740.5N 08521.0E	Delhi Kathmandu Kathmandu	
A584* (Proposed Amendment to be submitted to delete the segment not implemented)	TONGA NIUE APIA FUNAFUTI **NAURU (NI)** **KOSRAE (UKS)**	 0032.6S 16655.3E 0521.1N 16257.4E	 Nauru Oakland Oceanic	
B201* (Proposed Amendment to be submitted to delete from the BANP)	**NIUE (NU)** **AUCKLAND (AA)**	1904.4N 16955.0E 3700.3N 17448.8E	Fuji New Zealand	
B212* (Co-ordination on-going. Target implementation June 2006)	**KANGNUNG** **NIGATA (GTC)**	3757.5N 13906.9E	Incheon Tokyo	
B456* (Partially Implemented from WEWAK DCT to JAYAPURA proposed amendment to be submitted for the entire route)	**MADANG (MAG)** **WEWAK (WK)** **VANIMO (VNO)** **JAYAPURA (JPA)**	0512.7S 14546.6E 0335.0S 14340.6E 0240.7S 14118.2E 0235.3S 14031.9E	Port Moresby Port Moresby Port Moresby Biak	
B591* (Consider for future implementation)	**SHANGHAI (SHA)** **TAIBEI (APU)** HENGCHUN	3112.0N 12119.9E 2510.6N 12131.3E	Shanghai Taipei	

ATS ROUTES	SIGNIFICANT POINTS	COORDINATES	FIR	REMARKS
G461* (Amendment Proposal to be submitted)	**JAKARTA (DKI)** **CIREBON (CA)** SEMARAN BLORA SURABAYA	0557.7N 10702.1E 0641.9N 10833.6E	Jakarta Jakarta	
G473* (Implementation on-going)	BAGO MAKAS **PHITSANULOKE (PSL)** **DANANG (DAN)** **LUBANG (LBG)**	 1646.2N 10017.5E 1603.2N 10811.9E 1351.2N 12006.4E	 Thailand Ho Chi Minh Manila	
G589* (Implemented as B467. Amendment Proposal to delete G589 to be submitted)	**AVGOK** **KANGNUNG**	4336.1N 13814.8E	Vladivostock Inchoeon	
R216*	**URUMQI** **(ALMA ATA)**	4354.4N 08728.5E (4322.5N 07705.2E)	Urumqi Kazakhstan	
R333*	**DOTMI** **AKERO** (Now NOMAN)	2243.1N 11610.1E 2002.7N 11642.5E	Guangzhou Hong Kong/Manila	
R335*	**MAGOG** **MAKUNG (MKG)**	2217.3N 11549.4E 2335.7N 11938.2E	Hong Kong Taipei	
R339 (Amendment Proposal to delete R339 has been submitted.)	**HONG KONG** **VICAP N2131.3 E11332.0**		Hong Kong Hong Kong	
R345*	**VIENTIEN (VTN)** **TAKHAEK** **PAKSE (PAK)** **STREUNG TRENG (ST)** **RUPED**	1800.6N 10232.4E ? 1511.8N 10544.3E 1331.5N 10600.9E 1111.0N 10548.2E	Vientiane ? Vientiane Phnom Penh Phnom Penh	
R459* (To be implemented as L504. Target implementation date 12 May 2005)	**MANADO (MWB)** **BALIKPAPAN (BPN)** **ELANG** **PONTIANAK (PNK)** **MINOS** **TANJUNG PINANG (TI)**	0119.4N 12457.3E 0114.7N 11656.4E 0055.6N 11450.1E 0004.7N 10922.5E 0000.0 10901.7E 0055.2N 10431.6E	Ujung Pandang Bali Bali Jakarta Singapore	

ATS ROUTES	SIGNIFICANT POINTS	COORDINATES	FIR	REMARKS
R466* (Implemented as R446. Subject to BANP amendment)	**(YUZHNO-SAKHALINSK)** **ANIMO**	4511.9N 14340.8E	Yuzhno-sakhalinsk Yuzhno-sakhalinsk/Tokyo	
R579* (To be implemented 12 May 2005 with proposed route extension)	**PADANG (PDG)** **PEKANBARU (PKU)** **MALACCA (MC)**	0052.3N 10021.2E 0025.5N 10126.5E	Jakarta Jakarta Kuala Lumpur	
R593* (Amendment Proposal submitted)	**BOMBAY (BBB)** **(HAIMA)**	1905.1N 07252.5E	Mumbai Oman	

* Those routes were listed in the APANPIRG List of Deficiencies.

DETAILED DESCRIPTION OF ROUTES IN BANP – NOT IMPLEMENTED

ATS ROUTE NAME: **A1** Requested by :

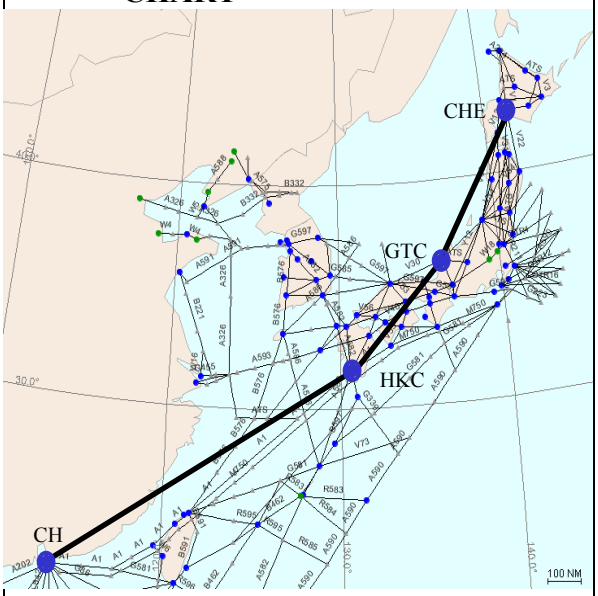
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **(DUBAI/SHARJAH) .. JIWANI (JI) .. KARACHI (KC) .. PRATAPGARH (PRA) .. CALCUTTA (CEA) .. BAGO (BGO) .. BANGKOK (BKK)..** **UBON .. DANANG .. CAVOI 1713.5N 11000.0E .. DAGON 1900.0N 11148.3E .. HONG KONG .. ELATO 2220.0N 11730.0E .. MAKUNG .. TAIBEI .. KAGOSHIMA .. MIYAKE JIMA** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** **Under development**

Action Required	States continue to coordinate to submit proposals for amendments.
	ICAO has circulated proposal for amendment as APAC 05/23.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: A1 has been replaced by A791 between Kolkata VOR in India and Hail VOR in the Middle East, and by L507 between LIMLA and Kolkata VOR. The ATS route A1 applies only east of LIMLA on the Yangon and Bangkok FIRs boundary.

ATS ROUTE NAME: **A202** Requested by :

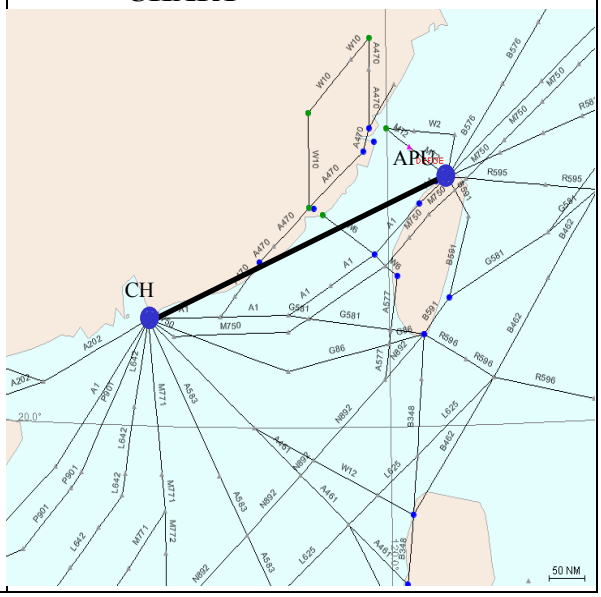
ENTRY/EXIT POINT **ROUTE DESCRIPTION** **CHITOSE (CHE) .. NIIGATA (GTC) .. KAGOSHIMA (HKC) .. CHEUNG CHAU (CH) .. SIKOU N2050.6 E11130.0 .. SAMAS N2030.3 E11029.7 .. ASSAD N182028 E1074053 .. XONUS N1804.2 E10714.0 .. DONGHOI .. VILAO N1718.0 E10600.0 .. SAVANNAKET .. KORAT .. BANGKOK (BKK)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	China and Hong Kong,China have submitted amendment proposals APAC 05/18 for deletion from BANP.
	ICAO circulated proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: Segment between Bangkok and Donghai is implemented. Segment between Hong Kong and Chitose is not possible and cannot be implemented at present. The requirement is being served by other available ATS route. The direct route requirement will be kept under review.

ATS ROUTE NAME: **A203** Requested by :

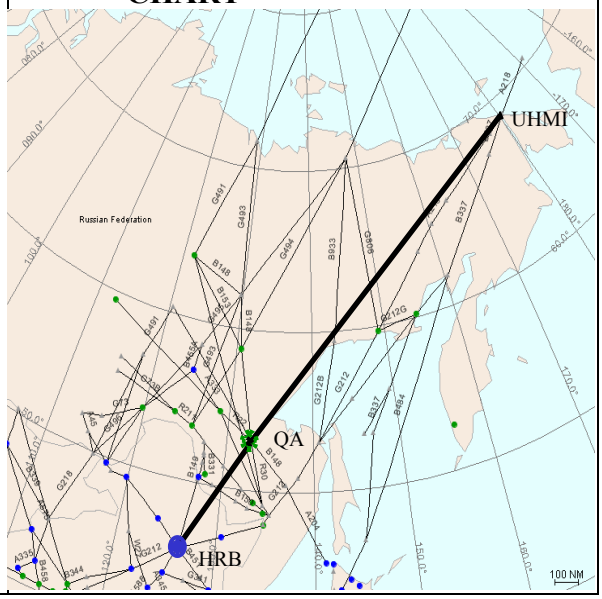
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Hong Kong (CH) .. Taipei (APU)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	China and Hong Kong,China have submitted amendment proposals for deletion from BANP .
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The route between Hong Kong and Taibei is not possible and cannot be implemented at present. The requirement is being served by other available ATS route. The direct route requirement will be kept under review.

ATS ROUTE NAME: **A218** Requested by :

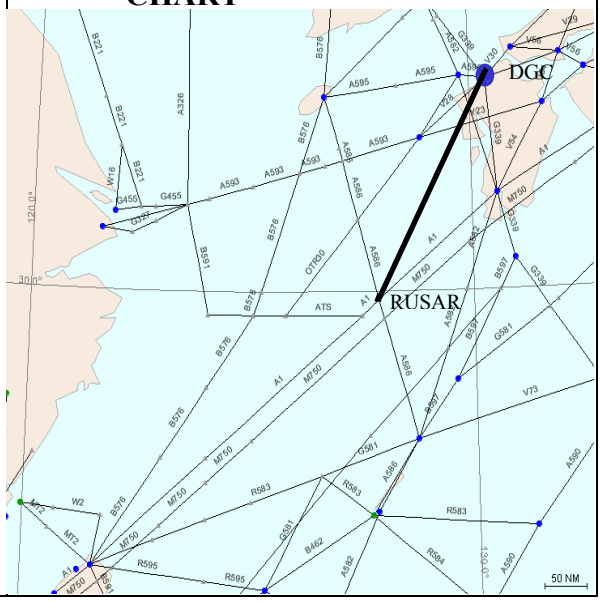
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Harbin (HRB) .. Ekimchan (QA) .. Mys Shmidta (UHMI) .. Barrow** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	States to submit proposals for deletion of the segment between Harbin and Ekimchan from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The route between Harbin and Ekimchan is not possible and cannot be implemented at present. The requirement is being served by other available ATS route. The direct route requirement will be kept under review.

ATS ROUTE NAME: **A223** Requested by :

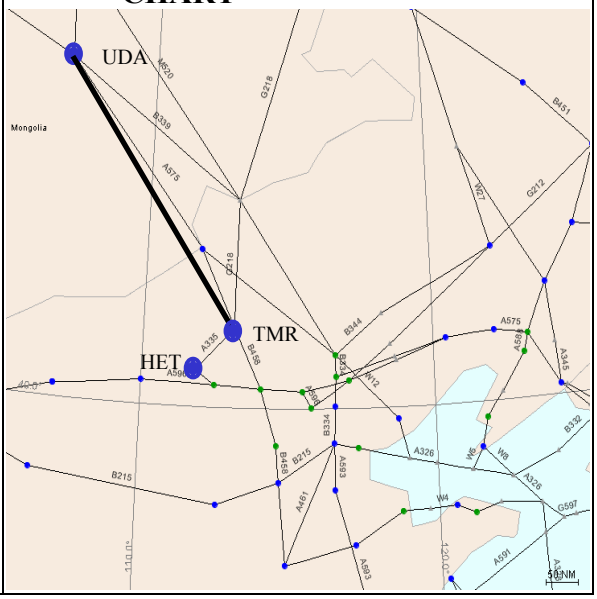
ENTRY/EXIT POINT **ROUTE DESCRIPTION** **RUSAR .. Fukuoka (DGC)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	Japan to continue to review or submit proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The route between RUSAR and FUKUOKA is not possible and cannot be implemented at present. The requirement is being served by other available ATS route. The direct route requirement will be kept under review.

ATS ROUTE NAME: **A335** Requested by :

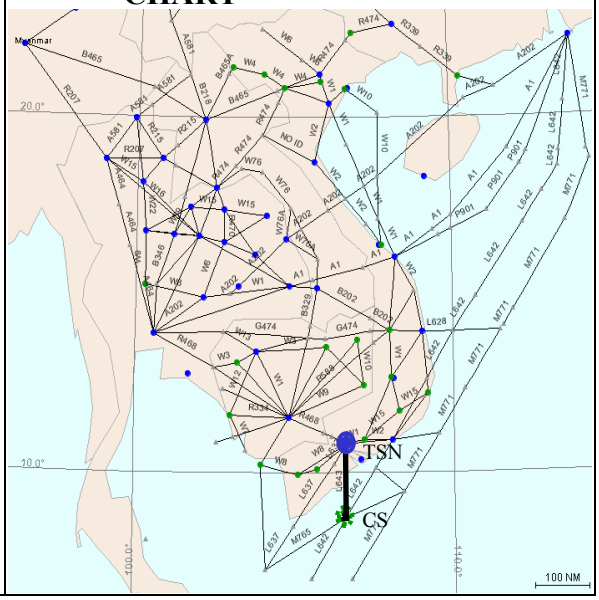
ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Hohhot .. Tumurtai (TMR) .. Ulaanbaatar (UDA) .. (Irkutsk)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	China to submit proposals for deletion from BANP.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The route between Tumurtai and Ulan Bator is being served by other available ATS route.

ATS ROUTE NAME: **A469** Requested by :

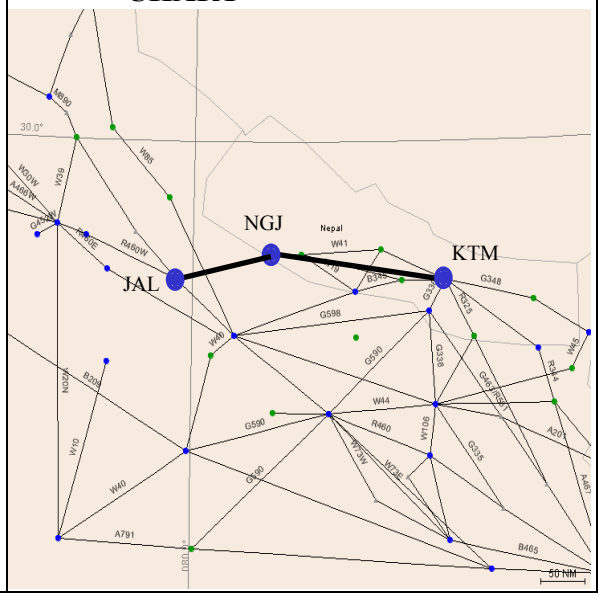
ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Tansonnhat (TSN) .. Conson (CS)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	Viet Nam to submit proposals for deletion from BANP.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The route is being served by other available ATS route.

ATS ROUTE NAME: **A473** Requested by :

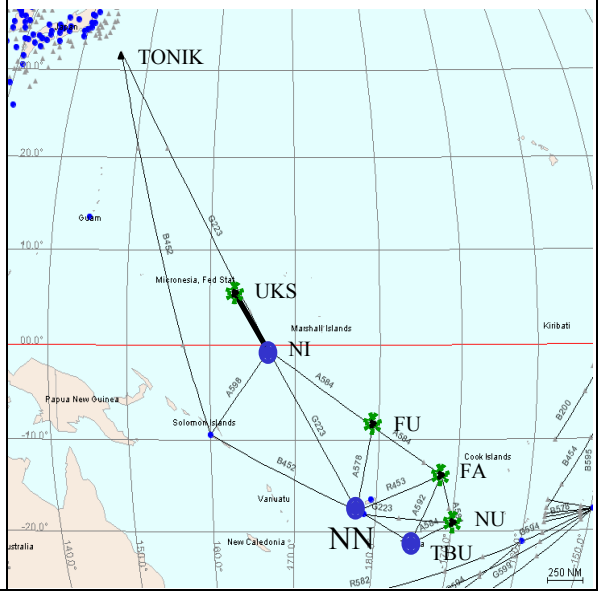
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Jalalabad (JAL) .. Nepalgunj (NGJ) .. Kathmandu (KTM)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	States to implement the requirement as L626 in June 2005.
	Amendment proposal to delete be submitted

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The route will be served as L626 in June 2005.

ATS ROUTE NAME: **A584** Requested by :

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Tonga (TBU) .. Niue (NU) .. Faleolo (FA) .. Funafuti (FU) .. Nauru (NI) .. Kosrae (UKS)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	US to submit proposal for deletion of the segment between Nauru and Kosrae.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The segment will be proposed by US to delete from the BANO.

ATS ROUTE NAME: **B201** Requested by :

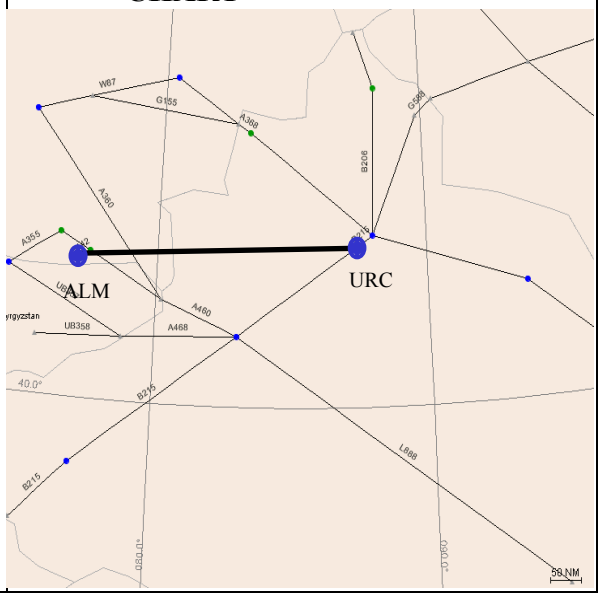
ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Niue (NU) .. Auckland (AA)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** **Under construction**

Action Required	States to coordinate to submit proposal for deletion of the requirement.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The segment will be delete after the States' proposals.

ATS ROUTE NAME: **R216** Requested by :

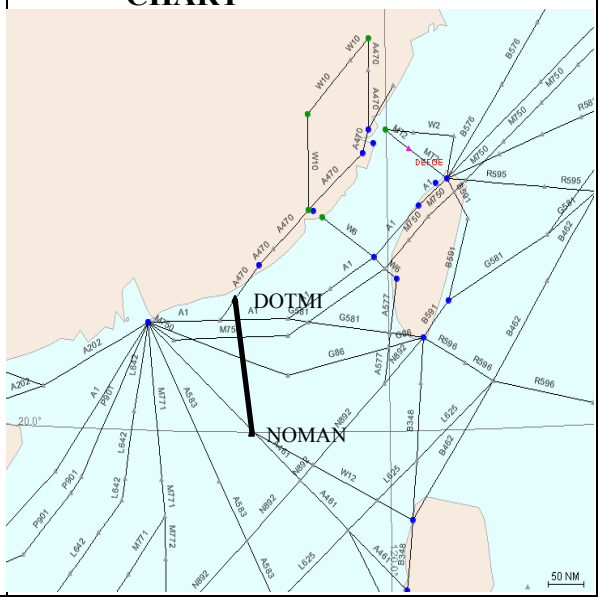
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Urumqi (URC) .. Almaty (ALM)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	States to coordinate to submit proposal for deletion of the requirement.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The route between URUMQI and ALMA ATA is not possible and cannot be implemented at present. The requirement is being served by other available ATS route. The direct route requirement will be kept under review.

ATS ROUTE NAME: **R333** Requested by :

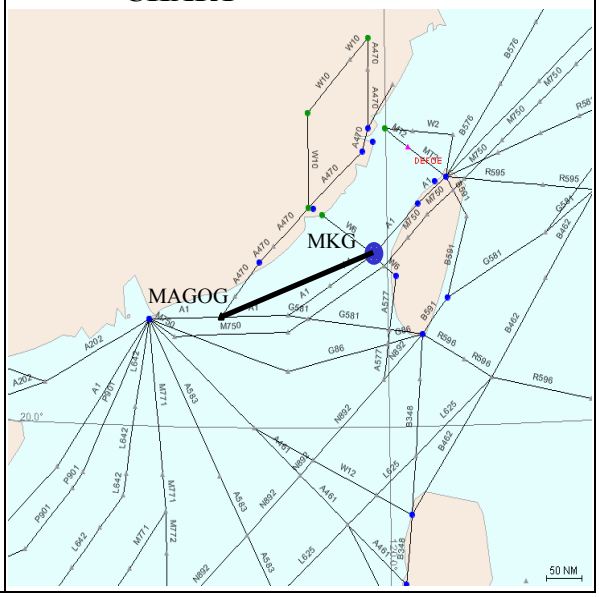
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **DOTMI .. NOMAN** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	China and Hong Kong,China have submitted amendment proposals for deletion from BANP.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The route requirement between DOTMI and NOMAN (formerly AKERO) need to be collectively considered with other future ATS route system to be developed in the region to reap the best overall result for all concerned parties. The direct route requirement will be kept under review.

ATS ROUTE NAME: **R335** Requested by :

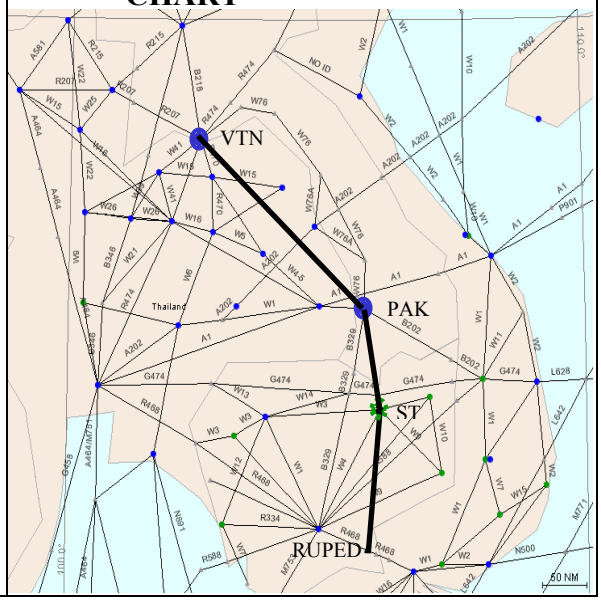
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **MAGOG .. Makung (MKG)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	China and Hong Kong,China have submitted amendment proposals for deletion from BANP.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The route between MAGOG and MAKUNG is not possible and cannot be implemented at present. The requirement is being served by other available ATS route. The direct route requirement will be kept under review.

ATS ROUTE NAME: **R345** Requested by :

ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Vientiane (VTN) .. Takhaek .. Pakse (PAK) .. Stung Treng (ST) .. RUPED** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: The route is not possible and cannot be implemented at present. The requirement is being served by other available ATS route.

Chapter 3: Routes Implemented Not In the BANP/Not In Accordance with the BANP

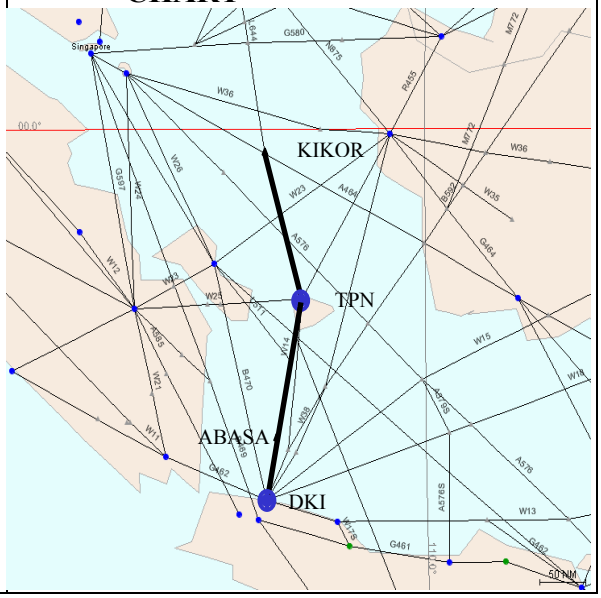
ATS Routes	Route Description /Significant points	Coordinates	FIR	Remarks
M512 (on operational trial, target implementation date 12 May 2005)	KATUNAYAKE ANIVE DOPDO		Colombo Maldives	APAC ….approved on …. Circulated on … (other relevant information e.g. ATC Coordination Group)
M772 (to be updated by ICAO Regional Office)				
EMMARSH Routes (to be updated by ICAO Regional Office)				

Chapter 4, Part A: Route Requirements − States

(This section contains routes that have been agreed to be included in the BANP and will be progressed as BANP amendments)

PROPOSER	ATS ROUTES	SIGNIFICANT POINTS	COORDINATES	FIR	REMARKS
Indonesia	L644	Jakarta ABASA Tanjung Pandan KIKOR	0557.7N 10702.1E 0456.9N 10715.7E 0243.5N 10745.2E 0024.0N 10705.1E	Jakarta Jakarta Jakarta Jakarta/Singapore	APAC-ATS-
	M635	Tanjung Pinang SANOS RAMPY Curtin	0054.2N 10430.9E 0042.0N 10619.6E 0620.8S 11320.8E 1735.3S 12351.1E	Singapore Singapore/Jakarta Jakarta Brisbane	
	M774	Tanjung Pinang KIKOR BOMAX BOLSA KIBON Pangkalan Bun KOBAS KEVOK KEONG KIKEM	0054.2N 10430.9E 0024.0N 10705.1E 0054.2S 10805.6E 0112.1S 10841.2E 0150.0S 11000.0E 0243.6S 11141.8E 0300.0S 11214.6E 0420.5S 1145605E 0655.3S 12002.0E 0952.9S 12607.4E	Singapore Singapore/Jakarta Jakarta Jakarta Jakarta Jakarta Jakarta Jakarta Jakarta Jakarta/Brisbane	
	P648	Jakarta ATOSO AMBOY AKULA KIBON OSUKA OMEGA OKADA Kinabalu	0057.9S 10702.3E 0508.9S 10728.0E 0408.0S 10810.0E 0307.2S 10857.1E 0150.0S 11000.0E 0117.5S 11024.7E 0023.0S 11107.2E 0134.0N 11238.0E 0553.9N 11601.9E	Jakarta Jakarta Jakarta Jakarta Jakarta Jakarta Jakarta Jakarta Kota Kinabaru	
	M522	Bali GALKO KEVOK ELANG MAMOK Kinabalu	0845.0S 11509.8E 0649.6S 11504.9E 0420.5N 11456.5E 0055.6S 11450.1E 0405.1N 11547.2E 0553.9N 11601.9E	Jakarta Jakarta Jakarta Jakarta Jakarta Kota Kinabaru	
Indonesia	M768	ELBIS PORAK LADOP MAMOK	0905.3S 12743.7E 0458.6S 12400.4E 0001.7N 11930.7E 0405.1N 11547.2E	Brisbane/U Pandang Ujung Pandang Jakarta Jakarta	

ATS ROUTE NAME: **L644** Requested by : Indonesia

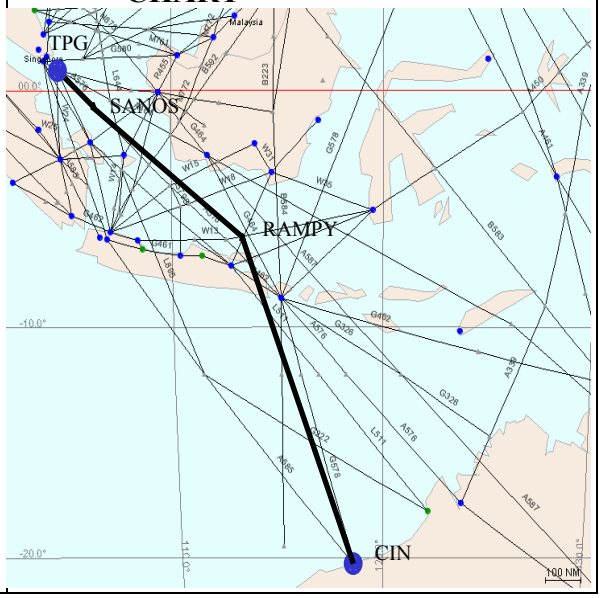
ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Jakarta (DKI) .. ABASA .. Tanjung Pandan (TPN) .. KIKOR** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required (Move to 4A)	States to coordinate imeplementation.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks:

ATS ROUTE NAME: **M635** Requested by : Indonesia

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Tanjung Pinang (TPG) .. SANOS .. RAMPY .. Curtin (CIN)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

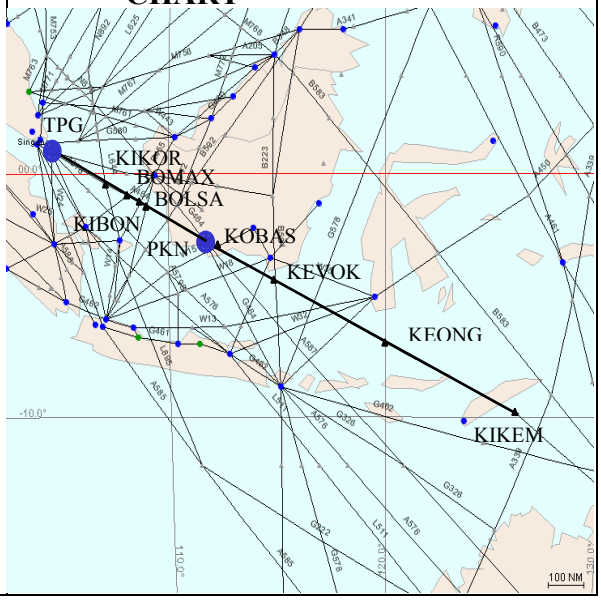
Action Required (Move to 4A)	States to coordinate to implementation.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks:

ATS ROUTE NAME: **M774**

Requested by : Indonesia

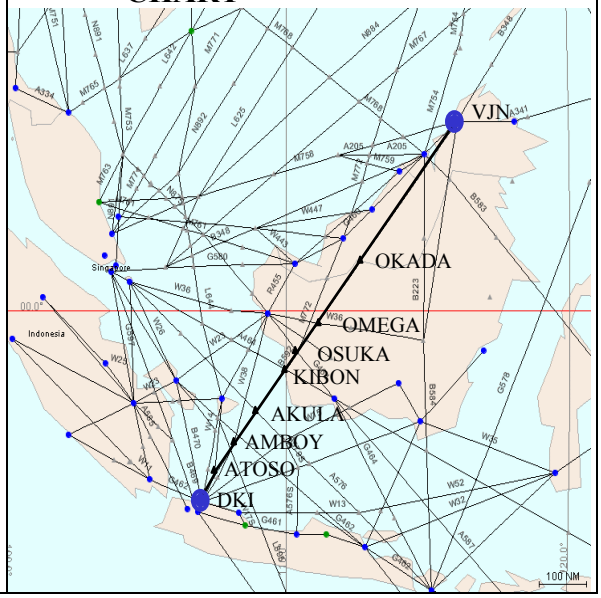
ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Tanjung Pinang (TPG) .. KIKOR .. BOMAX .. BOLSA .. KIBON .. Pangkalan Bun (PKN) .. KOBAS .. KEVOK .. KEONG .. KIKEM** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required (Move to 4A)	States agreed to implementation. BANP amendment proposal APAC-ATS/05/5 pending approval.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks:

ATS ROUTE NAME: **P648** Requested by : Indonesia

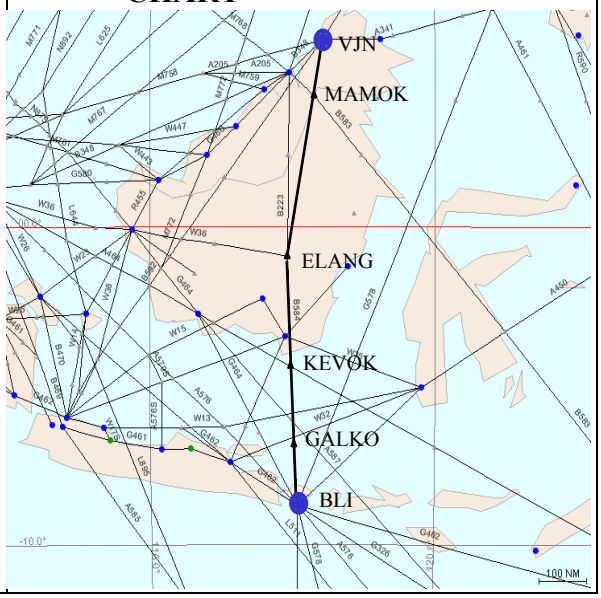
ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Jakarta (DKI) .. ATOSO .. AMBOY .. AKULA .. KIBON .. OSUKA .. OMEGA .. OKADA .. Kinabalu (VJN)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required (Move to 4A)	States agreed to implementation.
	BANP amendment proposal APAC-ATS/05/5 pending approval.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks:

ATS ROUTE NAME: **M522** Requested by : Indonesia

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Bali (BLI) .. GALKO .. KEVOK .. ELANG .. MAMOK .. Kinabalu (VJN)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required (Move to 4A)	States to coordinate implementation. BANP amendment proposal APAC-ATS/05/5 pending approval

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks:

ATS ROUTE NAME: **M768**

Requested by : Indonesia

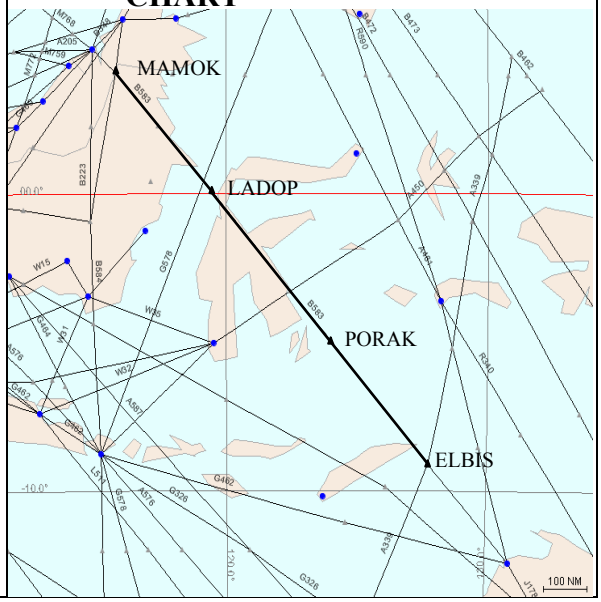
ENTRY/EXIT POINT

ROUTE DESCRIPTION
ELBIS .. PORAK .. LADOP .. MAMOK

FLIGHT LEVEL BAND

PRIORITY: HIGH/MED/LOW

CHART



Action Required (Move to 4A)	States to coordinate imeplementation.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks:

Chapter 4, Part B: Future Route Requirements – States

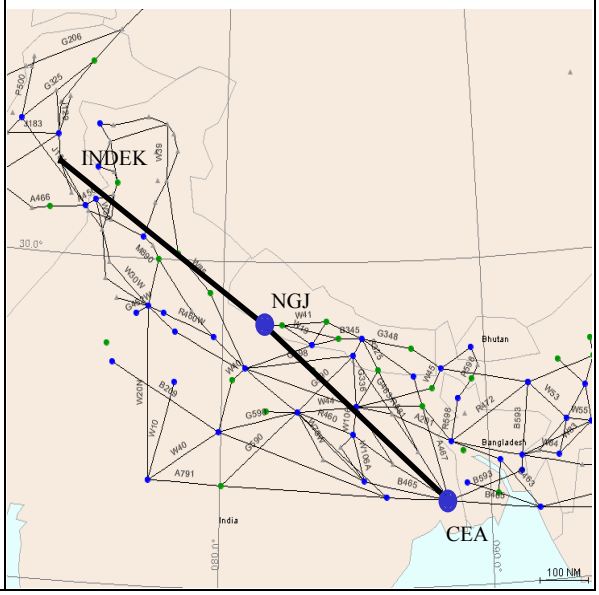
(The routes in this section are intended to be used as a basis for developing BANP amendment proposals, and to provide information on route planning developments which would form the basis for future proposals.These routes are subject to coordination and agreement.)

(Coordinates are indicative only, not for operational use)

PROPOSER	ATS ROUTE	SIGNIFICANT POINTS	COORDINATES	FIR	REMARKS
Cambodia Thailand Vietnam	R575	(provisional) PARPA UPNEP SURAT THANI Phuket			
Cambodia Thailand	R589	(provisional) Phnom Penh UPNEP SURAT THANI			
Nepal	Himalaya 1	Kolkata Nepalgunj INDEK	2238.7N 08827.2E 2806.1N 08139.1E 3246N 7316E	Kolkata Kathmandu Lahore	
	Himalaya 2	Kathmandu Baghdogra Guwahati Silchar Imphal Kunming	2740.5N 08521.0E 2641.3N 08819.8E 2606.1N 09135.3E 2454.8N 09258.9E 2446.0N 09354.5E 2501N 10244E	Kathmandu Kolkata Kolkata Kolkata Kolkata Kunming	
Tahiti	R582	KRILL MAITO Tahiti PAERE TOLAB TAMUR TIERE TARAO TUNBA TIAMU	2016.1N 15700.0E 1732.8S 14936.1E 1625.0S 14752.6W 1428.0S 14500.0W 1104.0S 14000.0W	Auckland Ocn/Tahiti Tahiti Tahiti Tahiti Tahiti Tahiti Tahiti Tahiti Tahiti Tahiti	

Viet Nam		HANOI DANANG PLEIK HO CHI MINH			
		NOBAI/ KUNMING			
		NOBAI CATBI SAMAS HONG KONG			
		ASSAD (LUANG PRABANG)			

ATS ROUTE NAME: Himalaya 1 Requested by : Nepal

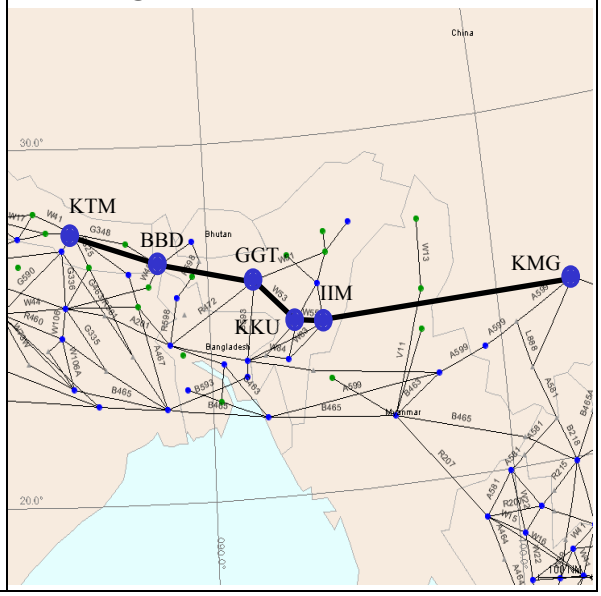
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Kolkata (CEA) .. Nepalgunj (NGJ) .. INDEK** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	States to coordinate implementation.
	.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks:

ATS ROUTE NAME: Himalaya 2 Requested by : Nepal

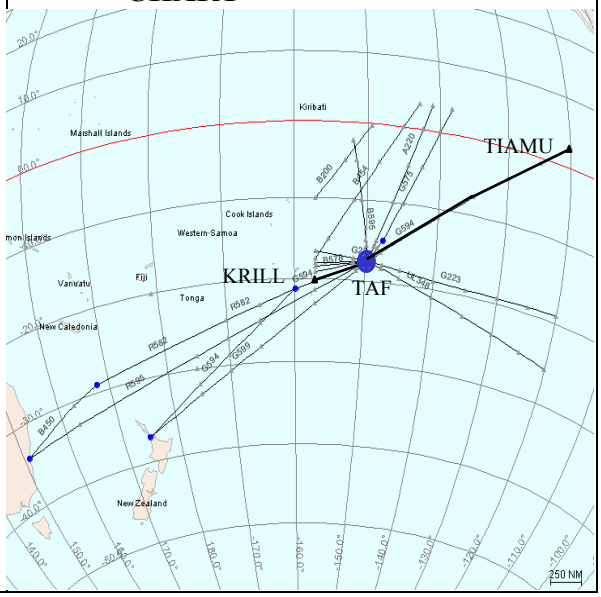
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Kathmandu (KTM) .. Baghdogra (BBD) .. Guwahati (GGT) .. Silchar (KKU) .. Imphal (IIM) .. Kunming (KTM)** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	States to coordinate imeplementation.
	.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks:

ATS ROUTE NAME: **R582** Requested by : Tahiti

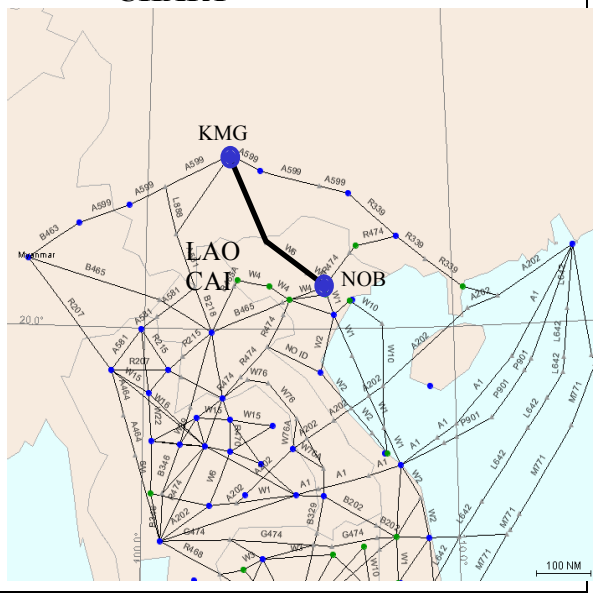
ENTRY/EXIT POINT	**CHART**
ROUTE DESCRIPTION **Decommissioned G594 and realigned R582 as KRILL .. MAITO .. Tahiti (TAF) .. PAERE .. TOLAB .. TAMUR .. TIERE.. TARAO .. TUNBA .. TIAMU** **FLIGHT LEVEL BAND** **PRIORITY: HIGH/MED/LOW**	

Action Required	States to coordinate imeplementation.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks:

ATS ROUTE NAME:
Requested by : Vietnam

ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Noibai (NOB) .. LAOCAI .. Kunming (KMG)** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	States to coordinate imeplementation.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: Because of small traffic demand and cost/benefit considerations, this route is impossible and can not be implemented at present.

ATS ROUTE NAME: Requested by : Vietnam

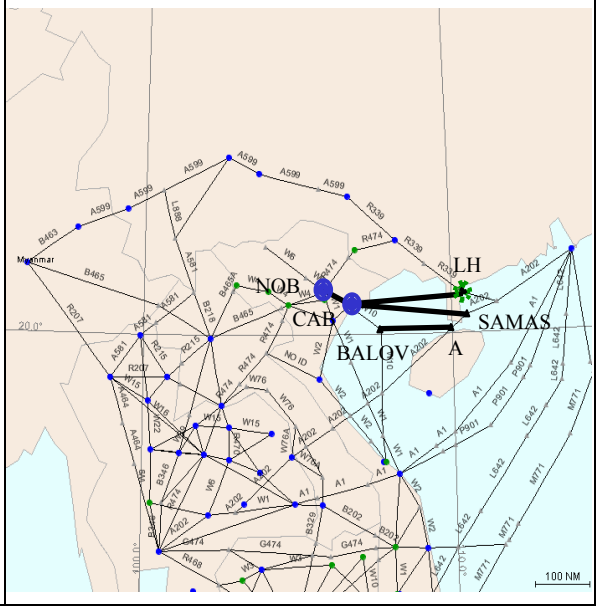
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Hanoi .. Danang .. Pleiku .. Buon Mathuot .. Anloc. .Ho Chi Minh** **FLIGHT LEVEL BAND** **29000 – 41000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** **Under Construction**

Action Required	States to coordinate to submit proposal for deletion of the requirement.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: CAAV has intended plan to upgrade the domestic ATS route W1 (Hanoi – Danang – Ho Chi Minh) to international ATS route in the upper airspace. Proposed to Regional Meeting on 4 May 2005.

ATS ROUTE NAME:
Requested by : Vietnam

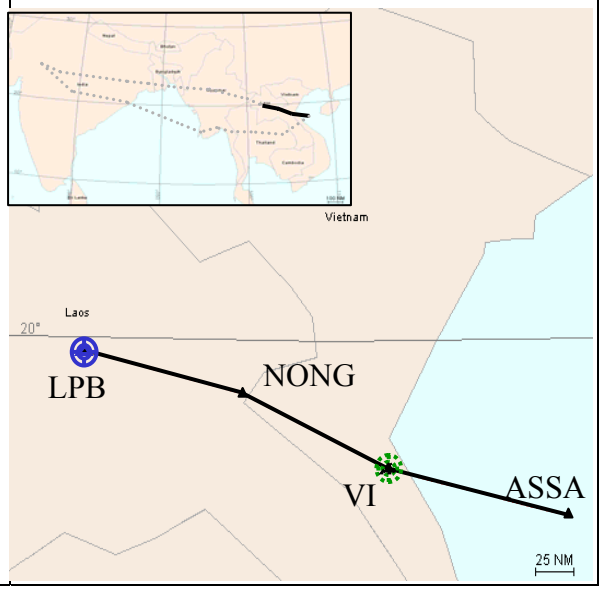
ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Three Options:** **A) Noibai (NOB) .. Catbi (CAB) .. SAMAS** **B) Noibai (NOB) .. Catbi (CAB) .. BALOV .. A .. SAMAS** **C) Noibai (NOB) .. Catbi (CAB) .. Huguang (LH)** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	States to coordinate to submit proposal for deletion of the requirement.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		
Emission	CO_2	
	NO_X	

Remarks: Because of small traffic demand and cost/benefit considerations, this route is impossible and can not be implemented at present.

ATS ROUTE NAME: SEA1 Requested by :Vietnam, Lao PDR Remarks: This route is also a user requirement as reflected in Chapter 5 under the same ATS Route Name

ENTRY/EXIT POINT **ASSAD / Nonghet(NONGT) / AKSAG** **ROUTE DESCRIPTION** **ASSAD .. Vinh(VIN) ..** **Nonghet(NONGT) ..** **LuangPrabang(LPB) ..** **FLIGHT LEVEL BAND** **28000 – 41000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	States to coordinate to submit proposal for deletion of the requirement.
	ICAO to circulate proposal for deletion from BANP.

Benefit		
Cost		
Fuel Saving		Mileage saving 100NM
Emission	CO_2	
	NO_X	

Remarks:

Chapter 5: Part A: Route Requirements − Users

(The routes in this section have been submitted by Users and agreed to be included in the BANP and are subject to an amendment proposal to the BANP)

ATS ROUTES	SIGNIFICANT POINTS	COORDINATES	FIR	REMARKS

Chapter 5: Part B: Future Route Requirements − Users

(The routes in this section are intended to be used as a basis for developing BANP amendment proposals, and to provide information on route planning developments which would form the basis for future proposals. These routes are subject to coordination and agreement.)

ATS ROUTES	SIGNIFICANT PTS	COORDINATES	FIR	REMARKS
IND 1	BBS BPL	N2014.6 E08548.8 N2317.0 E07720.2	KOLKATTA MUMBAI	
IND 2	GGC ASARI	N2444.5 E08456.6 N3048.3 E07509.5	KOLKATTA DELHI	
IND 3	LAPAN BUTOP	N2343.9 E08326.1 N2919.7 E07523.9	KOLKATTA DELHI	
IND 4	KAKID LAPAN	N2038.6 E08639.9 N2343.9 E08326.1	KOLKATTA KOLKATTA	
IND 5	BUTOP JHANG	N2919.7 E07523.9 N3116.0 E07218.0	DELHI PAKISTAN	
IND 6	BBS PRA	N2014.6 E08548.8 N2401.8 E07445.0	KOLKATTA MUMBAI	
IND 7	PRA SERKA KAMAR BIRJAND	N2401.8 E07445.0 N2951.0 E06615.0 N3239.0 E06044.0 N3258.3 E05912.0	MUMBAI DELHI KABUL TEHERAN	N877 Extension
SEA1	ASSAD VINH NONGT LPG	N1820.5 E10740.9 N1844.0 E 10540.1 N1930.0 E10359.0 N1954.0 E10209.6	HANOI HANOI VIENTIENE VIENTIENE	
SEA 2	DANANG SYX	N1603.2 E10811.9 N1818.4 E10910.4	HOCHIMINH SANYA AOR	
SEA 3	BUT ENREP	N1240.0E10100.0 N0452.4 E10414.7	BANGKOK SINGAPORE	
SEA 4	BITOD PNOMPENH	N0715.4 E10450.3 N1132.5 E10450.3	HOCHIMINH PNOMPENH	REALIGN M753
SEA 5	STUNG TRENG DANANG	N1331.5 E10600.9 N1603.2 E10811.9	PNOMPENH HOCHIMINH	

SEA 6	PAKSE ASSAD	N1511.8 E10544.5 N1820.5 E10740.9	VIENTIANE ASSAD	
SEA 7	BATAR PARDI	N0210.0 E10205.2 S0034.0 E10413.0	LUMPUR JAKARTA	UNIDIRECTION AL ROUTE
SEA 8	ARAMA BOBAG ANITO	N0136.9 E10307.2 N0102.5 E10329.9 S0017.0 E10452.0	LUMPUR SINGAPORE JAKARTA	
SEA 9	DANANG SAMUI	N1603.2 E10811.9 N0932.8 E10003.7	HOCHIMINH BANGKOK	
SEA 10	CAVOI/ IGNIS QUNGI SAMUI	N1713.5 E11000.0 N1721.0 E11109.0 N1507.0 E10848.0 N0932.8 E10003.7	SANYA AOR SANYA AOR HOCHIMINH BANGKOK	QUNGI TO CAVOI AND TO IGNIS
SEA 11	NANSHAN BUNTA/ SAMBO	N1818.4 E 10910.4 N1650.0 E 10923.7 N1616.8 E E108 42.5	SANYA AOR HOCHIMINH HOCHIMINH	NANSHAN TO BUNTA AND TO SAMBO
SEA 12	ROT HUGUANG	N16 07.0 E 103 46.7 N21 07.9 E110 20.2	HOCHIMINH GUANGZHOU	
SCS1	DAMEL CH	N1358.7 E11136.4 N2213.2E11401.8	HOCHIMINH HONGKONG	
SCS 2	VEPAM CH	N1358.0 E11000.0 N2213.2 E11401.8	HOCHIMINH HONGKONG	
SCS 3	EXOTO IDOSI	N1521.5 E11103.0 N1900.0 E11230.0	HOCHIMINH HONGKONG	
SCS 4	VKL CONSON	N0243.5 E10144.3 N0843.8 E10637.9	LUMPUR HOCHIMINH	
SCS 5	EXOTO DAMVO MELAS LUSMO	N1521.5 E11103.0 N1106.5 E10932.7 N0705.3 E10809.2 N0333.7 E10655.6	HOCHIMINH HOCHIMINH HOCHIMINH SINGAPORE	
SCS 6	LUSMO MELAS DAMVO	N0333.7 E10655.6 N0705.3 E10809.2 N1106.5 E10932.7	SINGAPORE HOCHIMINH HOCHIMINH	
SCS 7	BRUNEI LAXOR DULOP	N04 52.5E11453.1 N0949.6 E11448.5 N1814.2E11432.6	KINABALU SINGAPORE HONGKONG	TO JOIN M772 AT LAXOR

SCS8	DULOP ELATO ENVAR DULOP KAPLI	N1814.2E11432.6 N2220.0 E11730.0 N2159.5 E11730.0 N1814.2E11432.6 N2110.0 E11730.0	HONGKONG HONGKONG HONGKONG HONGKONG HONGKONG	EITHER DULOP/ KAPLI G86, OR DULOP/ ELATO& ENVAR
SCS 9	TOKON DILIS TOKON ENDAX	N1142.0 E11940.5 N1431.1 E12600.1 N1142.0 E11940.5 N1415.0 E13000.0	MANILA MANILA MANILA MANILA	EITHER TOKON/ DILIS OR TOKON/ ENDAX
PHI 1	MIA CAB MEVIN	N1430.5 E12101.3 N1528.9 E12101.5 N2100.0 E12233.0	MANILA MANILA MANILA	
PHI 2	MIA MYC	N1430.5 E12101.3 N2447.2 E12518.1	MANILA NAHA	
TWN 1	APU MIKES	N2510.6 E12131.3 N2935.2 E12544.9	TAIPEH NAHA	
THA 1	KORAT DAWEI	N1455.0 E10208.4 N1405.9 E09812.2	BANGKOK YANGON	
IDO 1	SJ MABIX	N0113.4 E10351.3 N0316.0 E09450.9	SINGAPORE JAKARTA	
COL 1	KAT TNV	N0709.7 E07952.1 S1842.2 E04731.1	COLOMBO MADAGASCAR	
KAB 1	HANGU GHAZNI	N33 29.1 E07100.4 N33 32.9 E06825.2	PAKISTAN KABUL	
WPC 1	PY VNO ROR ENDAX ELMAS TINHO	S0927.2 E14712.9 S0240.7 E14118.2 N0722.1 E13433.0 N1415.0 E13000.0 N2027.0 E12500.0 N2421.2 E12201.7	PT MORESBY PT MORESBY OAKLAND MANILA MANILA TAIPEI	
CHA 1 (CHA 5)	YNC GUPAD CGO SB	N3819.4 E 10623.8 N3618.7 E11028.4 N3430.9 E11350.6 N3150.4 E11714.0	LANZHOU LANZHOU WUHAN SHANGHAI	
CHA 2 (CHA 7)	KUQA CHW	N4143.0 E08300.0 N3951.0E09821.0	URUMQI LANZHOU	
CHA 3	FKG OMBON	N4410.0 E08759.0 N3238.5 E10420.0	URUMQI KUNMING	

(CHA 9A)				
CHA 4 (CHA 10A)	MORIT NSH POU	N4202.0 E10249.0 N3319.1 E10818.7 N2301.2 E11311.4	LANZHOU LANZHOU GUANGZHOU	
CHA 5 (CHA 11A)	YIN INTIK	N2412.4E11324.6 N4340.8 E11154.1	GUANGZHOU BEIJING	
CHA 6 (CHA14)	OMBON NSH OBLIK SB (LUOGANG)	N3238.5 E10420.0 N3319.1 E10818.7 N3218.0 E11432.0 N3146.8 E11718.1	KUNMING LANZHOU WUHAN SHANGHAI	
CHA 7 (CHA 15)	KANSU KICHA CGQ HLD	N3838.0 E13228.5 N4041.0 E12911.5 N4338.0 E12400.5 N4912.1 E11949.4	PYONGYANG PYONGYANG SHENYANG SHENYANG	
CHA 8 (CHA16)	SCH HTN CHW	N3825.7 E07714.4 N3702.2 E07952.3 N3951.0E09821.0	URUMQI URUMQI LANZHOU	
CHA 9 (CHA17)	YBL SANLI	N3925.7 E10246.3 N3200.0 E100.00.0	LANZHOU KUNMING	
CHA 10 (CHA18)	ARGUK DALIAN HEFEI BEMAG	N4753.0E13439.5 N3857.6 E12130.8 N3146.8 E11718.1 N2601.1 E11400.1	SHENYANG SHENYANG SHANGHAI GUANGZHOU	
CHA 11 (CHA19)	DALIAN XJT	N3857.6 E12130.8 N3557.7 E12014.4	SHENYANG SHANGHAI	
IATA1	KCA RED3 RED2 RED1 OMBON	N4143.0 E08300.0 N3810.0 E09230.0 N3700.0 E09530.0 N3609.1 E09738.0 N3238.5 E10420.0	URUMQI LANZHOU LANZHOU LANZHOU KUNMING	
IATA2	OMBON RO	N3238.5 E10420.0 N2546.1 E10936.4	KUNMING GUANGZHOU	
IATA3	OMBON SB (LUOGANG)	N3238.5 E10420.0 N3146.8 E11718.1	KUNMING SHANGHAI	
PRD 1	POU ZUH SIERA	N2301.2 E11311.4 N2213.3 E11328.0 N2159.1 E11333.2	GUANGZHOU GUANGZHOU HONGKONG	
PRD2	POU ZUH	N2301.2 E11311.4 N2213.3 E11328.0	GUANGZHOU GUANGZHOU	

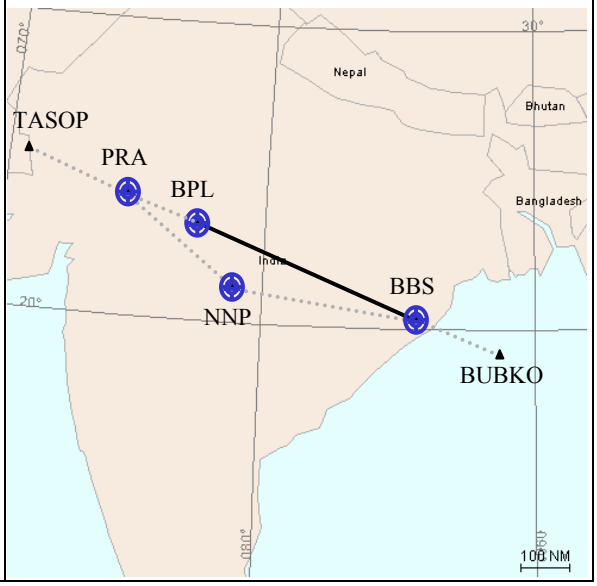
	SIERA SIKOU	N2159.1 E11333.2 N2050.6 E11130.0	HONGKONG HONGKONG	
RUS 1	SESUR XXXXX KAE	N4217.5 E13041.5 N3838.0 E12924.7 N3742.0 E12845.2	VLADIVOSTOK INCHOEN	
RUS 2	TEKUK XXXXX KAE	N4241.0 E13527.0 N3838.0 E12924.7 N3742.0 E12845.2	VLADIVOSTOK INCHOEN	
RUS 3	BG TELOD XXXXX KAE	N 4353.0 E13315.0 N4219.6 E13211.8 N3838.0 E12924.7 N3742.0 E12845.2	VLADIVOSTOK VLADIVOSTOK INCHOEN	

Note1: Acronyms used for route names are only intended as a rough guide to the location of the routes. They are explained below:

IND - India
SEA - South East Asia
SCS - South China Sea
PHI - Philippines
THA - Thailand
TWN - Taiwan
PRD - Pearl River Delta
KAB - Kabul
IDO - Indonesia
COL - Colombo
CHA - China
IATA - earlier IATA requested routes in China
WPC - West Pacific Area

Note 2: Route names in parenthesis refer to the original names from the earlier route catalogue. They are renamed following consolidation of China routes and ARNR TF 3 meeting.

ATS ROUTE NAME: IND1 REQUESTED BY: IATA

ENTRY/EXIT POINT **BBS / BPL** **ROUTE DESCRIPTION** **BBS .. BPL** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

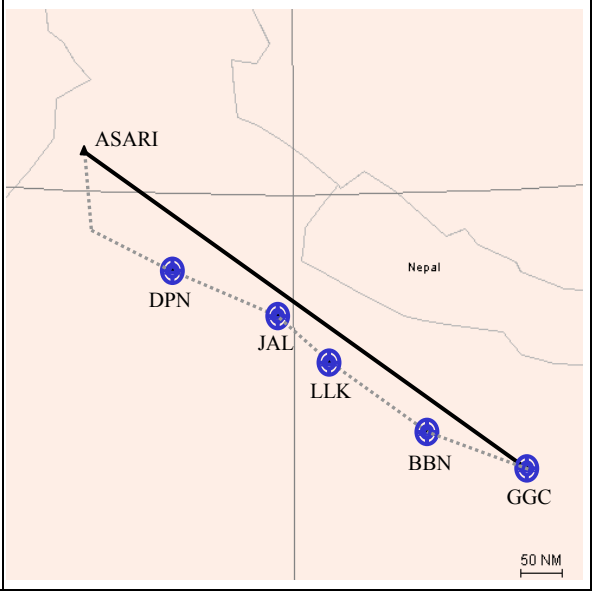
Saving	Per flight	Annual
Mileage / Time	25nm /3 mins	
Fuel	406kg	148190 kg
CO_2	1250kg	456250kg
No_x		

Remarks

Potential City Pairs: Europe/South East Asia

ATS ROUTE NAME: IND2

REQUESTED BY: IATA

ENTRY/EXIT POINT	**CHART**
ROUTE DESCRIPTION **GGC .. ASARI** **FLIGHT LEVEL BAND** **29000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	

Action Required	IATA
	ICAO

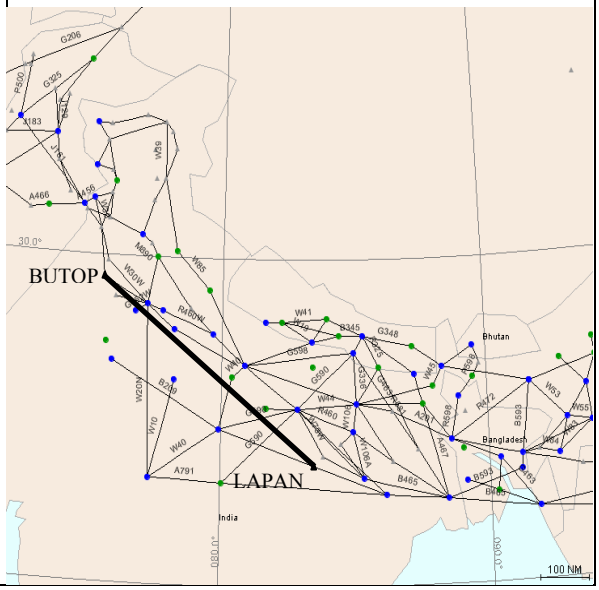
Saving	Per flight	Annual
Mileage / Time	40nm/ 5 mins	
Fuel	650kg	237250kg
CO_2	2000kg	730000kg
No_x		

Remarks

Potential City Pairs: Europe/South East Asia

ATS ROUTE NAME: IND 3

REQUESTED BY: IATA

ENTRY/EXIT POINT	**CHART**
ROUTE DESCRIPTION LAPAN ..BUTOP **FLIGHT LEVEL BAND** **28000 –46000 FEET** **PRIORITY: HIGH/MED/LOW** HIGH	

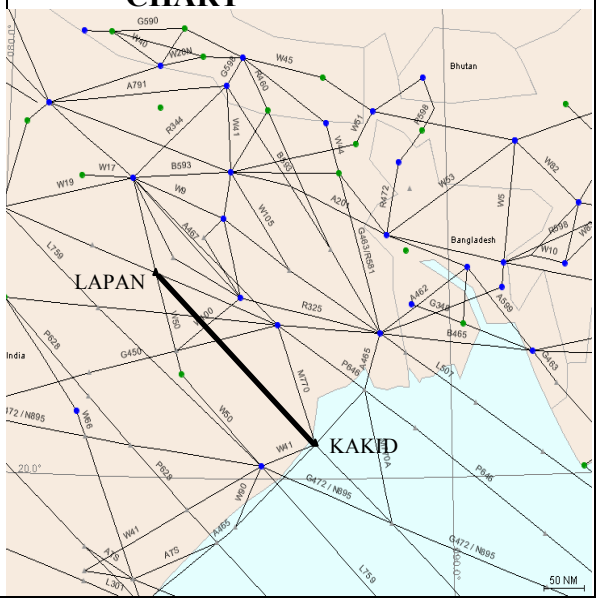
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	26nm/3.25mins	
Fuel	422kg	154,213kg
CO_2	1,300kg	474,500kg
No_x		

Remarks

Potential City Pairs: Europe – SEA airports

ATS ROUTE NAME: IND 4 REQUESTED BY: IATA

ENTRY/EXIT POINT	**CHART**
KAKID -LAPAN **ROUTE DESCRIPTION** **KAKID .. LAPAN** **FLIGHT LEVEL BAND** **28000- 46000 Feet** **PRIORITY: HIGH/MED/LOW** HIGH	

Action Required	IATA.
	ICAO

Saving	Per flight	Annual
Mileage / Time	18 nm/ 2.25min	
Fuel	292 kg	106,763kg
CO_2	900kg	328,500kg
No_x		

Remarks

Potential City Pairs: Europe – SEA Airports

ATS ROUTE NAME: IND 5

REQUESTED BY: IATA

ENTRY/EXIT POINT

BUTOP- JHANG

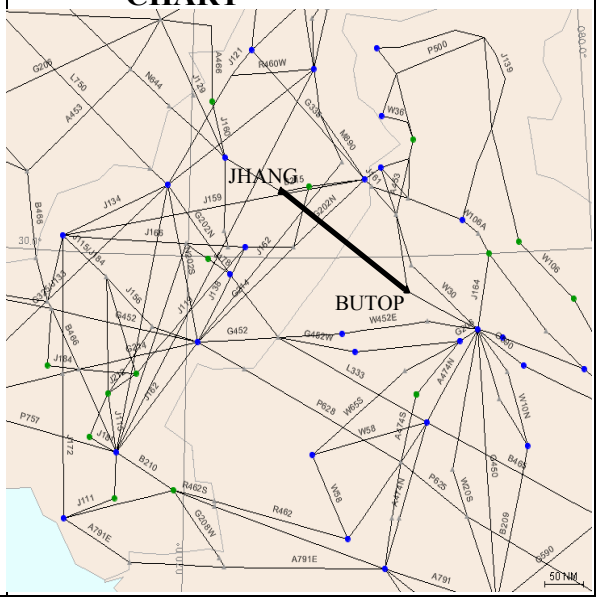
ROUTE DESCRIPTION

BUTOP- JHANG

FLIGHT LEVEL BAND
28000-46000 Feet

PRIORITY: HIGH/MED/LOW

CHART



Action Required	IATA.
	ICAO

Saving	Per flight	Annual
Mileage / Time	56nm/ 7min	
Fuel	910kg	332,150kg
CO_2	2,800kg	1,022 tons
No_x		

Remarks

Potential City Pairs: Europe – SEA Airports

ATS ROUTE NAME: IND 6

REQUESTED BY: IATA

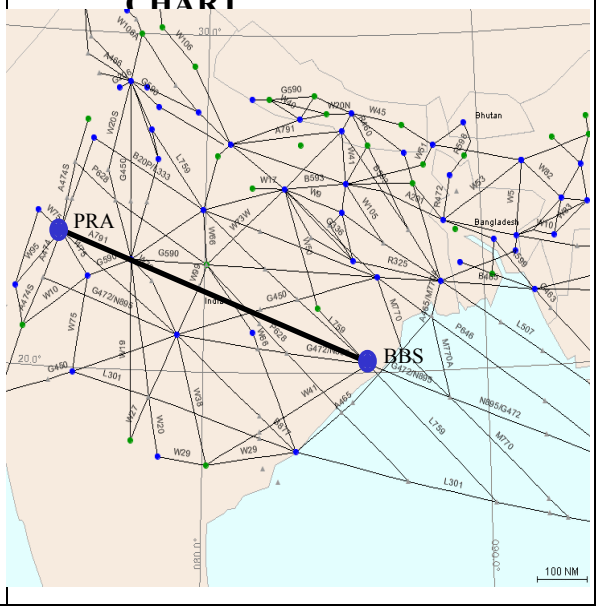
ENTRY/EXIT POINT

ROUTE DESCRIPTION
Bhubaneshwar (BBS).. Pratapgarh (PRA)

FLIGHT LEVEL BAND
28000- 46000 feet

PRIORITY: HIGH/MED/LOW

CHART



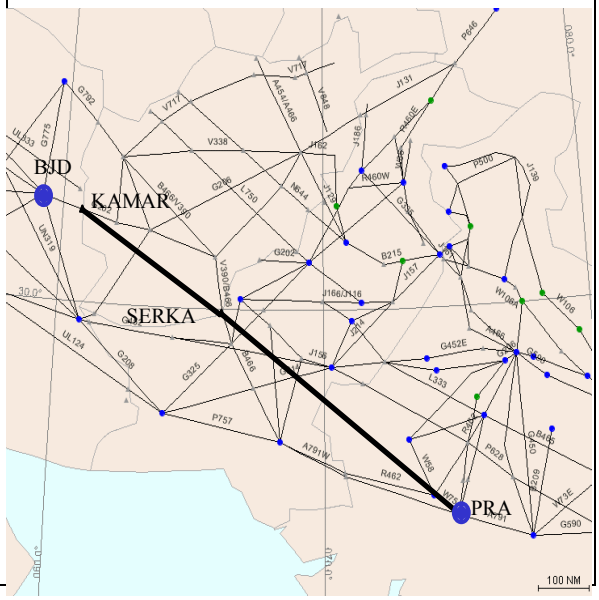
Action Required	IATA.
	ICAO

Saving	Per flight	Annual
Mileage / Time	21nm/ 2.6min	
Fuel	341kg	124,556kg
CO_2	1050kg	383,250kg
No_x		

Remarks

Potential City Pairs: Europe – SEA /Pearl River Delta Airports

ATS ROUTE NAME: IND 7 (N877 Extension) REQUESTED BY: IATA

ENTRY/EXIT POINT **PRA - KAMAR** **ROUTE DESCRIPTION** **Direct Route Track from PRATAGARH PRA – SERKA– KAMAR – BIRJAND** **FLIGHT LEVEL BAND** **28000-46000** **PRIORITY: HIGH/MED/LOW** **HIGH**	**CHART** 

Action Required	IATA.
	ICAO

Saving	Per flight	Annual
Mileage / Time	294 nm/37 min.	
Fuel	4777kg	1,743 tonnes
CO_2	147,000kg	5,365 tonnes
No_x		

Remarks

Potential City Pairs: KUL/SIN – MID-EAST/EUROPE

ATS ROUTE NAME: SEA1

REQUESTED BY: IATA

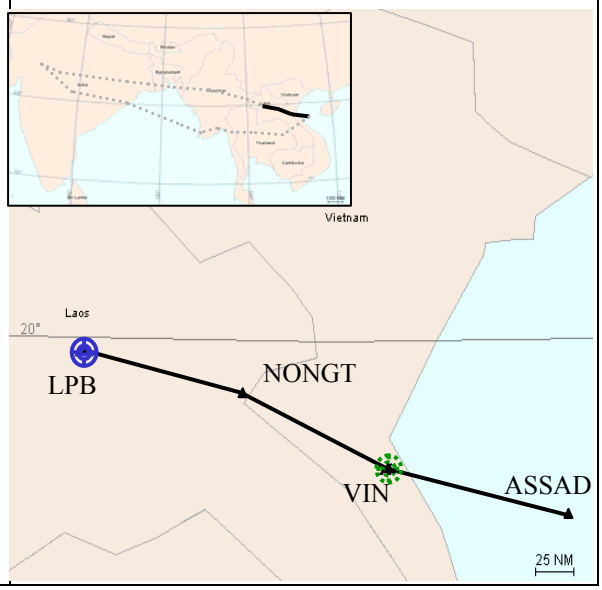
ENTRY/EXIT POINT
ASSAD / Nonghet(NONGT) / AKSAG

ROUTE DESCRIPTION
ASSAD .. Vinh(VIN) .. Nonghet(NONGT) .. LuangPrabang (LPB) ..

FLIGHT LEVEL BAND
28000 – 46000 feet

PRIORITY: HIGH/MED/LOW

CHART



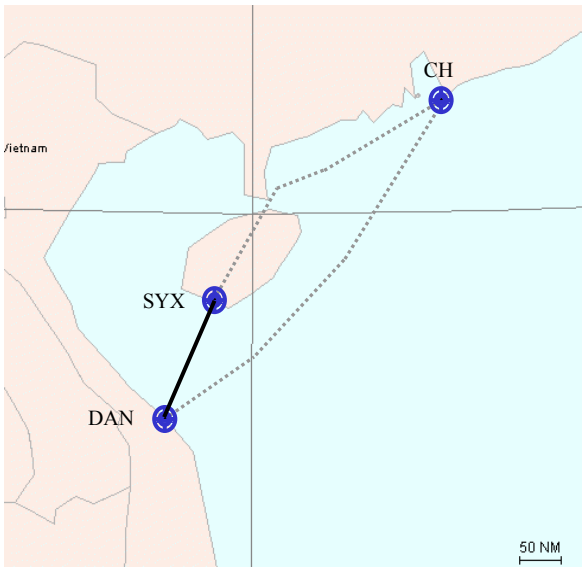
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	100nm/ 12.5mins	
Fuel	1625 kg	593125 kg
CO_2	5000kg	1,825 tonnes
No_x		

Remarks

Potential City Pairs: Middle East /Karachi – Pearl River Delta

ATS ROUTE NAME: SEA2 REQUESTED BY: IATA

ENTRY/EXIT POINT DAN / XXXXX / SYX **ROUTE DESCRIPTION** **DAN .. SYX** **FLIGHT LEVEL BAND** **29000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	739nm/93 mins	
Fuel	12090 kg	4,412 tonnes
CO_2	37200kg	13,578 tonnes
No_x		

Remarks

Potential City Pairs: South East Asia - Hainan

ATS ROUTE NAME: SEA3

REQUESTED BY: IATA

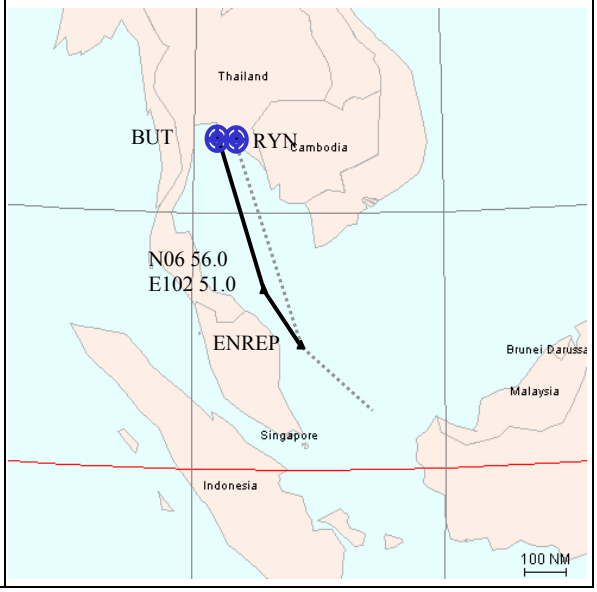
ENTRY/EXIT POINT
BUT / XXXXX / ENREP

ROUTE DESCRIPTION
BUT- ENREP

FLIGHT LEVEL BAND
29000 – 46000 feet

PRIORITY: HIGH/MED/LOW

CHART



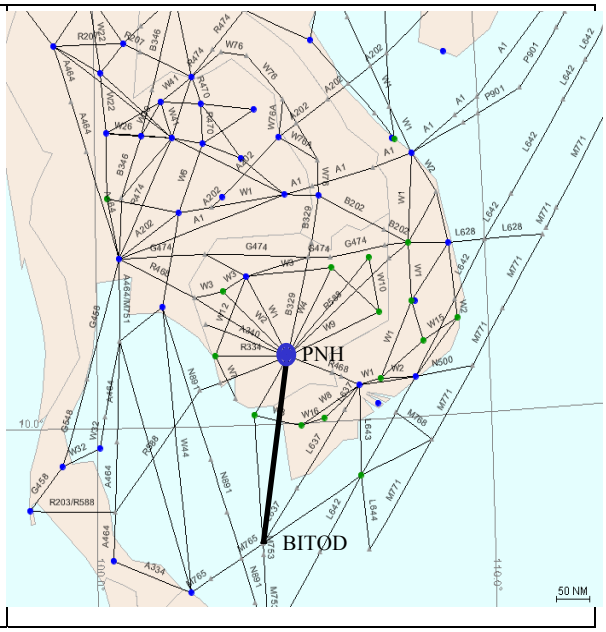
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs: Bangkok- Australia

ATS ROUTE NAME: SEA 4 (REALIGN M753) REQUESTED BY: IATA

ENTRY/EXIT POINT **BITOD – PHNOM PENH (PNH)** **ROUTE DESCRIPTION** **BITOD – PNH** **FLIGHT LEVEL BAND** **29000 - 46000** **PRIORITY: HIGH/MED/LOW** **MED**	

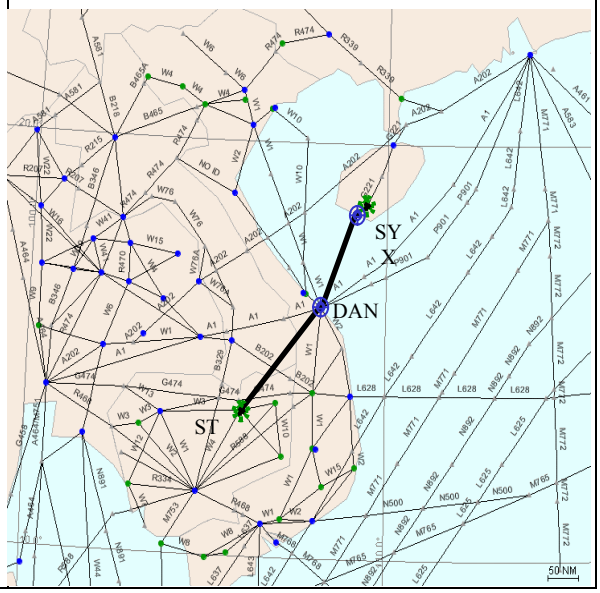
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	42 nm/5.25 min	
Fuel	682 kg	249,113kg
CO_2	2100kg	766,500kg
No_x		

Remarks

Potential City Pairs: Singapore/KL –Pnom Penh

ATS ROUTE NAME: **SEA 5** REQUESTED BY: IATA

ENTRY/EXIT POINT STUNG TRENG (ST) – DANANG (DAN) **ROUTE DESCRIPTION** **Direct STUNG TRENG (ST) to DANANG (DAN)** **FLIGHT LEVEL BAND** **29000 – 46000** **PRIORITY: HIGH/MED/LOW** **MED**	**CHART** 

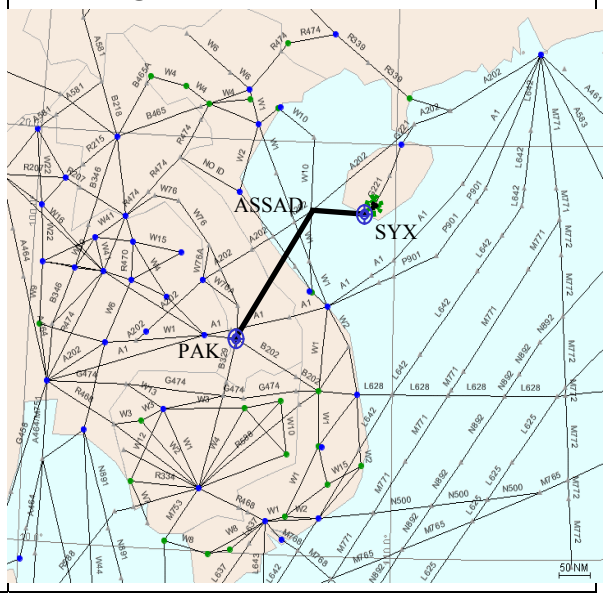
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	64 nm / 8 min	
Fuel	1040 kg	379,600kg
CO_2	3200 kg	1168 tonnes
No_x		
SO_2		

Remarks

Potential City Pairs: Singapore/ KL –Hainan/Hong Kong

ATS ROUTE NAME: **SEA 6** REQUESTED BY: IATA

ENTRY/EXIT POINT **PAKSE - ASSAD** **ROUTE DESCRIPTION** **Direct PAKSE to ASSAD** **FLIGHT LEVEL BAND** **29000 – 46000 feet** **PRIORITY: HIGH/MED/LOW** **MED**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	126 nm / 16 min	
Fuel	2047 kg	747.338 kg
CO_2	6300 kg	2299,500 kg
No_x		

Remarks

Potential City Pairs: KUL/SIN/Phnom Penh/JKT – Hainan/ Hong Kong

ATS ROUTE NAME: SEA 7

REQUESTED BY: IATA

ENTRY/EXIT POINT

ROUTE DESCRIPTION

PARDI ..BATAR

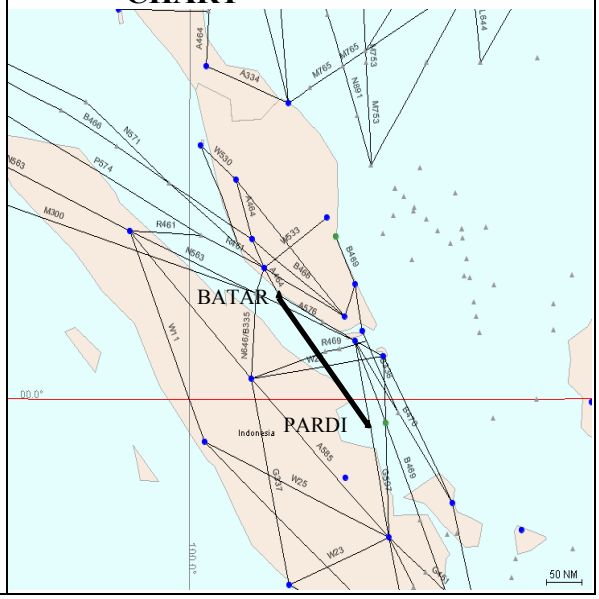
FLIGHT LEVEL BAND
28000 –46000 FEET

PRIORITY: HIGH/MED/LOW

MED

UNIDIRECTIONAL ROUTE

CHART



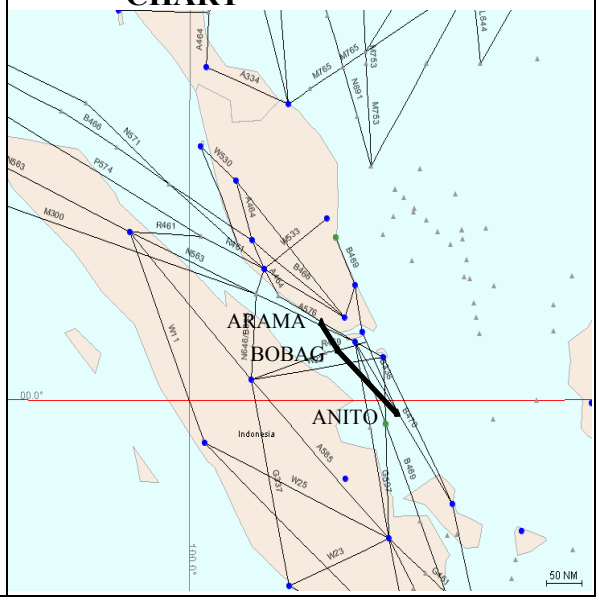
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs: Kuala Lumpur -Jakarta

ATS ROUTE NAME: **SEA 8** REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **ARAMA..BOBAG..ANITO** **FLIGHT LEVEL BAND** **28000- 46000 Feet** **PRIORITY: HIGH/MED/LOW** **MED** UNIDIRECTIONAL	**CHART** 

Action Required	IATA
	ICAO

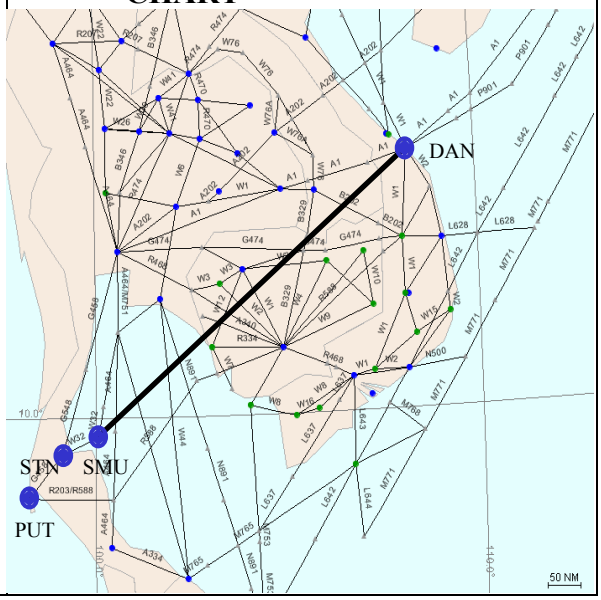
Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs:

Potential City Pairs: Kuala Lumpur – Jakarta

ATS ROUTE NAME: **SEA 9** REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** Danang (DAN) .. SAMUI (SMU) **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

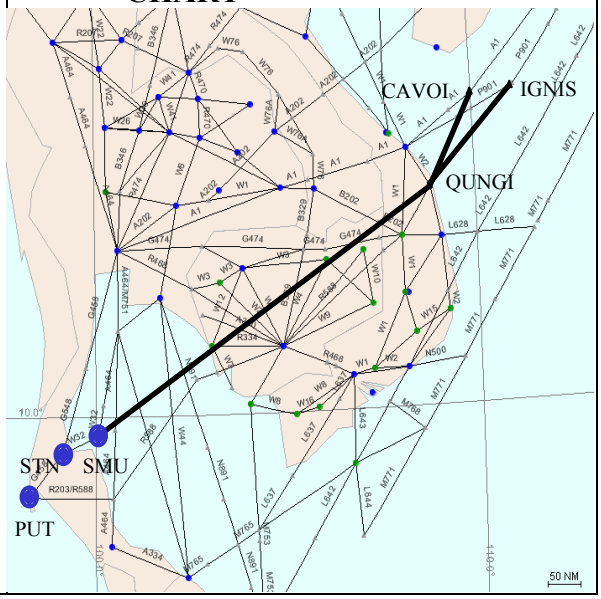
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs: Colombo/Phuket- Pearl River Delta

ATS ROUTE NAME: SEA 10 REQUESTED BY: IATA

ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **CAVOI and IGNIS ..** **Quangngai/QUNGI .. SAMUI (SMU)** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

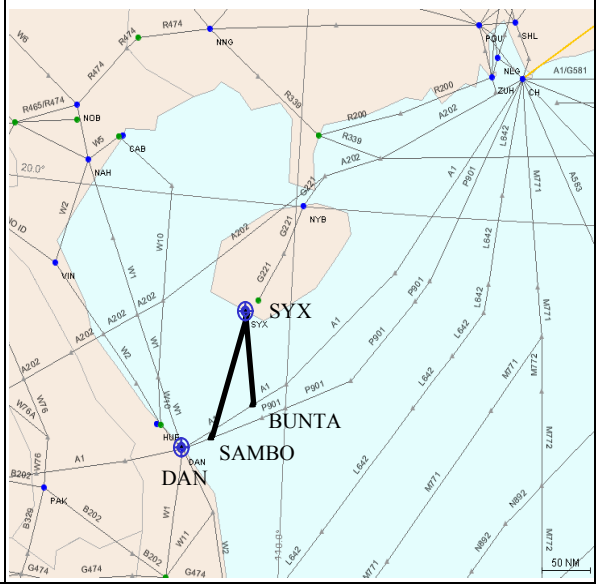
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs: Colombo/ Phuket - Pearl River Delta

ATS ROUTE NAME: SEA11 REQUESTED BY: IATA

ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Danang (DAN) .. SAMBO .. Nanshan (SYX) and** **Danang (DAN) .. BUNTA .. Nanshan (SYX)** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs: South East Asia -Hainan

ATS ROUTE NAME: SEA 12

REQUESTED BY: IATA

ENTRY/EXIT POINT
ROT - HUGUANG

ROUTE DESCRIPTION

Direct ROT - HUGUANG

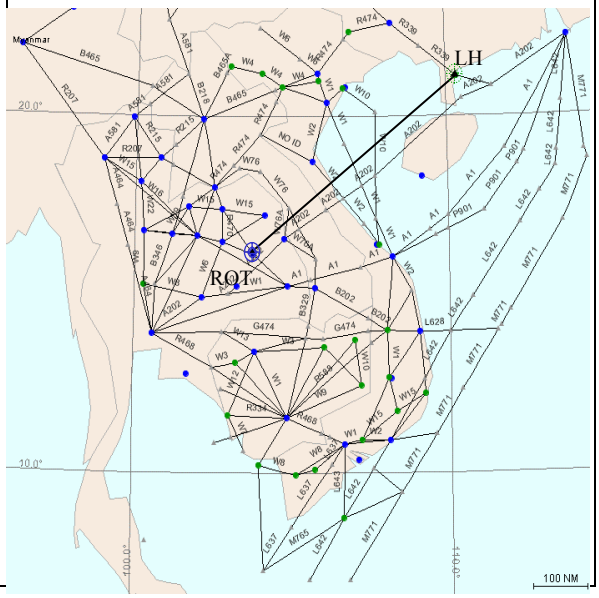
FLIGHT LEVEL BAND

29000 - 46000

PRIORITY: HIGH/MED/LOW

HIGH

CHART



Action Required	IATA
	ICAO

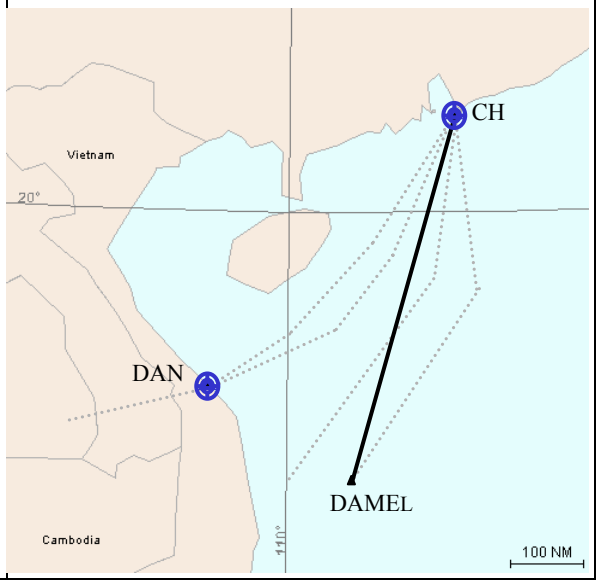
Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs: KUL/SIN/Phnom Penh/JKT – SANYA/HKG

ATS ROUTE NAME: SCS1

REQUESTED BY: IATA

ENTRY/EXIT POINT **DAMEL / CH** **ROUTE DESCRIPTION** **DAMEL .. CH** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

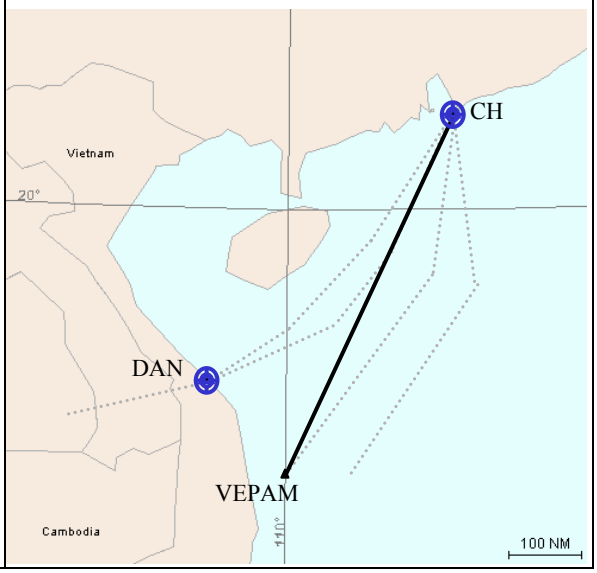
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	35nm / 4mins	
Fuel	568kg	207594kg
CO_2	1750kg	638,750kg
No_x		

Remarks

Potential City Pairs: Singapore-Pearl River Delta Airports

ATS ROUTE NAME: SCS2 REQUESTED BY: IATA

ENTRY/EXIT POINT **CH / VEPAM** **ROUTE DESCRIPTION** **CH .. VEPAM** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	17nm/ 2 mins	
Fuel	276kg	100,831kg
CO_2	850kg	310,250kg
No_x		

Remarks

Potential City Pairs: Singapore-Pearl River Delta Airports

ATS ROUTE NAME: SCS3

REQUESTED BY: IATA

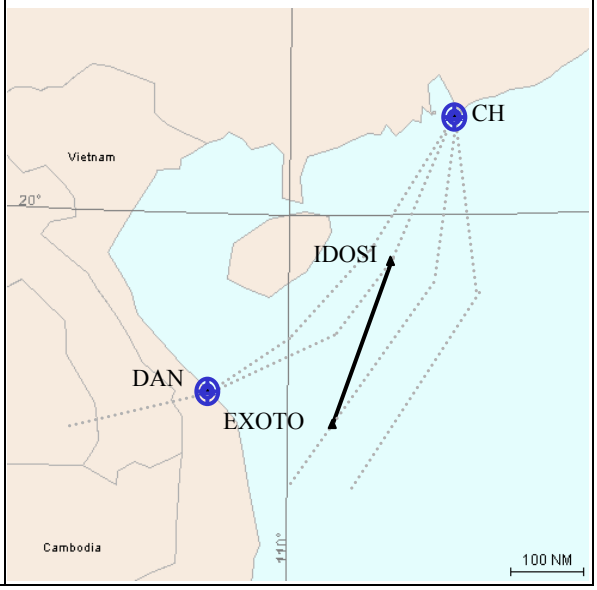
ENTRY/EXIT POINT
IDOSI / EXOTO

ROUTE DESCRIPTION
IDOSI .. EXOTO

FLIGHT LEVEL BAND
28000 – 46000 feet

PRIORITY: HIGH/MED/LOW

CHART



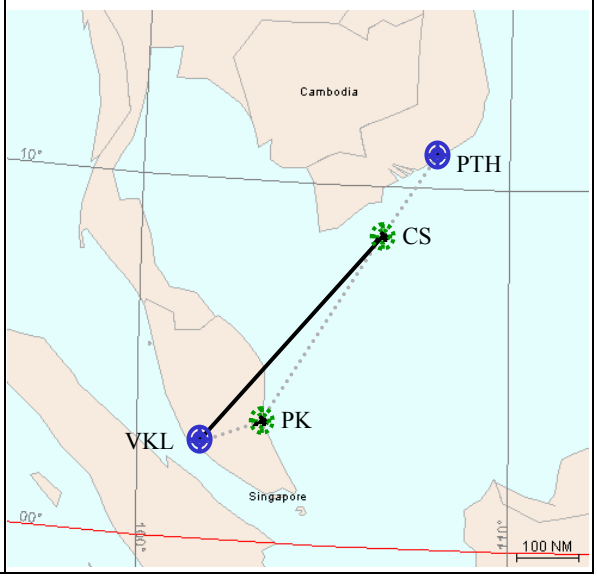
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	15 nm / 2 mins	
Fuel	260kg	94,900kg
CO_2	800kg	292,000kg
No_x		

Remarks

Potential City Pairs: Singapore-Pearl River Delta Airports

ATS ROUTE NAME: SCS4 REQUESTED BY: IATA

ENTRY/EXIT POINT **CS / VKL** **ROUTE DESCRIPTION** **CS .. VKL** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	18nm / 2.25 mins	
Fuel	292kg	106,763kg
CO_2	900kg	328,500kg
No_x		

Remarks

Potential City Pairs: Kuala Lumpur-Pearl River Delta Airports

ATS ROUTE NAME: SCS5 REQUESTED BY: IATA

ENTRY/EXIT POINT **EXOTO / MELAS / LUSMO** **ROUTE DESCRIPTION** **EXOTO .. DAMVO .. MELAS .. LUSMO** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	76nm/ 9.5 mins	
Fuel	1235kg	450,775kg
CO_2	3800kg	1,387 tonnes
No_x		

Remarks

Potential City Pairs: Jakarta- Pearl River Delta Airports

ATS ROUTE NAME: SCS6 REQUESTED BY: IATA

ENTRY/EXIT POINT **LUSMO / MELAS / DALBA** **ROUTE DESCRIPTION** **LUSMO .. MELAS .. DAMVO** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

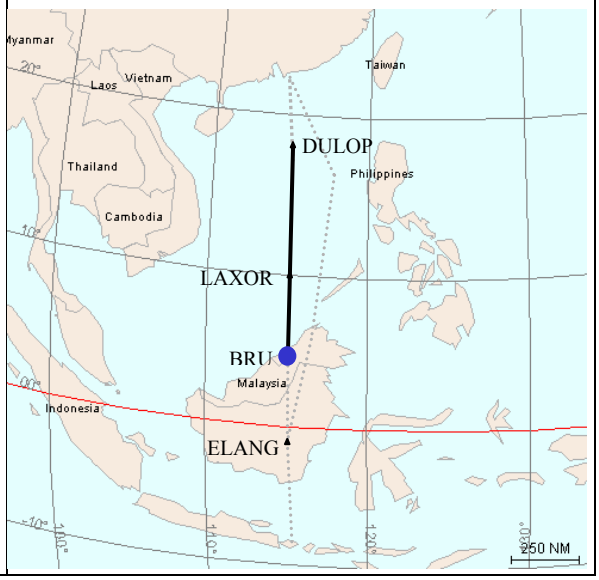
Saving	Per flight	Annual
Mileage / Time	85nm/ 10.5 mins	
Fuel	1381kg	504,156kg
CO_2	4,250kg	1,551,250kg
No_x		

Remarks

Potential City Pairs: Jakarta- Pearl River Delta Airports

ATS ROUTE NAME: SCS7

REQUESTED BY: IATA

ENTRY/EXIT POINT **DULOP/ M772 / LAXOR / XXXXX / BRU** **ROUTE DESCRIPTION** **DULOP M772 LAXOR .. XXXXX .. BRU** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

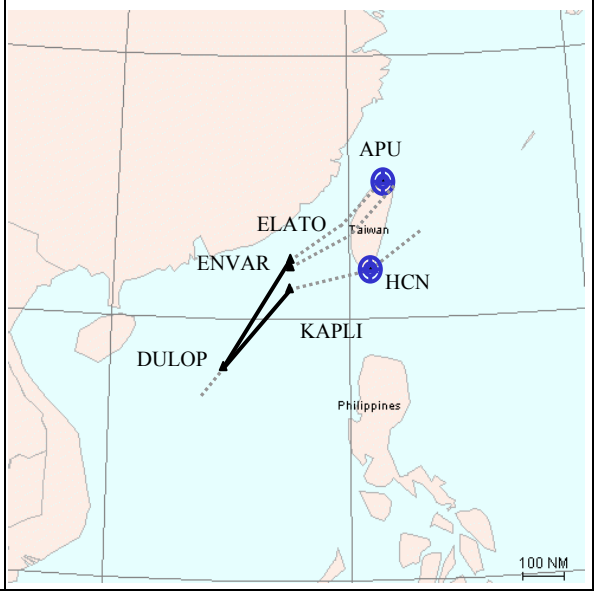
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	60nm/ 7.5mins	
Fuel	975kg	355,875kg
CO_2	3000kg	1,095 tonnes
No_x		

Remarks

Potential City Pairs: Pearl River Delta Airports-Bali/ Surabaya/ Perth

ATS ROUTE NAME: SCS 8 REQUESTED BY: IATA

ENTRY/EXIT POINT	**CHART**
1. DULOP / ELATO(ENVAR) **2. DULOP / KAPLI** **ROUTE DESCRIPTION** **DULOP .. ELATO (A1)/ENVAR (M750)** **or** **DULOP .. KAPLI (G86)** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	

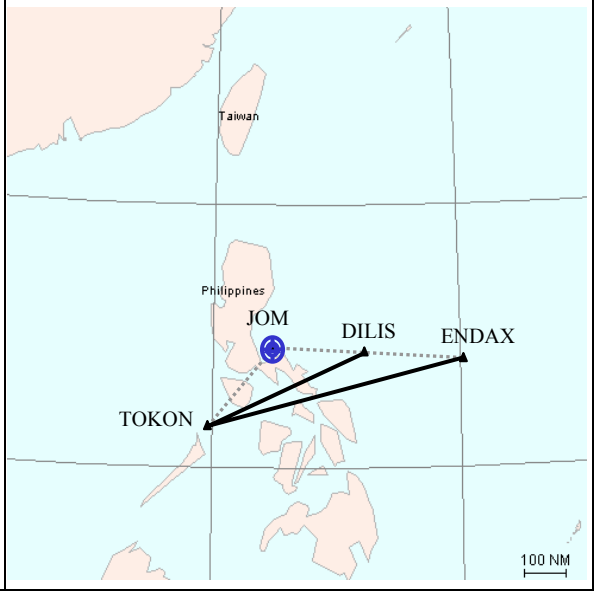
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	a.DULOP/ENVAR 140nm/17.5min b.DULOP/KAPLI 238nm/ 30min	
Fuel	a.2275kg b.3867kg	a.830,000kg b.1,411 tonnes
CO_2	a. 7000kg b.11,900kg	a.2,555tonnes b.4,343 tonnes
No_x		

Remarks

Potential City Pairs: SEAsia-North Asia Airports

ATS ROUTE NAME: SCS 9 REQUESTED BY: IATA

ENTRY/EXIT POINT	**CHART**
1. ENDAX (FIR Boundary between Oakland and Manila FIRs) or DILIS on G467 **2. TOKON on M767 (Manila FIR)** **ROUTE DESCRIPTION** **ENDAX .. TOKON or** **DILIS .. TOKON** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW** **(Immediate request with DILIS – TOKON)**	

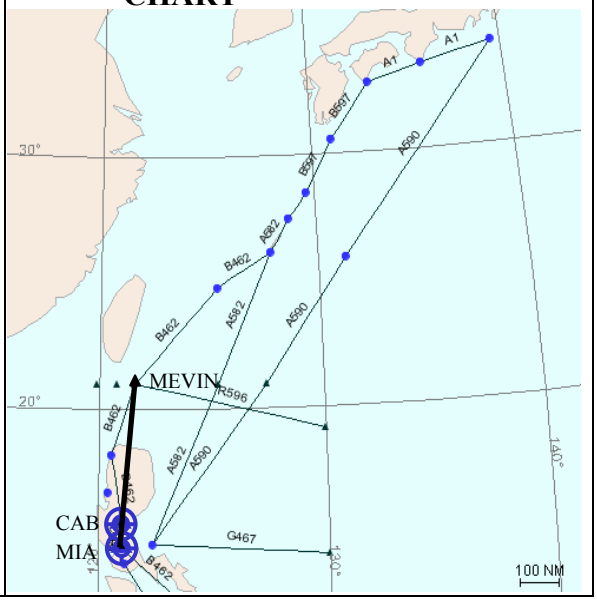
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	a.TOKON-DILIS 45nm/ 5.5in b.TOKON-ENDAX 110nm/14min	
Fuel	a.731kg b. 1788kg	a.266,906kg b.652,440kg
CO_2	a.2250kg b.5,500kg	a.821,250kg b.2,007 tonnes
No_x		

Remarks

Potential City Pairs: SEA –San Francisco/Los Angeles

ATS ROUTE NAME: PHI 1 REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Manila (MIA) .. MEVIN or** **Cabanatuan (CAB) .. MEVIN** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

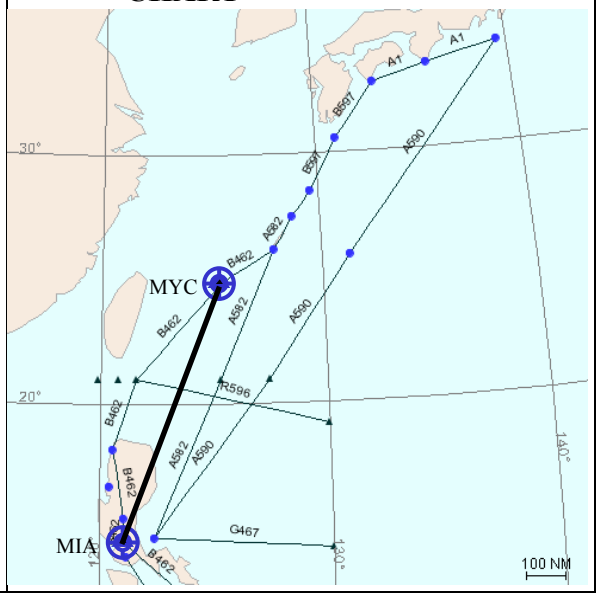
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	11nm/1.5min	
Fuel	179kg	59,300kg
CO_2	550kg	200,750kg
No_x		

Remarks

Potential City Pairs: Philippines-Japan/North America

ATS ROUTE NAME: PHI 2 REQUESTED BY: IATA

ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Manila (MIA) .. XXXXX .. Miyakojima (MYC)** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	46nm/ 6min	
Fuel	748kg	272800kg
CO_2	2,300kg	839,000kg
No_x		

Remarks

Potential City Pairs: Philippines-Japan/North America

ATS ROUTE NAME: TWN1

REQUESTED BY: IATA

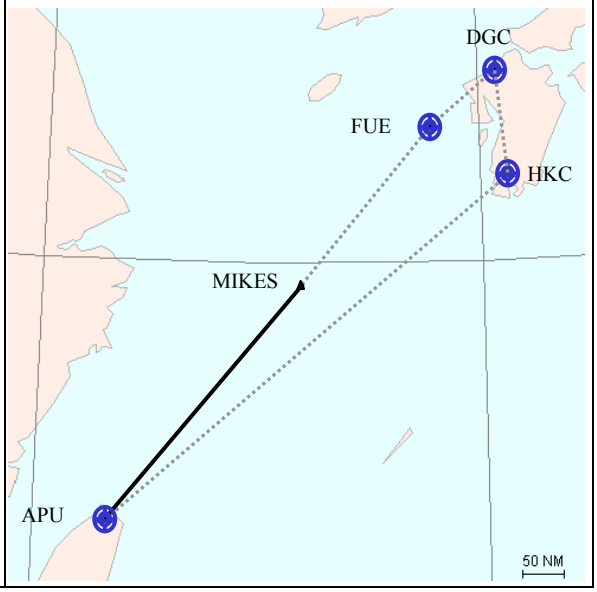
ENTRY/EXIT POINT
APU / XXXXX / MIKES

ROUTE DESCRIPTION
APU- MIKES

FLIGHT LEVEL BAND
28000 – 46000 feet

PRIORITY: HIGH/MED/LOW

CHART



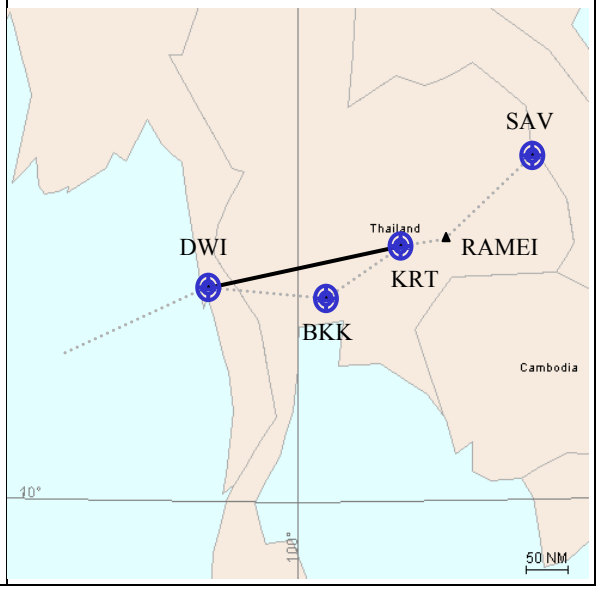
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	40nm/ 5min	
Fuel	650kg	237,000kg
CO_2	2,000kg	730,000kg
No_x		

Remarks

Potential City Pairs: SEA/HKG/TPE-Fukuoka

ATS ROUTE NAME: THA1 REQUESTED BY: IATA

ENTRY/EXIT POINT **KRT / DWI** **ROUTE DESCRIPTION** **KRT .. DWI** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

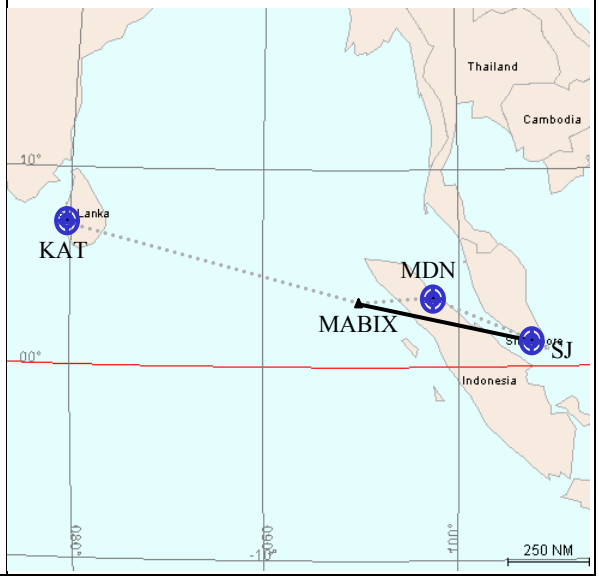
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	15nm/ 2min	
Fuel	245kg	89,000kg
CO_2	750kg	274,000kg
No_x		

Remarks

Potential City Pairs:

ATS ROUTE NAME: IDO1 REQUESTED BY: IATA

ENTRY/EXIT POINT **SJ / MABIX** **ROUTE DESCRIPTION** **SJ .. MABIX** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	16nm/ 2min	
Fuel	260kg	95,000kg
CO_2	800kg	292,000kg
No_x		

Remarks

Potential City Pairs:

ATS ROUTE NAME: COL 1

REQUESTED BY: IATA

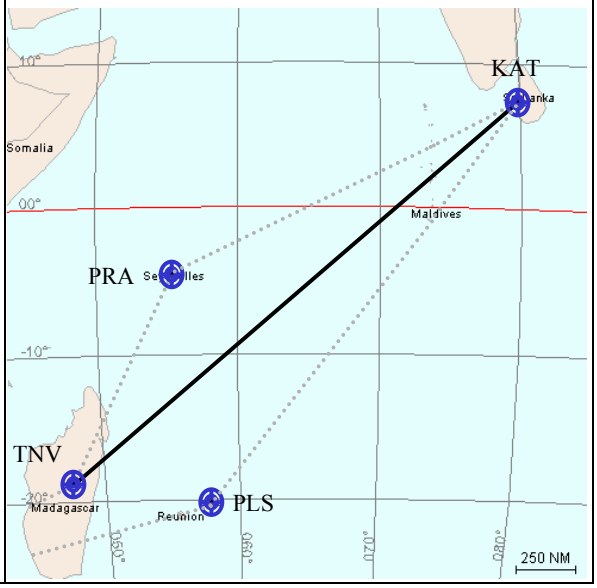
ENTRY/EXIT POINT
KAT / TNV

ROUTE DESCRIPTION
KAT .. TNV (ANTANANARIVO)

FLIGHT LEVEL BAND
28000 – 46000 feet

PRIORITY: HIGH/MED/LOW

CHART



Action Required	IATA
	ICAO

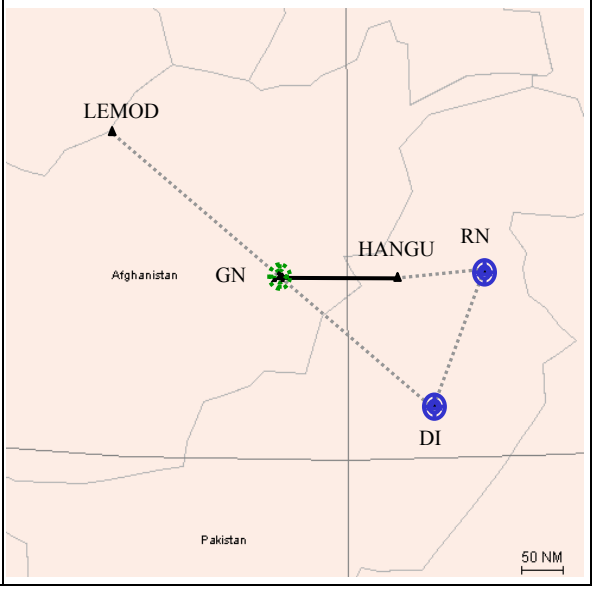
Saving	Per flight	Annual
Mileage / Time	130nm /16 min	
Fuel	2110kg	770,000kg
CO_2	6,500kg	2,370 tonnes
No_x		

Remarks

Potential City Pairs:

ATS ROUTE NAME: **KAB1**

REQUESTED BY: IATA

ENTRY/EXIT POINT **HANGU / XXXXX / GN** **ROUTE DESCRIPTION** **HANGU -GN** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW** HIGH	**CHART** 

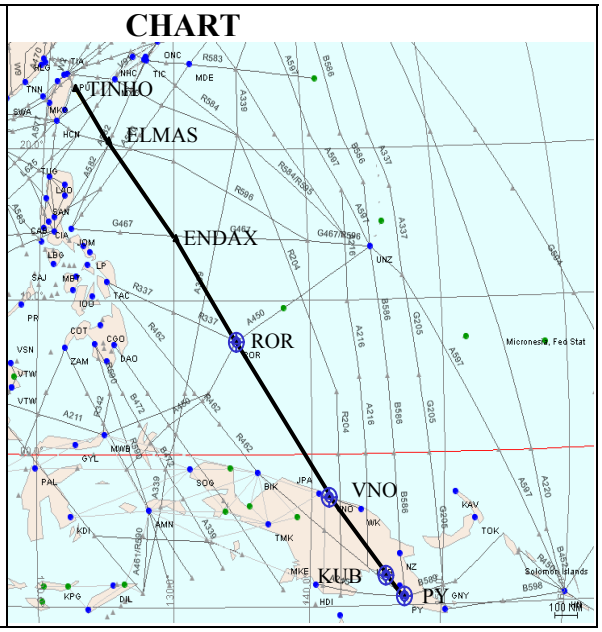
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	66nm/ 8min	
Fuel	1070kg	391,000kg
CO_2	3,300kg	1,204 tonnes
No_x		

Remarks

Potential City Pairs:

ATS ROUTE NAME: WPC 1 Requested by : IATA

ENTRY/EXIT POINT **PY-TINHO** **ROUTE DESCRIPTION** **Port Moresby (PY) .... Vanimo (VNO) .. Koror (ROR) .. ENDAX .. ELMAS .. TINHO** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW** **HIGH**	**CHART** 

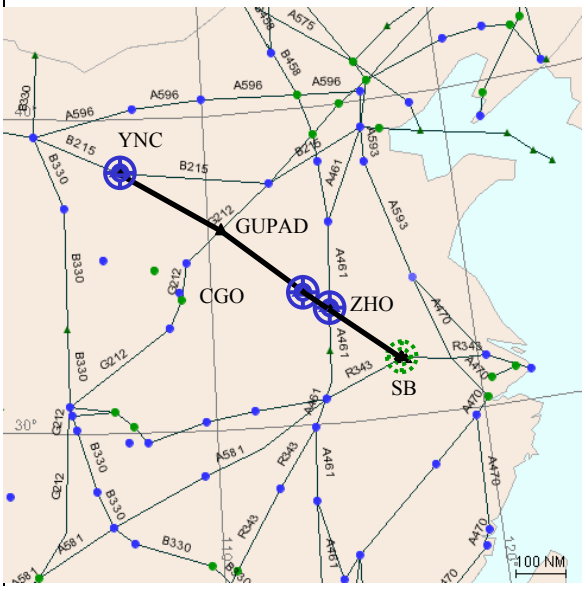
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	160 nm/20min	
Fuel	2600kg	949,000kg
CO_2	8000kg	2,920 tonnes
No_x		

Remarks

Potential City Pairs: Auckland-Taipei.

ATS ROUTE NAME: CHA 1 (Renumbered from CHA5) REQUESTED BY: IATA

ENTRY/EXIT POINT	**CHART**
ROUTE DESCRIPTION **Yinchuan (YNC) .. GUPAD .. Zhengzhou (CGO) .. Zhoukou (ZHO) .. Luogang (SB)** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	

Action Required	IATA
	ICAO

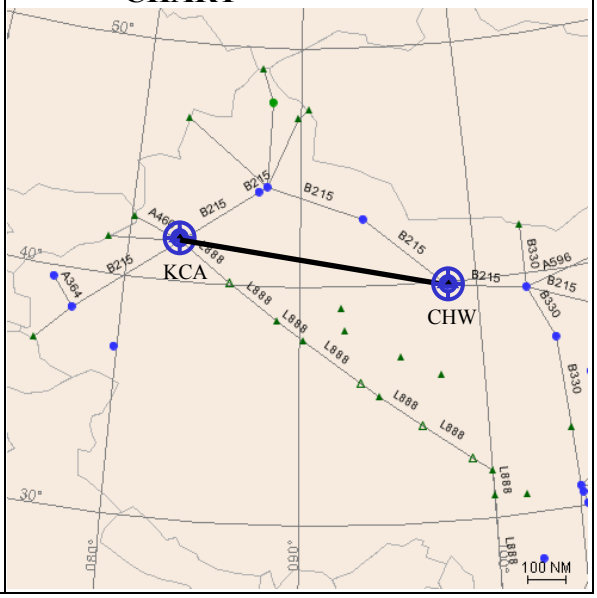
Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs: Europe-Shanghai

ATS ROUTE NAME: CHA2 (Renumbered from CHA 7)

REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Kuqa (KCA) .. Jiayuguan (CHW)** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

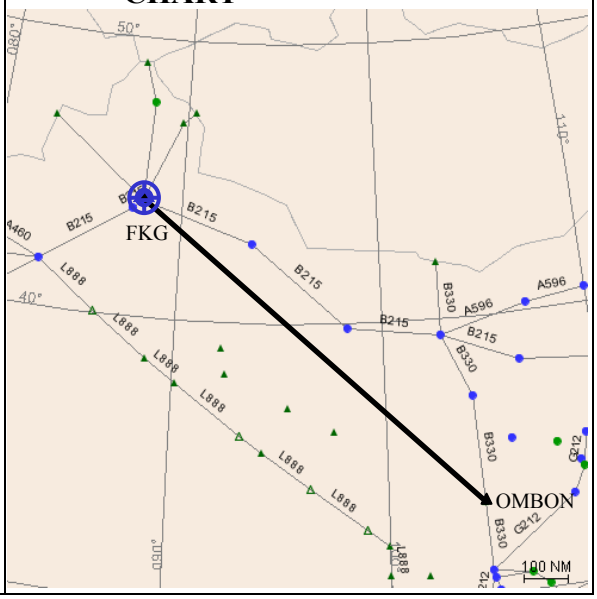
Saving	Per flight	Annual
Mileage / Time	93nm/ 12min	
Fuel		
CO_2		
No_x		

Remarks: There are exiting routes between KCA and CHW. Direct route is impossible.

Potential City Pairs: Middle East/Pakistan-China/Korea/Japan

ATS ROUTE NAME: CHA 3 (Renumbered from CHA 9A)

REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Fukang (FKG) .. OMBON** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

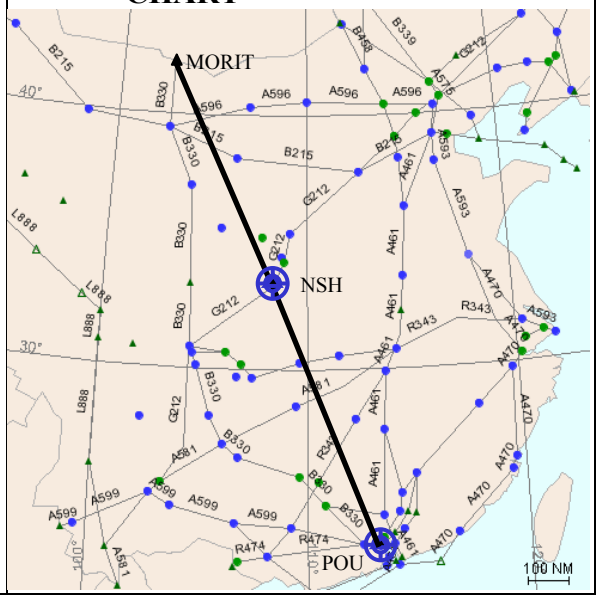
Saving	Per flight	Annual
Mileage / Time	123nm/ 15.5min	
Fuel	2000kg	730,000kg
CO_2	6,150kg	2,245 tonnes
No_x		

Remarks: This direct route is impossible and can not be implemented at present.

Potential City Pairs: Europe/Russia-Pearl River Delta Airports

ATS ROUTE NAME: CHA4 (Renumbered from CHA 10A)

REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **MORIT .. Ningshan (NSH) .. Pingzhou (POU)** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

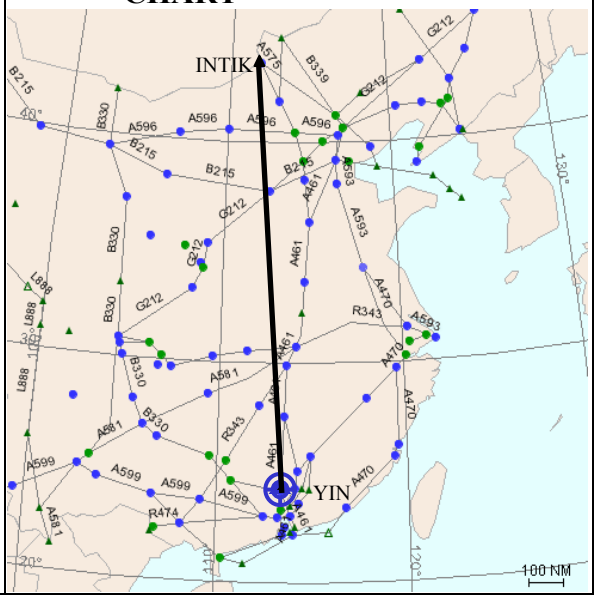
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	152nm/ 19min	
Fuel	2470kg	901,000kg
CO_2	7,600kg	2,774 tonnes
No_x		

Remarks: This direct route is impossible and can not be implemented.

Potential City Pairs: Europe Russia-Pearl River Delta Airports

ATS ROUTE NAME: CHA 5 (Renumbered from CHA 11A) REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Yingde (YIN) .. INTIK** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

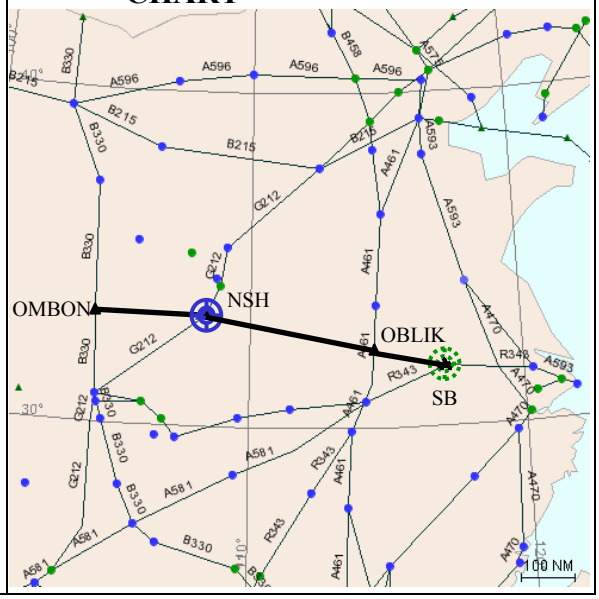
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	140nm/17.5min	
Fuel	2275kg	830,000kg
CO_2	7,000kg	2,555 tonnes
No_x		

Remarks: This direct route is impossible and can not be implemented.

Potential City Pairs: Europe/Russia –Pearl River Delta Airports

ATS ROUTE NAME: CHA 6 (Renumbered from CHA 14) REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **OMBON .. Ningshan (NSH) .. OBLIK .. Luogang (SB)** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

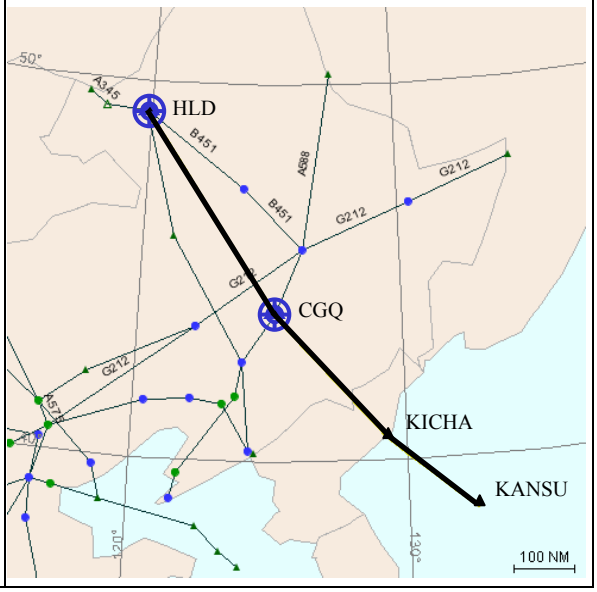
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks: This route is impossible and can not be implemented at present.

Potential City Pairs: Europe-Shanghai

ATS ROUTE NAME: CHA 7 (Renumbered from CHA 15) REQUESTED BY:IATA

ENTRY/EXIT POINT **KANSU/XXXXX** **ROUTE DESCRIPTION** **KANSU .. KICHA .. Changchun (CGQ) .. Hailar (HLD)** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

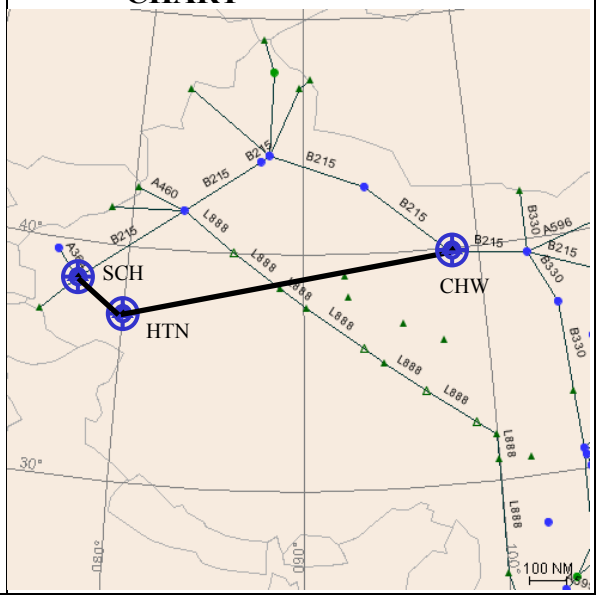
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs: Europe-Korea /Japan

ATS ROUTE NAME: CHA 8 (Renumbered from CHA 16) REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Shache (SCH) .. Hotan (HTN) .. Jiayuguan (CHW)** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

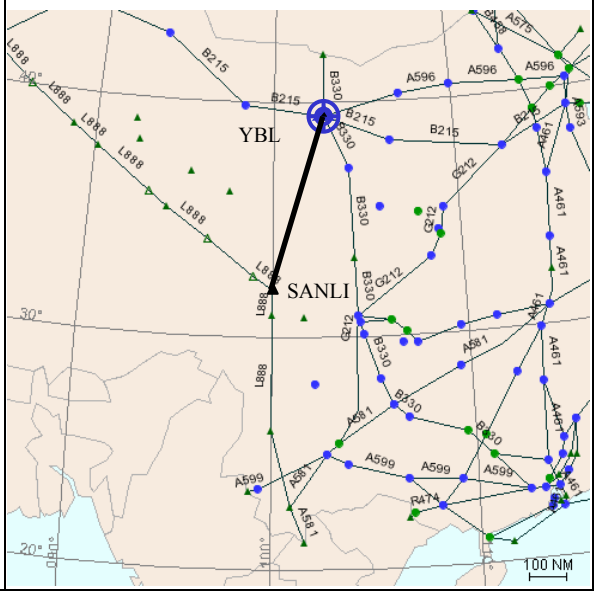
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	69nm/9min	
Fuel	1121kg	409,000kg
CO_2	3,450 kg	1,260 tonnes
No_x		

Remarks: Direct route between HTN and CHW is impossible and can not be implemented at present.

Potential City Pairs: Middle East /Pakistan-China/Korea/Japan

ATS ROUTE NAME: CHA 9 (Renumbered from CHA 17) REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Yabrai (YBL) .. SANLI** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA.
	ICAO

Saving	Per flight	Annual
Mileage / Time	48nm/ 6min	
Fuel	780kg	284,000kg
CO_2	2,400kg	876,000kg
No_x		

Remarks: This direct route is impossible and can not be implemented at present.

Potential City Pairs: North America-SE Asia

ATS ROUTE NAME: CHA 10 (Renumbered from CHA18-formerly SE1 in CTF/2000)

REQUESTED BY: IATA

ENTRY/EXIT POINT

ARGUK/BEMAG

ROUTE DESCRIPTION

ARGUK/DALIAN/HEFEI/BEMAG

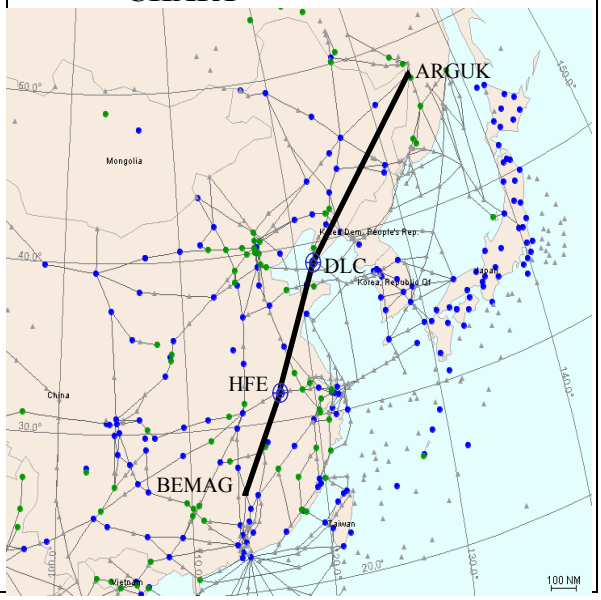
FLIGHT LEVEL BAND

8400-15000 metres

PRIORITY: HIGH/MED/LOW

HIGH

CHART



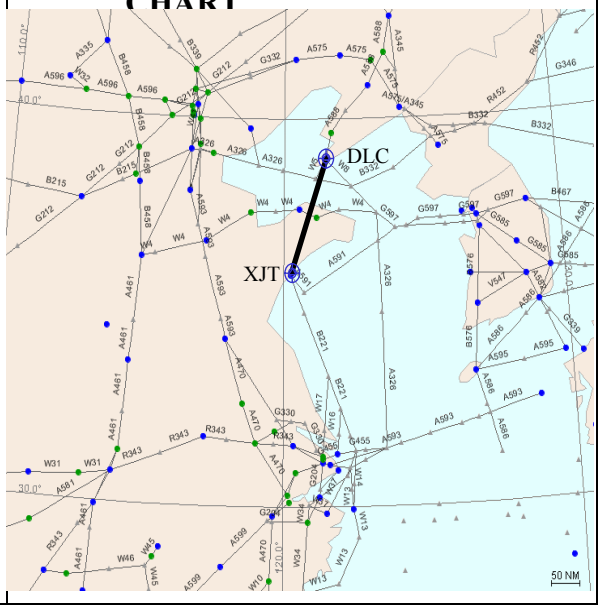
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks: There are exiting routes between ARGUK-DLC-HFE-BEMAG. Direct route between ARGUK-DLC-HFE-BEMAG is impossible.

Potential City Pairs: North America- Pearl River Delta

ATS ROUTE NAME: CHA 11 (Renumbered from CHA19 formerly SE2 in CTF/2000) REQUESTRED BY:IATA

ENTRY/EXIT POINT DALIAN/(DLC) to XJT/B221 **ROUTE DESCRIPTION** DALIAN/ XJT /B221 **FLIGHT LEVEL BAND** 8400-15000 metres **PRIORITY: HIGH/MED/LOW** HIGH	**CHART** 

Action Required	IATA
	ICAO

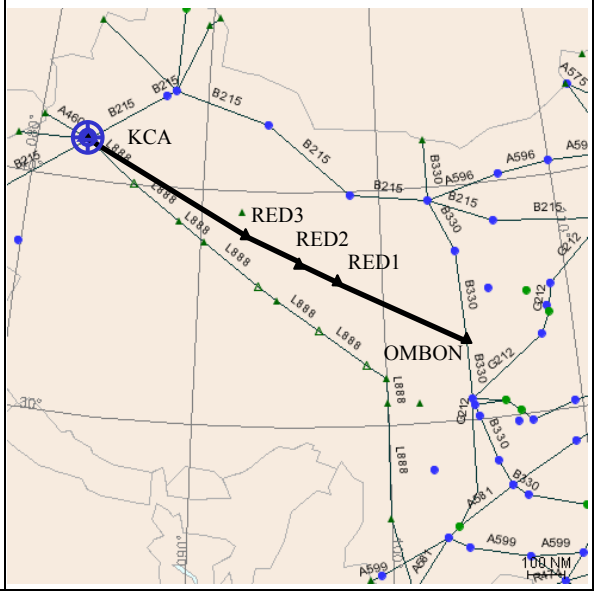
Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks: There are exiting routes between DLC and XJT. Direct route is impossible.

Potential City Pairs: North America-Shanghai

ATS ROUTE NAME: IATA 1

REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **Kuqa (KCA) .. RED3 .. RED2 .. RED1 .. OMBON** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs: Europe –Pearl River Delta Airports

ATS ROUTE NAME: IATA 2 REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks: There are exiting routes between OMBON and RO. Direct route is impossible at present.

Potential City Pairs: Europe –Pearl River Delta Airports

ATS ROUTE NAME: IATA 3

REQUESTED BY: IATA

ENTRY/EXIT POINT **ROUTE DESCRIPTION** **FLIGHT LEVEL BAND** **8400 – 15000 meters** **PRIORITY: HIGH/MED/LOW**	**CHART** 

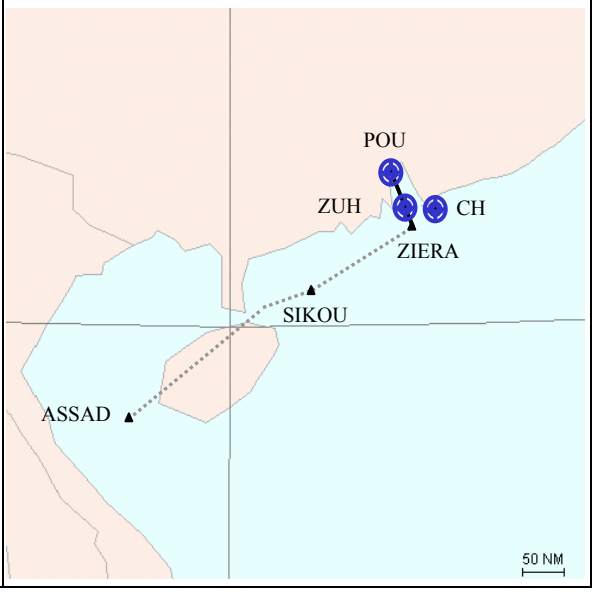
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks: There are exiting routes between OMBON and SB; direct route is impossible at present.

Potential City Pairs: Europe-Shanghai

ATS ROUTE NAME: PRD 1

ENTRY/EXIT POINT SIERA / XXXXX / ZUH **ROUTE DESCRIPTION** **POU .. ZUH .. SIERA** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

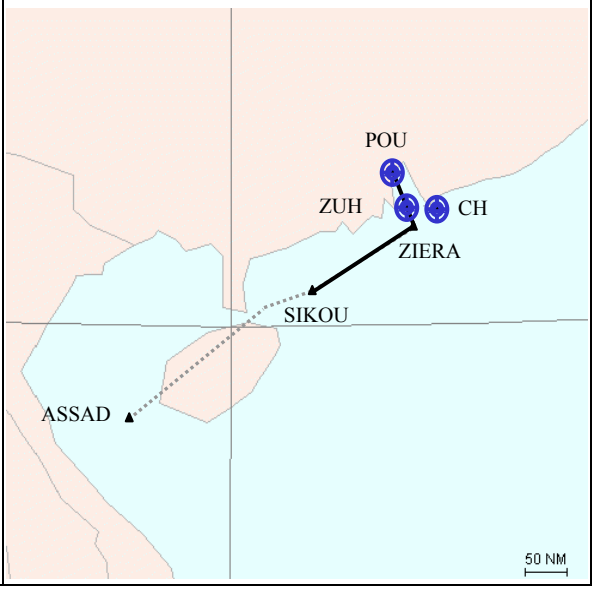
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	80nm/ 10min	
Fuel	1300kg	475,000kg
CO_2	4,000kg	1,460 tonnes
No_x		

Remarks

Potential City Pairs: Mainland China/Pearl River Delta Airports to SEAsia

ATS ROUTE NAME: PRD 2

ENTRY/EXIT POINT SIERA / XXXXX / ZUH **ROUTE DESCRIPTION** **POU .. ZUH .. SIERA .. SIKOU** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW**	**CHART** 

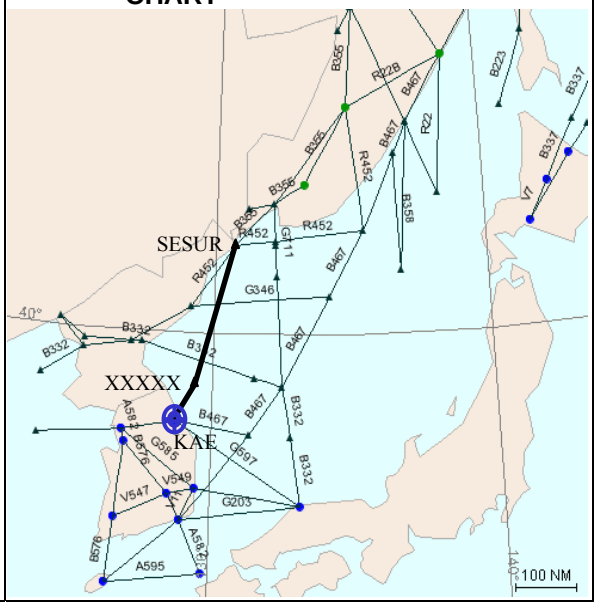
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	80nm/10 mins	
Fuel	1,300kg	474,000kg
CO_2	4,000kg	1,460 tonnes
No_x		

Remarks

Potential City Pairs: Mainland China /Pearl River Delta Airports to SEAsia

ATS ROUTE NAME: RUS 1 Requested by : IATA

ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **SESUR .. XXXXX .. Gangwon (KAE)** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW** **"XXXXX" Approx N38 38.0 E129 24.7**	**CHART** 

Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	121nm/15min	
Fuel	1966kg	717,000kg
CO_2	6050kg	2,208 tonnes
No_x		

Remarks

Potential City Pairs: North America- Inchoen

ATS ROUTE NAME: RUS 2

Requested by : IATA

ENTRY/EXIT POINT
XXXXX

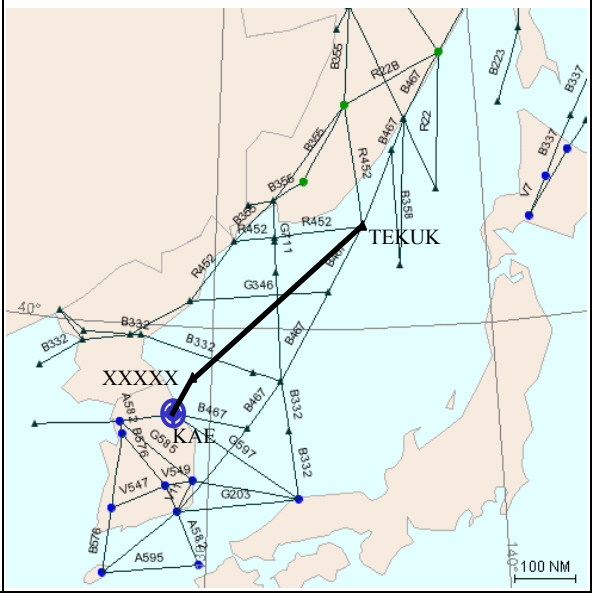
ROUTE DESCRIPTION
TEKUK .. XXXXX .. Gangwon (KAE)

FLIGHT LEVEL BAND
28000 – 46000 feet

PRIORITY: HIGH/MED/LOW

"XXXXX" Approx N38 38.0 E129 24.7

CHART



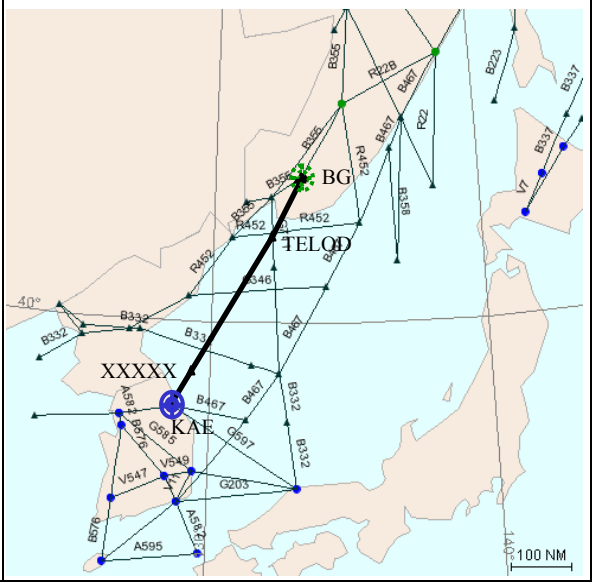
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	67nm/8mins	
Fuel	1088kg	1,222 tonnes
CO_2	3350kg	397400kg
No_x		

Remarks

Potential City Pairs: North America- Inchoen

ATS ROUTE NAME: RUS 3 Requested by : IATA

ENTRY/EXIT POINT **XXXXX** **ROUTE DESCRIPTION** **Muraveyka (BG) .. TELOD .. XXXXX .. Gangwon (KAE)** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW** **"XXXXX" Approx N38 38.0 E129 24.7**	**CHART** 

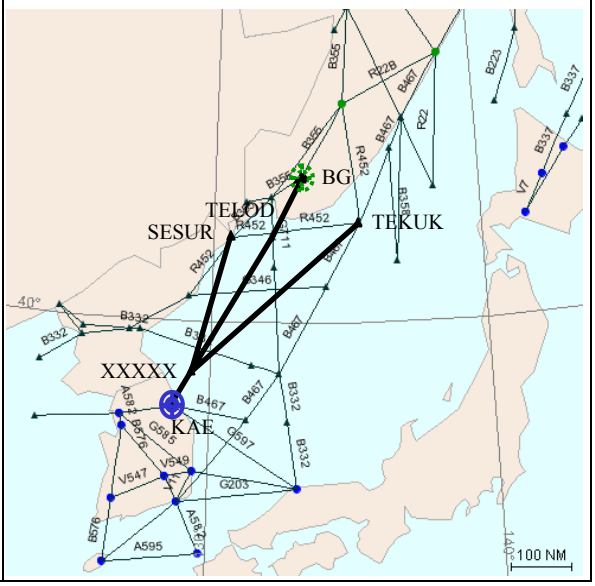
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time	136/17mins	
Fuel	2,194kg	800,000kg
CO_2	6750kg	2,464 tonnes
No_x		

Remarks

Potential City Pairs: North America- Inchoen

ATS ROUTE NAME: RUS 1, 2, 3 Requested by : IATA

ENTRY/EXIT POINT **XXXXX (N38 38.0 E129 24.7)** **ROUTE DESCRIPTION** **1. SESUR .. XXXXX .. Gangwon (KAE)** **2. TEKUK .. XXXXX .. Gangwon (KAE)** **3. Muraveyka (BG) .. TELOD .. XXXXX .. Gangwon (KAE)** **FLIGHT LEVEL BAND** **28000 – 46000 feet** **PRIORITY: HIGH/MED/LOW** **"XXXXX" Approx N38 38.0 E129 24.7**	**CHART** 

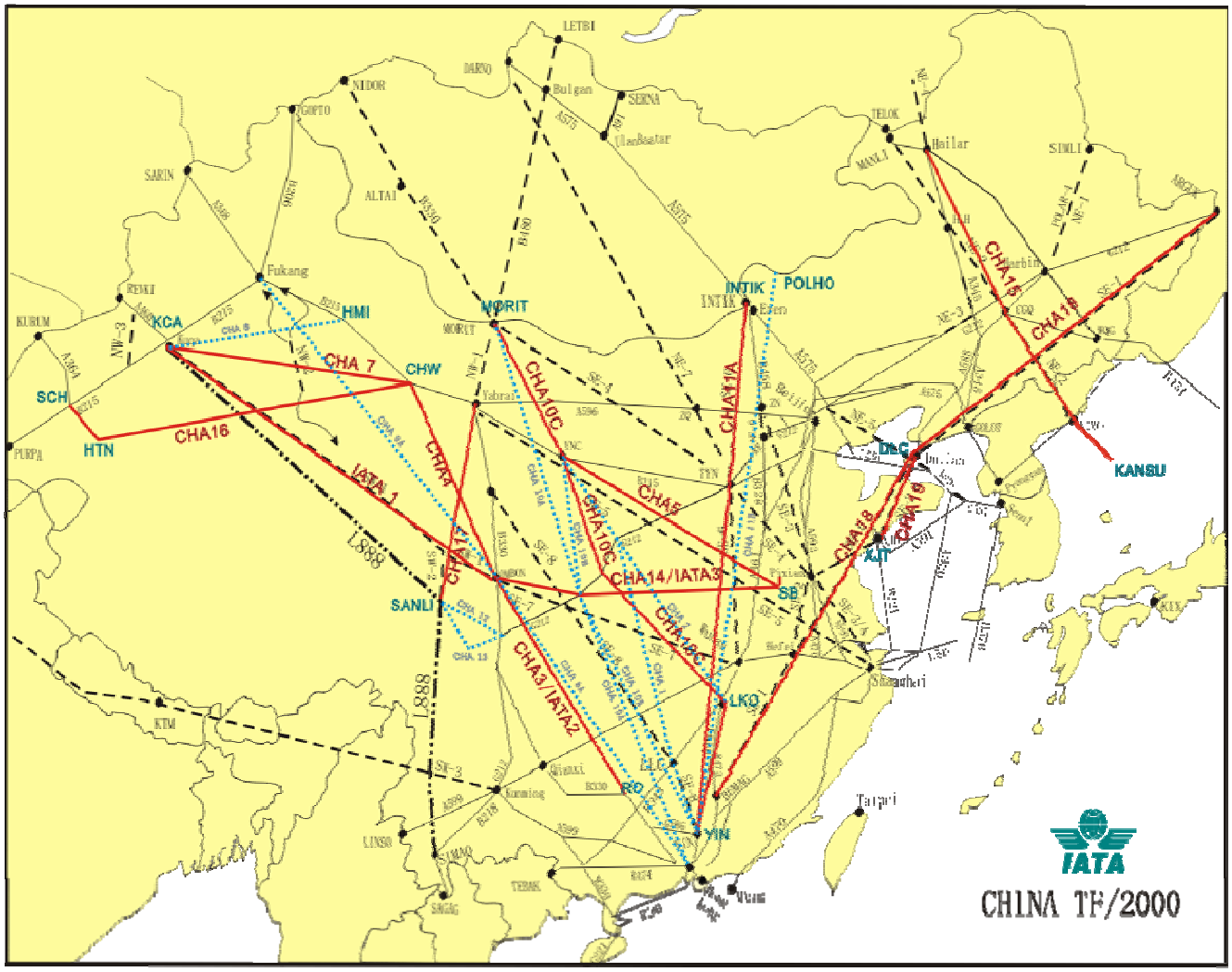
Action Required	IATA
	ICAO

Saving	Per flight	Annual
Mileage / Time		
Fuel		
CO_2		
No_x		

Remarks

Potential City Pairs: North America- Inchoen

CONSOLIDATED CHART OF USERS REQUESTED ROUTES IN CHINA



DRAFT GUIDANCE MATERIAL FOR END-TO-END SAFETY AND PERFORMANCE MONITORING OF AIR TRAFFIC SERVICE (ATS) DATALINK SYSTEMS IN THE ASIA/PACIFIC REGION

1 Background

1.1 The Asia Pacific Airspace Safety Monitoring (APASM) Task Force established by the Asia Pacific Air Navigation Planning Implementation Regional Group (APANPIRG) noted that requirements for monitoring aircraft height-keeping performance and the safety of reduced vertical separation minimum (RVSM) operations had been more comprehensively developed than for other Air Traffic Management (ATM) services, such as reduced horizontal separation based on required navigation performance (RNP), and monitoring of Air Traffic Services (ATS) datalink systems. For RVSM, a handbook with detailed guidance on the requirements for establishing and operating Regional Monitoring Agencies (RMA) was at an advanced stage of development by the ICAO Separation and Airspace Safety Panel (SASP). (The RMA Handbook has since been completed and is expected to be adopted by ICAO in 2005). There was no comparable document under development by ICAO for ATS datalink applications and so the APASM Task Force developed draft guidance material for the Asia/Pacific Region covering safety and performance monitoring for ATS datalink applications.

1.2 The experience gained by the Informal Pacific ATC Coordinating Group (IPACG) and the Informal South Pacific ATS Coordinating Group (ISPACG) FANS Interoperability Teams (FITs) and the supporting Central Reporting Agency (CRA) to monitor automatic dependent surveillance (ADS) and controller pilot datalink communication (CPDLC) performance for both aircraft and ground systems was used as a resource on which to develop monitoring guidance material.

1.3 The APASM Task Force was succeeded by the Regional Airspace Safety Monitoring Advisory Group (RASMAG) of APANPIRG, which decided to adopt this APASM material and further develop it to become the standard guidance material for end-to-end safety and performance monitoring of ATS datalink systems in the Asia Pacific region.

1.4 Within the remainder of the Asia Pacific Region, the Bay of Bengal and South East Asia Coordinating Groups are mirroring what has been done by IPACG and ISPACG and have created implementation teams and CRAs to accomplish this activity. These implementation teams also perform the interoperability activities which will continue after the implementation is complete. This guidance material focuses on interoperability issues, both prior to and following implementation.

2 Requirements for Safety and Performance Monitoring

2.1 Annex 11, at 2.26.5, states:

> "Any significant safety-related change to the ATC system, including the implementation of a reduced separation minimum or a new procedure, shall only be effected after a safety assessment has demonstrated that an acceptable level of safety will be met and users have been consulted. When appropriate, the responsible authority shall ensure that adequate provision is made for post-implementation monitoring to verify that the defined level of safety continues to be met."

2.2 ATS datalink applications, such as ADS, CPDLC and ATS interfacility data communication (AIDC), are increasingly being used in support of separation and particularly of reduced separation minima. Accordingly, it is necessary to provide the monitoring required by Annex 11 to those

datalink services. Datalink services comprise both a technical and an operational element. These guidelines, which apply only to the technical element, propose a structure and methodology for monitoring the technical end-to-end safety performance of air-ground and ground-air datalink services. The operational aspects of datalink monitoring are carried out by the appropriate Safety Monitoring Agency (SMA).

2.3 Ground-ground datalink systems supporting applications such as AIDC are essentially simpler and more direct than air-ground systems, and monitoring can be achieved directly between the concerned ATS providers. However, it should be noted that States have a responsibility to ensure that monitoring of ground-ground datalink systems is carried out in support of the implementation of reduced separation minima. Monitoring of ground-ground datalink performance is outlined in Appendix A.

2.4 The requirement for on-going monitoring after implementation is based on several factors, including both degradation of performance with time and changes to equipment which may occur, either through modification or under renewal programmes. The use of ADS-B to support separation and the introduction of the Aeronautical Telecommunication Network (ATN) will bring significant changes to the system that will require monitoring programmes.

3 Purpose of Guidance Material

3.1 The purpose of this guidance material is to:

a) Provide a set of working principles common to all States implementing ATS datalink systems.

b) Provide detailed guidance on the requirements for establishing and operating an interoperability team.

c) Provide detailed guidance on the requirements for establishing and operating a Central Reporting Agency.

d) Promote a standardized approach for implementation and monitoring within the Region.

e) Promote interchange of information among different Regions to support common operational monitoring procedures.

4 Establishment and Operation of an Interoperability Team and CRA

4.1 Recognizing the safety oversight responsibilities necessary to support the implementation and continued safe use of ATS datalink systems, the following standards apply to any organization intending to fill the role of an interoperability team:

a) The organization must receive authority to act as an interoperability team as the result of a decision by a State, a group of States or a regional planning group, or by regional agreement.

b) States should appoint a CRA that has the required tools and personnel with the technical skills and experience to carry out the CRA functions.

c) States should ensure that the CRA is adequately funded to carry out its required functions.

5 Interoperability Teams

5.1 The technologies adopted to provide ATS datalink functionality exist in several different domains (e.g. aircraft, satellite, ground network, air traffic service units and human factors) and these elements must be successfully integrated across all domains. Airborne and ground equipment from many different vendors, as well as the sub-systems of several different communication networks, must inter-operate successfully to provide the required end-to-end system performance. In addition, standardised procedures must be coordinated among many different airlines and States to provide the desired operational performance. Technical and operational elements must then coalesce to allow the various applications to demonstrate mature and stable performance. Only then can essential benefits be realized.

5.2 A team approach to interoperability is essential to the success of any ATS datalink implementation, an important lesson learned by the ISPACG, whose members were the first to implement CNS/ATM applications using FANS 1/A systems. Stakeholders had worked closely together during the initial development and subsequent certification of FANS-1/A, but even though a problem-reporting system was in place when FANS-1/A operations commenced, many problems went unresolved and it was not possible in the short term to adopt the new operational procedures that would provide the expected benefits of higher traffic capacity and more economic routes. Therefore, an interoperability team was formed to address both technical and operational issues and help to ensure that benefits would result. However, the ISPACG also realized that a traditional industry team approach would not be effective. Daily attention and sometimes significant research would be required if the many issues were to be adequately resolved. To address these concerns, the interoperability team created a dedicated sub-team, the CRA, to perform the daily monitoring, coordination, testing, and problem research tasks outlined by the team. This approach is similar to that taken for RVSM implementations where supporting groups provide aircraft height keeping monitoring services.

5.3 Although the monitoring process described above was developed for FANS-1/A based CPDLC and ADS applications, it applies equally to ATN-based ATS applications. This was validated during the Preliminary EUROCONTROL Test of Air/ground data Link (PETAL) implementation of ATN-based ATS datalink services in Maastricht Area Control Centre.

5.4 Role of the Interoperability Team

5.4.1 The role of the interoperability team is to address technical and operational problems affecting the transit of datalink aircraft through international airspace. To do this, the interoperability team must oversee the end-to-end monitoring process to ensure the datalink system meets, and continues to meet, its performance, safety, and interoperability requirements and that operations and procedures are working as specified.

5.4.2 The specific tasks of an interoperability team are:

a) Initiate and oversee problem reporting and problem resolution processes.

b) Initiate and oversee end-to-end system performance monitoring processes.

c) Oversee the implementation of new procedures.

d) Report to the appropriate State regulatory authorities and to the appropriate ATS coordinating group.

5.4.3 Terms of reference for an interoperability team are shown at Appendix B.

5.5 Interoperability Team Members

5.5.1 The principal members of an interoperability team are the major stakeholders of the sub-systems that must interoperate to achieve the desired system performance and end-to-end operation. In the case of ATS datalink systems, the major stakeholders are aircraft operators, ATS providers, and communication service providers. Other stakeholders such as international organizations, and airframe and avionics manufacturers also play an important role and should be invited by the major stakeholders to contribute their expertise.

6 Central Reporting Agencies

6.1 Work must be done on a daily basis for an interoperability team to achieve its important goals of problem resolution, system performance assurance, and planning and testing of operations that will enable benefits. A dedicated sub-team, the CRA, is required to do the daily monitoring, coordination, testing and problem research tasks for the interoperability team. Appendix C shows a table of CRA tasks and the associated resource requirements.

6.2 A CRA should be established in order to determine the safety performance of the datalink systems before the implementation of reduced separation minima in a particular area, and it should remain active throughout the early stages of implementation. However, as the performance of the systems stabilises to a satisfactory level, it should be possible to reduce the number of CRAs in the region by combining responsibility for different areas.

6.3 The functions of a CRA are:

a) To develop and administer problem report processes.

b) To maintain a database of problem reports.

c) To process monthly end-to-end system performance reports from air traffic service providers.

d) To coordinate and test the implementation of new procedures resulting from ATS datalink systems for a given region.

e) To administer and monitor an informal end-to-end configuration process.

f) To manage data confidentiality agreements as required.

g) To identify trends.

h) To provide regular reports to the interoperability team.

6.4 CRA Resource Requirements

6.4.1 To be effective, the CRA must have dedicated staff and adequate tools. Staffing requirements will depend on the complexity of the region being monitored. There are several factors that affect regional complexity from an ATS monitoring standpoint such as dimensions of the airspace, variety in operating procedures, number of airlines, number of airborne equipment variants, number of air traffic service providers, number of ground equipment variants and number of communication service providers.

6.4.2 The CRA must be able to simulate an ATS ground station operational capability to the extent of exercising all combinations and ranges of CPDLC uplinks and ADS reports. The CRA must also have access to airborne equipment: a test bench is adequate, though engineering simulators that can be connected to either the ARINC or SITA communication network can offer additional capability for problem solving. In support of the datalink audit analysis task, the CRA must have software that can decode communication service provider audit data and produce usable reports. Without these tools it is virtually impossible for a CRA to resolve problems or monitor system performance.

6.4.3 Coordination is an important part of the CRA's job. In the pursuit of problem resolution, action item resolution, monitoring and testing, many issues arise that require coordination among the various stakeholders. The CRA has a primary responsibility to provide this coordination function as delegated by the interoperability team. Coordination between CRAs is also important, particularly to expand the information database on problems and trends; there may be a need for CRA coordination within the region and with CRAs in other regions. An incident may appear to be an isolated case, but the collation of similar reports by a CRA or the CRA coordinating group might indicate an area that needs more detailed examination

7 Working Principles for Central Reporting Agencies

7.1 The working principles in this guidance material result from the combined experience of the North Atlantic FANS Implementation Group, ISPACG FANS Interoperability Team, IPACG FANS Interoperability Team, and the ATN implementation in Maastricht ACC.

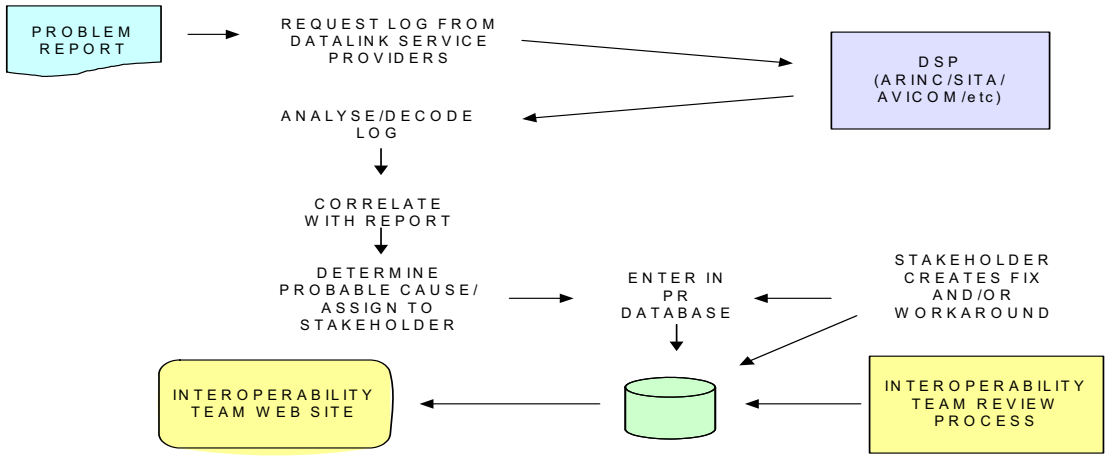
7.2 Confidentiality Agreements

7.2.1 Confidentiality of information is an established principle for problem reporting, and so reports must be de-identified before being made accessible to other agencies. However, it is necessary for the CRA to retain the identity of the original reports so that problem resolution and follow-up action can be taken.

7.2.2 The CRA must initiate and maintain confidentiality agreements with each entity providing problem reports.

7.3 Problem Identification and Resolution

7.3.1 The problem identification and resolution process, as it applies to an individual problem, consists of a data collection phase, followed by problem analysis and coordination with affected parties to secure a resolution, and recommendation of interim procedures to mitigate the problem in some instances. This is shown in the diagram below.



7.3.2 The problem identification task begins with receipt of a report from a stakeholder, usually an operator, ATS provider or communication service provider. If the person reporting the problem has used the problem reporting form provided in the appropriate regional manual, then data collection can begin. If not, additional data may have to be requested from the person reporting the problem.

7.3.3 The data collection phase consists of obtaining message logs from the appropriate parties (which will depend on which service providers were being used and operator service contracts). Today, this usually means obtaining logs for the appropriate period of time from the communication service providers involved. (In the future, with ATN development, additional providers will become involved and airborne recordings as per EUROCAE ED-112 should become available.) Usually, a log for a few hours before and after the event that was reported will suffice, but once the analysis has begun, it is sometimes necessary to request additional data, (perhaps for several days prior to the event if the problem appears to be an on-going one).

7.3.4 Additionally, some airplane-specific recordings may be available that may assist in the data analysis task. These are not always requested initially as doing so would be an unacceptable imposition on the operators, but may occur when the nature of the problem has been clarified enough to indicate the line of investigation that needs to be pursued. These additional records include:

- Aircraft maintenance system logs.
- Built-In Test Equipment data dumps for some airplane systems.
- SATCOM activity logs.

7.3.5 Logs and printouts from the flight crew and recordings/logs from the ATS provider(s) involved in the problem may also be necessary. It is important that the organization collecting data for the analysis task requests all this data in a timely manner, as much of it is subject to limited retention.

7.3.6 Once the data has been collected, the analysis can begin. For this, it is necessary to be able to decode all the messages involved, and a tool that can decode every ATS datalink message type used in the region is essential. These messages include:

- AFN (ARINC 622), ADS and CPDLC (RTCA DO-258/EUROCAE ED-100) in a region operating FANS-1/A.
- Context Management, ADS and CPDLC applications ICAO Doc 9705 and RTCA DO-280/ED-110) in a region using ATN.
- FIS or ARINC 623 messages used in the region.

7.3.7 The analysis of the decoded messages requires a thorough understanding of the complete message traffic, including:

- Media management messages.
- Relationship of ground-ground and air-ground traffic.
- Message envelope schemes used by the particular datalink technology (ACARS, ATN, etc).

7.3.8 The analyst must also have a good understanding of how the aircraft systems operate and interact to provide the ATS datalink functions, as many of the reported problems are airplane system problems.

7.3.9 This information will enable the analyst to determine a probable cause by working back from the area where the problem was noticed to where it began. In some cases, this may entail manual decoding of parts of messages based on the appropriate standard to identify particular encoding errors. It may also require lab testing using the airborne equipment (and sometimes the ground networks) to reliably assign the problem to a particular cause.

7.3.10 Once the problem has been identified, then the task of coordination with affected parties begins. The stakeholder who is assigned responsibility for fixing the problem must be contacted and a corrective action plan agreed.

7.3.11 This information (the problem description, the results of the analysis and the plan for corrective action) is then entered into a database covering datalink problems, both in a complete form to allow continued analysis and monitoring of the corrective action and in a de-identified form for the information of other stakeholders. These de-identified summaries are reported at the appropriate regional management forum.

7.4 Mitigating Procedures

7.4.1 The CRA's responsibility does not end with determining the cause of the problem and identifying a fix. As part of that activity, and because a considerable period may elapse while software updates are applied to all aircraft in a fleet, procedural methods to mitigate the problem may have to be developed while the solution is being coordinated. The CRA should identify the need for such procedures and develop recommendations for implementation by the service providers and operators involved.

7.5 Routine Datalink Performance Reporting

7.5.1 An important part of datalink safety performance is the measurement of the end-to-end performance. This should, of course, be carried out prior to implementation of new separation minima, but should continue on a regular basis to give assurance that the safety requirements continue to be met. Datalink performance assessment is based on round-trip time,

availability, integrity, reliability and continuity, and ATS providers should provide the CRA with regular measurements of these parameters.

7.5.2 The CRA will use the information supplied by ATS providers to produce a performance assessment against the established datalink requirements for the region. These requirements are set according to the separation minima being applied, and so may differ within different areas according to usage.

7.5.3 The CRA performance assessment should be made available to the RMA and SMA for their calculation of system performance against the minimum values defined in the FANS 1/A Operations Manual. The system performance criteria are at Appendix D.

7.5.4 ADS round-trip times are normally measured as the time between sending a contract request and receiving the associated Acknowledgement (ACK) or Message Assurance (MAS) message. CPDLC round-trip times are normally determined from the ATSU end-system time stamps for transmission of the uplink message and reception of the associated MAS.

7.5.5 ADS and CPDLC downlink one-way times are defined by the difference between the aircraft time stamp and the ASTU end-system reception time stamp.

7.5.6 ADS and CPDLC success rates are only available for uplink messages. The success rate is expressed as the percentage of messages that receive a successful ACK or MAS within a specified time.

7.5.7 AIDC round trip times may be obtained from the difference between message transmission and reception of the Logical Acknowledgement Message (LAM). The success rate is expressed as the percentage of messages that are successfully delivered to the destination ATSU.

7.6 Configuration Monitoring

7.6.1 A variety of technical systems are involved in the datalink process and changes, particularly to software and software parameters, are not infrequent; any change may have an impact on the overall performance of the datalink. It is therefore important that the CRA is kept informed of each change of configuration of each system. With this information it is often possible to identify changes that lead to improvements or deteriorations in the datalink performance or that may be associated with particular problems.

7.6.2 All ATS providers, communication service providers, aircraft operators and avionics suppliers should therefore report all system configuration changes to the CRA. The CRA will then maintain a database of configuration changes for each system or sub-system. It is not necessary for the CRA to know the details of changes, but where a change is expected to affect performance, information on the likely effect should be provided.

7.7 New Procedures and Improved Performance Requirements

7.7.1 The CRA may recommend new end-to-end datalink system performance requirements, either to accommodate new operational procedures or to take account of recognised problems.

7.7.2 The CRA may recommend the testing and implementation of new procedures.

APPENDIX A

METHODOLOGY FOR MONITORING AIDC

1 Introduction

1.1 AIDC plays an important role in ATC coordination, and may become a significant element of ATC in the support of reduced separation minima. The performance of AIDC operations should therefore be monitored as part of the required monitoring process prior to the implementation of reduced separation minima.

1.2 AIDC operates essentially over fixed networks and generally has only two or three involved parties: the ATS providers and network providers. It is therefore generally unnecessary to develop a FIT-type approach to safety monitoring; instead such monitoring and problem identification and resolution can be carried out directly by the concerned parties.

1.3 Because, in general, fixed networks are used for AIDC, continuous performance monitoring after implementation of reduced separation minima is not generally necessary, though annual performance and availability checks are recommended. Monitoring should also take place after any changes to the network or the end-user equipment. This will be particularly important during the implementation of the ATN.

2 AIDC Technical Performance

2.1 Two major criteria for monitoring AIDC technical performance are the achievement of acceptable delivery times and the reliability of message delivery. Delivery times can best be measured in terms of the end-to-end round trip time. Reliability is measured as the AIDC message delivery success rate.

3 End-to-end Round-Trip Time

3.1 The end-to-end round trip message time may be measured as the time difference between the transmission of an AIDC message and the reception of the corresponding Logical Acknowledgement Message (LAM) or Logical Rejection Message (LRM). If the originating AIDC system receives neither a LAM nor an LRM from the receiving system within a specified time limit (a variable system parameter, typically 5 minutes), it will declare a time-out, and the time parameter must be used as the round-trip time.

3.2 Any AIDC message requiring a LAM response may be used; CPL messages are perhaps the most used and therefore the most convenient.

3.3 A large number of measurements of round-trip times should be averaged for performance reporting.

4 Message Delivery Success Rate

4.1 The Message Delivery Success Rate may be expressed as the percentage of messages successfully delivered to the destination ATSU.

4.2 Unsuccessful delivery is indicated by either the reception of an LRM or a time-out due to non-reception of a LAM within a specified time.

4.3 Case-1: LRM Received

4.3.1 When an AIDC system detects an error in a received message, it responds with a Logical Reject Message (LRM) to the originating system. Receipt of the LRM indicates that the original message was not successfully delivered.

4.4 Case-2: Time out

4.4.1 The time-out indicates non-delivery of the message (and initiates various actions within the AIDC system).

$$\text{Message Delivery Success Rate} = 1 - \frac{(\text{LRM} + \text{TO})}{\text{TOT}}$$

Where:
LRM = number of received LRMs
TO = number of Time Outs
TOT = total number of messages

4.5 A large number of measurements of delivery success rates should be averaged for performance reporting.

5 Reporting

5.1 ATS providers should report the results of AIDC performance monitoring to RASMAG.

6 Caution

6.1 It is known that there are incompatibilities between some ATS end-systems leading to a situation in which a satisfactorily received message may not be able to be properly processed. In at least one case, the receiving system has been programmed to send neither LAM nor LRM in response to such messages.

6.2 This will result in a distortion of the true round-trip time and success rate for the originating end-system.

6.3 It is recommended that ATS providers ensure that all involved parties are aware of such situations so that affected messages may be excluded from the performance measurement data.

APPENDIX B

TERMS OF REFERENCE FOR AN INTEROPERABILITY TEAM

Reporting and problem resolution processes

- To establish a problem reporting system.
- To review de-identified problem reports and determine appropriate resolution.
- To identify trends.
- To develop interim operational procedures to mitigate the effects of problems until such time as they are resolved.
- To monitor the progress of problem resolution.
- To prepare summaries of problems encountered and their operational implications.

System performance and monitoring processes

- To determine and validate system performance requirements.
- To establish a performance monitoring system.
- To assess system performance based on information from the CRA.
- To authorise and coordinate system testing.
- To identify accountability for each element of the end-to-end system.
- To develop, document and implement a quality assurance plan that will provide a path to a more stable system.
- To identify configurations of the end-to-end system that provide acceptable datalink performance, and to ensure that such configurations are maintained by all stakeholders.

New procedures

- To coordinate testing in support of implementation of enhanced operational procedures

Reporting

- To report safety-related issues to the appropriate State or regulatory authorities for action
- To provide reports to each meeting of the implementation team or ATS coordinating group, as appropriate.
- To provide reports to RASMAG.

APPENDIX C

CRA TASKS AND RESOURCE REQUIREMENTS

NOTE: CHANGE ORDER TO MATCH PARA 6.3

CRA Task	Resource Requirement
Manage data confidentiality agreements as required	Legal services Technical expertise
Develop and administer problem report process: • de-identify all reports • enter de-identified reports into a database • keep the identified reports for processing • request audit data from communication service providers • assign responsibility for problem resolution where possible • analyse the data Identify trends	Problem reporting data base ATS audit decode capability Airborne test bench as a minimum, simulator highly recommended ATS simulation capability (CPDLC and ADS)
Coordinate and test the implementation of new procedures	Airborne test bench as a minimum, simulator capability highly recommended ATS simulation capability (CPDLC and ADS) ATS audit decode and report capability Technical expertise Operational expertise
Administer and monitor an informal end-to-end configuration process.	Technical expertise
Report to the interoperability team	Technical expertise

APPENDIX D

FANS 1/A OPERATION MANUAL
SYSTEM PERFORMANCE CRITERIA

The table below defines the minimum values to be met and verified. This does not prevent ATS service providers from negotiating more constraining contractual requirements with their communication service providers if it is thought necessary.

Criteria	Definition	Values
Performance	End to end round trip time for uplinks. (sending and reception of MAS)	Round trip time of 2 minutes, 95% of messages. Round trip time of 6 minutes, 99% of messages.
	End to end one way time for downlinks. (comparison of message time stamp and receipt time)	One way time of 1 minute, 95% of messages. One way time of 3 minutes, 99% of messages
	Uplink messages only: Undelivered messages will be determined by: • Message assurance failure is received. After trying VHF and, SATCOM Depending on reason code received, the message might, in fact, have reached the aircraft. • No message assurance or flight crew response is received by ATSU after 900 seconds	Less than 1% of all attempted messages undelivered
Availability	The ability of the network data link service to perform a required function under given conditions at a given time: The maximum allowed time of continuous unavailability or downtime should be declared MTTR (Mean Time To Repair) *	99.9% TBD
Reliability	The ability of a data link application/system to perform a required function under given conditions for a given time interval: it can be expressed in MTBF (Mean Time Between failure) *	TBD
Integrity	The probability of an undetected failure, event or occurrence within a given time interval.	10^{-6}/hour

* Availability = MTBF x 100/(MTBF+MTTR)

Note: RTCA SC189/EUROCAE WG 53 defines the performance requirements for specific operational environments.

— END —

LANGUAGE PROFICIENCY

ICAO RATING SCALE FOR OPERATIONAL LEVEL 4

Pronunciation*: (Assumes a dialect and/or accent intelligible to the aeronautical community)*

Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation but only sometimes interfere with ease of understanding.

Structure: *(Relevant grammatical structures and sentence patterns are determined by language functions appropriate to the task)*

Basic grammatical structures and sentence patterns are used creatively and are usually well controlled. Errors may occur, particularly in unusual or unexpected circumstances, but rarely interfere with meaning.

Vocabulary:

Vocabulary range and accuracy are usually sufficient to communicate effectively on common, concrete, and work-related topics. Can often paraphrase successfully when lacking vocabulary in unusual or unexpected circumstances.

Fluency:

Produces stretches of language at an appropriate tempo. There may be occasional loss of fluency on transition from rehearsed or formulaic speech to spontaneous interaction, but this does not prevent effective communication. Can make limited use of discourse markers or connectors. Fillers are not distracting.

Comprehension:

Comprehension is mostly accurate on common, concrete, and work related-topics when the accent or variety used is sufficiently intelligible for an international community of users. When the speaker is confronted with a linguistic or situational complication or an unexpected turn of events, comprehension may be slower or require clarification strategies.

Interactions:

Responses are usually immediate, appropriate, and informative. Initiates and maintains exchanges even when dealing with an unexpected turn of events. Deals adequately with apparent misunderstandings by checking, confirming, or clarifying.

(Note: For complete information on the ICAO language proficiency rating scales, please refer to the Attachment to Annex 1.)

— END —

SAR RECOMMENDATIONS

ICAO SAR Seminar and SAREX, Chennai, India, 7-11 March 2005

An ICAO SAR Seminar was held in conjunction with the Bay of Bengal SAREX at Chennai, India from 7 to 11 March 2005. The SAR seminar focused on the development of SAR cooperation and coordination and addressed ICAO requirements for States to provide SAR services and agreements in accordance with Annex 12.

A comprehensive briefing was provided by India on its extensive involvement in the tsunami emergency that struck the Indian Ocean area on 26 December 2004. Other States present at the seminar that were affected by the tsunami disaster also briefed the meeting on their emergency responses and the valuable lessons learnt were appreciated by the seminar.

The seminar, in its review of the information provided and discussions held, made a list of recommendations as shown below. APANPIRG/16 (22-26 August, 2005) reviewed the recommendations and agreed that they should be taken into account by States in the region when considering their SAR activities.

Recommendations

1) The seminar was of the view that the establishment of RCCs should be made on the basis of need and risk. This strategy allows for, on the one hand, regionalized SAR service provision in areas of light traffic density and few resources, and, on the other hand, dedicated facilities in States with high traffic density of sufficient justification to warrant RCC staff appropriately trained and specializing in SAR;

2) Rapid and accurate collation and dissemination of SAR information is essential to ensure timely and appropriate SAR response to operational units. This could be most effectively achieved by using up to date and automated technology which can be supported by an appropriate specialized infrastructure and States should take full advantage of such systems in equipping their RCCs.

3) The seminar highlighted the importance of including in the seminar all organizations involved in providing emergency services for search and rescue, therefore, annual exercises should be held involving all parties concerned.

4) The seminar recognized the importance of clearly specifying the duties and responsibilities of all participating organizations in a search and rescue operation. Therefore, procedures should be provided that specify coordination requirements including reporting, lines of responsibility and standardized formats for documentation. This work can be best facilitated by the establishment of an appropriately representative Search and Rescue Coordinating Committee in the development of a National SAR Plan.

5) SAR agreements with neighbouring States should take into harmonized account both maritime and aeronautical requirements giving due balance to matters of sovereignty and expeditious mutual access by foreign SAR aircraft.

6) The seminar recognized that an aircraft crash involving a large commercial jet into a densely populated area could result in a major disaster of wide ramifications and appropriately specialized parallel disaster management units need to coordinate with civil aviation SAR agencies in the development and execution of broadly based plans.

7) In light of the earthquake and tsunami disaster on 26 December 2004 and lack of public awareness of the large-scale risk to life and property posed by this natural phenomena, the seminar considered that there needs to be a public awareness programmes targeting all sections of the community regarding earthquake and tsunami etc, and precautions and actions to be taken to minimize the loss of life and property.

8) The seminar, in considering the response by the international community to the tsunami emergency relief, recognized that there had been an urgent and rushed response that significantly increased air traffic in a short period of time to air lift aid to the disaster areas. In some notable cases, the airport capacity, resources and infrastructure were inadequate. This could significantly impede the delivery of humanitarian relief supplies. Therefore, the Seminar requested that ICAO consider undertaking a study with the States concerned to examine the air operations that took place and provide appropriate guidelines on handling major disaster situations.

9) States should review the ICAO SAR capability table compiled by APANPIRG and update the Asia and Pacific Regional Office accordingly.

10) The seminar acknowledged the highly successful large-scale land and sea search and rescue exercises that were held involving multi-disciplinary emergency response units, and urged ICAO to organize annual regional SAR seminars and SAREX's similar to the one held in Chennai.

11) The seminar urged the States to hasten completion of SAR Letters of Agreement and to provide a copy to the Regional Office.

12) The seminar recognized the vital operational and economic contribution made to effective SAR service provision by the Cospas-Sarsat system and recommended that States participate as a matter of priority.

13) The seminar, noting the promising developments and the desirability of producing a low cost SAR emergency beacon for a much wider user community which would greatly benefit personal safety, encouraged the continued development and manufacture of this product.

– END –

Analysis of SAR Capability of ICAO States in the ASIA/PAC Region

	Training	Alerting	Legislative	SAR committee	Agreements	Relationships	Communications	Quality Control	Civil/Military	Resources	SAREX	Library	Computerisation	SAR programme	Supply dropping	Special equipment	SAR aircraft	Navigation	ELTs	LUT
Australia	E	E	E	E	E	C	E	E	E	E	E	E	E	E	E	E	E	E	C	E
Bangladesh	B	C	D	A	A	C	C	A	D	A	A	C	A	A	C	C	D	A	D	C
Bhutan																				
Brunei	E	E	E	E	E	E	E	E	E	E	E	E	E	E	D	D	E	E	E	A
Cambodia	B	B	B	B	B	B	C	A	B	B	A	C	A	A	A	A	B	A	A	A
China	E	E	E	E	E	E	D	D	E	D	D	C	B	A	E	E	E	E	E	A
Cook Islands	A	B	B	A	A	C	C	C	B	A	B	A	A	A	A	B	B	A	E	A
DPR Korea	B	D	B	D	A	B	D	D	D	C	B	A	A	A	B	A	C	C	A	A
Fiji	B	C	C	C	C	C	C	B	D	C	D	C	A	C	B	A	C	C	C	A
French Polynesia	C	D	D	D	C	D	E	A	E	C	C	B	A	A	E	D	E	E	E	**A**
Hong Kong, China	E	E	E	E	D	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
India	D	C	C	B	B	C	C	A	C	C	C	C	C	D	D	D	C	A	B	E
Indonesia	E	D	E	E	E	D	D	D	E	D	E	D	D	D	C	D	D	D	D	E
Japan	E	E	E	E	D	E	E	E	E	E	E	E	D	E	E	E	E	E	E	E
Kiribati																				
Lao PDR	B	A	B	B	B	A	B	A	B	B	A	C	A	A	A	A	A	A	A	A
Macau, China	E					E	E				E						E			
Malaysia	E	E	C	E	D	E	E	E	E	E	E	D	E	E	E	D	E	E	E	B
Maldives	B	A	A	A	A	A	A	A	D	A	C	A	A	A	A	A	A	A	A	A
Marshall Islands																				
Micronesia	C	B		A	A	B	C					A		B	B					
Mongolia	A	C	C	A	B	B	B	A	B	B	B	C	B	B	A	A	A	A	B	A
Myanmar	B	A	B	C	A	D	C	C	D	A	A	A	A	A	C	A	D	C	A	A
Nauru																				
Nepal	D	D	C	B	A	C	C	B	D	B	A	B	A	D	D	C	D	D	D	B
New Caledonia	C	D	D	D	C	D	E	A	E	C	C	B	A	A	E	D	E	E	E	E
New Zealand	E	E	E	E	A	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Pakistan	C	C	D	D	A	D	D	C	D	C	A	A	A	A	D	A	D	D	C	E
Palau																				
Papua New Guinea	D	E	D	C	D	D	C	C	D	C	C	D	C	C	C	A	A	A	E	A
Philippines	D	C	E	D	D	C	D	D	E	C	C	C	C	C	C	B	C	E	C	A
Rep. of Korea	C	C	C	C	C	D	E	E	E	E	C	A	D	E	D	E	E	E	E	E
Samoa																				
Solomon Islands																				
Singapore	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Sri Lanka	D	A	C	D	B	C	C	D	E	D	B	C	A	A	D	D	C	A	C	A
Thailand	E	E	E	E	D	E	E	E	E	E	E	D	B	B	E	E	E	E	E	B
Tonga	C	B	A	A	B	C	C	A	D	A	A	A	A	A	A	A	C	A	E	A
United States	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Vanuatu																				
Viet Nam	D	D	D	E	C	D	D	B	E	D	C	C	B	C	C	D	D	C	D	B

Updated 29 July 2005

Categorisations:	
A = Not implemented	D = Meets Annex 12 requirements in most areas
B = Initial implementation	E = Fully meets Annex 12 requirements
C = Meets Annex 12 requirements in some areas	Blank = No response

STATE SAR AGREEMENTS
(updated 26 August 2005)

ID NO.	DATE	STATES	REMARKS
1	June 1982	Indonesia / Singapore	
2	August 1984	Malaysia / Singapore	
3	July 1996	Viet Nam / Singapore	
4		Singapore / Thailand	
5		Philippines / Singapore	
6	November 1990	Australia / Indonesia	Updated 5 April 2004
7	February 1999	Cambodia / Viet Nam	
8	December 2000	Malaysia / Singapore Malaysia / Philippines Malaysia / Thailand Malaysia / Indonesia Malaysia / Brunei Darussalam	
9	February 2001	Australia / Papua New Guinea	
10	September 2002	New Caledonia / New Zealand	
11	November 2002	United States / Republic of Palau	
12	2003	United States/New Zealand	
13	1988	United States/Indonesia	
14	1986	United States/Japan	
15	Notified 2003	United States/Marshall Islands	
16	Notified 2003	United States/Micronesia	
17	Notified 2003	United States/China	
18	1998	Lao PDR/Vietnam	LOA for provision of assistance
19	**June 2005**	**Tonga / New Zealand**	
20	**August 1986**	**Indonesia / Philippines**	
21		**Indonesia / United States**	**Agreement on the Coordination of SAR Services, 5 SAREXs conducted**
22	**1990**	**Indonesia / Papua New Guinea**	**JBC MOU signed**
23	**July 1996**	**Viet Nam / Singapore**	
24	**September 1996**	**Viet Nam / Philippines**	
25	**Notified 2005**	**New Zealand / Australia**	
26	**Notified 2005**	**New Zealand / Samoa**	
		New Zealand/ Cook Islands, Fiji, Tokelau and French Polynesia	Under development

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SUBJECT/TASKS IN THE ATM/AIS/SAR 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 a medium priority on which work should be undertaken as soon as possible but not to the detriment of Priority "A" tasks; and
C = Tasks of a medium priority on which work should be undertaken as time and resources permit but not to the detriment of Priority "A" & "B" tasks. **(Updated 26/08/05)**

No.	Reference	Subject/Task	Priority	Action Proposed / In Progress	Action By	Target Date
1	RAN/3 C 6/9 R 14/22 APANPIRG C 2/22 C 3/24 C 4/4 C 4/5 C 5/2 C 5/3	Subject: Implementation of RNP Task: Implement RNP into the Asia Pacific Region	A	a) Identify routes and areas where RNP implementation is required; and b) — monitor progress. Note: a) RNP10 (60 NM) implemented South China Sea route network November 2001; b) RNAV EMARSSH Route network implemented November 2002; and c) RNP4 implemented Tasman Sea January 2005.	ATM/AIS/SAR/SG Regional Offcie	On-going
2	APANPIRG C 3/22	Subject: Traffic congestion within the region Task: Suggest ways of reducing this congestion by means of appropriate traffic management	A	a) Identify routes and areas where management of traffic congestion is required; and c) — Monitor r progress. Note: The BBACG established the ATFM/TF to address congestion in the Bay of Bengal and Indian airspace. An operational trial using an automated ATFM system to commence on 22 December 2005.	ATM/AIS/SAR/SG Regional Office	Onging

No.	Reference	Subject/Task	Priority	Action Proposed / In Progress	Action By	Target Date
3	RAN/3 C 13/14 APANPIRG D 2/35	Subject: AIS Automation Task: Develop a Regional AIS Automation Plan Note: To progress this task, the AIS/TF/1 meeting is tentatively scheduled on 7-11 November 2005. Due to Regional Office ATM staff reduction, was unlikely to be convened ATM/AIS/SAR/SG/15 agreed (Decision15/8) that the Task Force must commence, States (Japan) would convene and run the Task Force, Regional Office to assist if able.		Develop AIS automation plan and introduction of AIS quality systems and AIS databases and consider issues arising from the use of public internet for AIS Note: APANPIRG Decision 14/8 reactivated the AIS Automation Task Force and changed the name and role of the task force to the AIS Implementation Task Force (AITF). First meeting expected November 2004	AITF ATM/AIS/SAR/SG	On-going
4	~~APANPIRG C 2/31~~	~~Subject: Provision of AIS within the Region~~ ~~Task: Examine and comment on the provision of AIS and develop a programme to improve the provision of AIS within the region~~ ~~Note: AIS/MAP and one ATM Regional Officer posts removed from Regional Office establishment, effective 2005. No ability of Regional Office to assist with AIS matters. States will convene AIS Implementation Task Force in November 2005 to consider AIS matters, as described under Task list Item 3 above.~~	~~B~~	~~a) Increase AIS support from the ICAO APAC Office~~ ~~b) Regional AIS seminars to be conducted periodically~~ ~~c) Review the use of Internet for aeronautical information taking into account results of the ICAO AUPI Study Group and update Chapter 4 to the AIS Guidance Manual~~	~~APANPIRG ICAO~~ ~~ICAO~~ ~~AATF ATM/AIS/SAR/SG~~	~~On-going~~ ~~On-going Dec. 2002~~ ~~No update avbl to ATM/AIS/SAR/SG/14 re internet~~
5	APANPIRG C 3/24 C 9/3 D 9/4	Subject: Implementation of RVSM in the Asia Pacific Region Task: Plan for and facilitate implementation of RVSM, as appropriate, in the Asia Pacific Region	A	a) Plan schedule and facilitate implementation of RVSM in the Asia Pacific Region b) RVSM implementation for the international airspace in the APAC Region is in its final stage with implementation in the Incheon, Naha and Tokyo FIRs on 29 September 2005. c) Follow-up meetings required for b); 90-day review and one year review; d) The South China Sea/West Pacific RVSM FLOS review to be completed and a meeting scheduled in January/February 2006.	RVSM/TF	On-going North Asia - 2005

No.	Reference	Subject/Task	Priority	Action Proposed / In Progress	Action By	Target Date
6	APANPIRG D 3/12 D 3/2 C 4/2	Subject: Inappropriate provision of SAR facilities, services and procedures within the Asia Pacific Region Task: a) Review SAR facilities, services and procedures in the region e) Assist States without SAR services to provide SAR coverage	A	a) Encourage States to delegate or negotiate SAR services b) Identify deficiencies Note: Future ICAO SAR activities in the APAC Region constrained due to Regional Office ATM staffing levels.	ICAO ATM/AIS/SAR/SG	On-going On-going
7	~~APANPIRG~~ ~~D 3/21~~ ~~C 9/2~~	~~Subject: Transition to WGS-84 in the Asia Pacific Region~~ ~~Task: Monitor and facilitate the transition to WGS-84~~	~~A~~	~~a) Maintain status report of WGS-84 implementation within the Asia Pacific Region~~ ~~b) Identify States requiring assistance and where possible assist those States~~ ~~c) Identify deficiencies~~ ~~Note: Substantially complete, remaining issues being managed by the APANPIRG Deficiencies List~~	~~ATM/AIS/SAR/SG~~ ~~States~~ ~~ICAO~~ ~~ATM/AIS/SAR/SG~~ ~~ATM/AIS/SAR/SG~~	~~On-going~~ ~~On-going~~ ~~On-going~~
8	RAN/3 R 14/13 APANPIRG C 5/12 D 6/21 C 9/8	Subject: Implementation of ATS route requirements	B	~~a)~~ Identify ATS route requirements b) Monitor progress of route implementation in APAC Region c) Identify deficiencies Note: APANPIRG Decision 14/4 created the ATS Route Network Review Task Force (ARNR/TF). ATM/AIS/SAR/SG/14 referred matters on the deficiencies list relating to ATS routes to the ARNR/TF for study. ~~First meeting of ARNR/TF expected September 2004~~. The ARNR/TF held its first meeting on 6-10 September 2004 and completed its work at ARNR/TF/3 on 2-3 May 2005.	ATM/AIS/SAR/SG	On-going On-going On-going

No.	Reference	Subject/Task	Priority	Action Proposed / In Progress	Action By	Target Date
9	C 11/8	**SAR Capability Matrix** That, a) the "SAR Capability Matrix" be distributed to States for information and action as appropriate; and b) States provide information to ICAO by 30 April each year to permit the periodic update of the Matrix.	C	a) The SAR Matrix is reviewed by States at all ATM/AIS/SAR/SG Meetings b) States to update the Matrix by providing information to ICAO by 30 April each year	ATM/ASI/SAR/SG States ICAO	On-going On-going
10	RAN/3 R 7/18 APANPIRG C 8/9	Subject: SAR training and exercises Task: Facilitate SAR training and exercises	B	a) Co-ordinate SAR training available in the region b) Facilitate international participation in SAR exercises c) Bay of Bengal Seminar and SAREX ~~-was-held at Chennai on-7-11-March 2005~~ Note: APANPIRG/16 raised Conclusion 16/xx in respect of SAR SIP for Pacific Island States	ICAO States India	On-going ~~2003~~ On-going ~~2005~~ Completed
11	APANPIRG ~~C 6/13~~ C11/9	Subject: Appropriate SAR legislation, National SAR Plans and Amendments Task: Establish appropriate documentation and National SAR Committee	A	a) Implement appropriate legislation, establish National SAR Committees and Plans to support SAR operations b) Monitor developments of SAR Agreements between SAR organizations c) Establish and maintain a Register of SAR Agreements	States ATM/AIS/SAR/SG ICAO	On-going On-going On-going
12	APANPIRG C 9/9	Subject: Lack of consideration of Human Factors in the provision of ATS Task: Consider ways by which Human Factors aspects in the provision of ATS within the region could be improved	B	a) ~~States to~~ Provide input including lessons learned (ICAO to encourage States to submit reports) b) ICAO to conduct seminars Note: ATM/AIS/SAR/SG/15 noted limited ATM resources remaining at the Regional Office and that presently ICAO Headquarters taking primary carriage of Human Factors activities.	States ICAO ICAO	On-going ~~2004~~ On-going
13	APANPIRG D 8/	Subject: Maintenance of the CNS/ATM/GM for the Region	B	Note: ATM/AIS/SAR/SG/15 noted that ICAO Headquarters has taken over development of global guidance material and the status of the APAC Regional Guidance to be reviewed subsequent to provisions of global material under development.	ATM/AIS/SAR/SG States	Ongoing

No.	Reference	Subject/Task	Priority	Action Proposed / In Progress	Action By	Target Date
14	APANPIRG C 9/48 C 10/39 C 10/40	Subject: Deficiencies in the field of air navigation Task: Develop and maintain Deficiencies list	A	a) Identify unimplemented items in the BANP b) Review mission reports c) Analyze differences from SARPs d) Review accidents / incidents	ATM/AIS/SAR/SG ICAO	On-going On-going On-going On-going
15	APANPIRG/12	Subject: Lateral Offset Procedures	A	a) Identify issues regarding route structures where offsets could be applied b) Implement 2 NM right of route offsets in accordance with ICAO guidelines Note: Significant implementations of 2 NM lateral offset procedures occurred on 20 January 2005 and 17 March 2005 in Asia/Pacific.	ATM/AIS/SAR/SG States	On-going ~~2004~~ ~~2005~~/2006
16	APANPIRG/13 C12/6	Subject: Regional Contingency Planning Survey Task: That, ICAO survey States in the Asia/Pacific Region to determine the status of contingency planning and the extent to which contingency plans are exchanged between neighboring States.	C	a) States to complete their State Contingency Plans, using framework supplied in their Y2K CP b) Coordinate with neighboring States c) Send copy of their Contingency Plan to ICAO d) Regional Office initiated survey in March 2005 with results submitted by States by 30 June 2005, and results being studied Note: APANPIRG/16 raised Conclusion in respect of SIP for APAC State.	ICAO/States	On-going On-going On-going On-going
17	C 15/52	Review key priorities for implementation of CNS/ATM systems for the ASIA/PAC region, identify new items as required and monitor implementation	A	Review key priorities and recommend appropriate actions	ATM/AIS/SAR/SG ICAO/States	On-going
18	Decision 1/3 APANPIRG/15 C 15/49	Make recommendation aimed at improving ATM and CNS support for Terminal Area and Airport Operations, respectively.	B	a) Study operational problems being experienced; b) identify requirements/areas for improvement from States	ATM/AIS/SAR/SG States	On-going Ongoing

No.	Reference	Subject/Task	Priority	Action Proposed / In Progress	Action By	Target Date
19	APANPIRG/15 C 15/46	That recommendations 1/1, 1/10, 1/13, 4/1, 4/2, 6/11 and 7/1 of AN-Conf/11 be studied by the ATM/AIS/SAR/SG, and action be taken to implement them.	B	Review recommendations and take appropriate action to implement	ATM/AIS/SAR/SG ICAO/States	On-going
20	APANPIRG/15 Paragraph 2.1.151	To monitor environmental issues relating to the implementation of CNS/ATM< systems, in particular the work of ICAO's Committee on Aviation Environmental Protection (CAEP), to disseminate relevant information to contracting States, and to carry out appropriate coordination with Contracting States.	B	Monitor the work of the ARNR/TF in this respect	ATM/AIS/SAR/SG ICAO/States	On-going
21	APANPIRG/15 Paragraph 2.1.151	Develop a framework for regional training plans for the introduction of CNS/ATM systems and to include this material in the "Asia/Pacific Regional Plan for the New CNS/ATM Systems".	B	Review regional training plans and requirements	ATM/AIS/SAR/SG ICAO/States	On-going
22	APANPIRG/15 Paragraph 2.1.151	Develop business cases for various options of CNS/ATM implementation taking into account environmental benefits.	B	Coordinate with Regional Officer Air Transport in respect of business case activities	ATM/AIS/SAR/SG ICAO/States	On-going

AGENDA ITEM 2.2: CNS/MET MATTERS

Agenda Item 2: Asia/Pacific Air Navigation System and Related Activities

2.2 CNS/MET Matters

2.2.1 The meeting reviewed report of the Ninth Meeting of the Communications, Navigation and Surveillance/Meteorology Sub-Group (CNS/MET SG/9) of APANPIRG held in Bangkok from 11 to 15 July 2005. The contents of the report were noted with appreciation of the work done by the Sub-group. The meeting expressed satisfaction on the result of actions taken by States and the Secretariat on the Conclusions and Decisions adopted by APANPIRG/15. The meeting took the following actions on the report of the CNS/MET SG/ 9.

Ground -to-ground communications

Review report of the Seventh Meeting of the ATN Transition Task Force

2.2.2 The meeting noted with appreciation the following tasks accomplished by the Seventh Meeting of the ATN Transition Task Force held in Shanghai, China from 18 to 22 April 2005.

TCP/IP

2.2.3 The meeting noted developments in the Aeronautical Communication Panel (ACP) on matters of direct interest. It was noted that the ATN protocol suite 8208 and TCP/IP dual stack protocols will be implemented where required in the United States. It was also noted that dual stack protocol will be implemented at the entry/exit points between EUR region and other regions to ensure interoperability between Regions where ATN in full compliant with the SARPs is being or has been implemented.

Use of TCP/IP Protocols in Asia/Pacific Region

2.2.4 The meeting noted that TCP/IP may be used to interconnect ATN Ground-Ground Routers through bilateral agreement between States/Administrations; however the ATN Internet using CLNP and IDRP will still be required in order to ensure regional interoperability. It was noted that the in the Asia/Pacific Region TCP/IP may only be used as an encapsulation sub-network of the ATN under bilateral agreement between States. In order to clarify this issue a strategy for implementation of ATN has been developed.

ATN Documents

2.2.5 The meeting noted the ATN technical documents developed by the by the Seventh Meeting of the ATN Transition Task Force to assist States for implementation of the ground-to-ground ATN and adopted the following conclusion:

Conclusion 16/24 - ATN Documents

That, the following ATN documents be adopted and published in the ICAO web site under CNS Documents:

1) ASIA/PAC System Integrity Policy
2) ASIA/PAC System Management Policy
3) Communication Performance Document
4) First edition of ASIA/PAC ICD for ISO/IEC 8208

5) Second edition of ASIA/PAC ICD for ATN ground-to-ground Router Internet Communication Service (ICS)
6) ASIA/PAC technical document on the use of ATN Directory Service and
7) AMHS/MTA Routing Policy

ATN Documentation Tree

2.2.6 It was noted that the 3rd Edition of the ATN Document Tree and its updated profile was prepared for publication in the APAC website for use by States as a reference document.

Interim Regional AMHS Address Database

2.2.7 The meeting noted a proposal for establishment of a centrally administered AMHS database that can be used during the initial phase of AMHS implementation until a regional Directory Service is established.

2.2.8 It was noted that States in the Asia/Pacific region are currently in the process of implementing AMHS services to replace AFTN services in accordance with the ATN transition plan of APANPIRG. As the number of AMHS User Agents (UA) and Message Transfer Agents (MTA) in the region grows, there is an urgent requirement for a regional database of AMHS addresses. There is an urgent need to establish a regional AMHS address database as a stopgap measure that States will be able to access to obtain information on MTA and UA addresses, points of contact, etc.

2.2.9 It was therefore proposed that the ICAO Asia/Pacific Regional Office administer such a database with the support by Aerothai to carry out this task. Japan was also requested to study the detailed requirements for the resource needed and inform ICAO Regional Office to take further action in coordination with Aerothai, Thailand.

AMHS Addressing Scheme and PRMD Value

2.2.10 The meeting noted the Translated Form (XF) and Common AMHS Addressing Scheme (CAAS) Addressing Scheme. A draft of the AMHS Addressing Scheme and Private Management Domain (PRMD) value for each State/Air Traffic Service Organization (ATSO) in the Asia/Pacific Region was prepared.

2.2.11 The meeting endorsed the detailed description of the two addressing scheme and agreed that the proposed sample values of CAAS Addressing Scheme for States/ATSOs in Asia/Pacific Region should be circulated to States for consideration. The meeting also agreed that the information provided in the presentation be included in the 3rd Edition of the AMHS Naming Plan. Accordingly the meeting adopted the following conclusion:

Conclusion 16/25 - ASIA/PAC AMHS Naming Plan

That,

1) the updated ASIA/PAC AMHS Naming Plan provided in **Appendix A** to the Report on Agenda Item 2.2 be adopted; and

2) ICAO issue a State letter requesting States to reconsider and adopt the proposed AMHS Address Scheme and PRMD name values described in the Plan.

ASIA/PAC AMHS MTA/UA Naming Registration Table & Contact List

2.2.12 The meeting noted the Table for registering AMHS MTA/UA and a contact list for use in the Asia/Pacific Region. The meeting endorsed the final draft Table for registering AMHS MTA/UA and a contact list for use in the Asia/Pacific Region and adopted the following Conclusion:

Conclusion 16/26 - ASIA/PAC AMHS Naming Registration Table and Contact List

That,

a) the Table for registering AMHS MTA/UA and a Contact List for use in the Asia/Pacific Region provided in **Appendix B** to the Report on Agenda Item 2.2 be adopted; and

b) the registration Table be circulated to States by ICAO with a request to commence the registration process.

ATN Security and AIDC

2.2.13 It was noted at the ACP WGN/2 meeting (Bangkok, 2003) that the ATN security solution couldn't be applied to Version 1 AIDC owing to the fact that it does not use the Dialogue Service. Possible solutions have been mooted to address this deficiency, including re-specifying AIDC over the GACS application, and enabling applications to invoke the Security Service Object (SSO) directly rather than through the UCLS SASO. However, such developments will probably wait work starting on AIDC Version 2.

2.2.14 Under the current circumstances, it was recognized that it would be premature to proceed with the development of the Interface Control Document (ICD) for ATN AIDC. Delaying work on the ICD is not expected to have any impact on the deployment of AIDC in the region as existing operational requirements are met by APANPIRG AIDC based on AFTN procedure. In view of the above the work on the Interface Control Document for the ATN AIDC will be delayed until performance criteria have been properly addressed by the appropriate bodies within ICAO.

Table CNS 1D- ATS Inter-facility Data communications (AIDC)

2.2.15 In accordance with Conclusion 15/16 of APANPIRG the Table was circulated and the responses from States were reflected in the Table. The meeting reviewed the Table and updated the requirements. It was agreed that the existing Table CNS-1D, which was included in the FASID Table as a sample, should be replaced with the new Table CNS-1D. In view of the foregoing the meeting adopted the following conclusion:

Conclusion 16/27 - Amendment to the ASIA/ PAC CNS FASID Table CNS-1D-AIDC

That, the Table CNS-1D-ATS Inter-facility Data Communication (AIDC) Plan reflected in Part IV CNS of the ASIA/PAC FASID be amended by replacing the existing Table CNS-1D with an updated Table in accordance with established procedure.

Japan and the United States - AMHS Operational Service

2.2.16 The meeting noted that on 15 March 2005, Japan and the United States commissioned the AMHS operational service using AMHS/AFTN gateways through the 64 Kbps ATN circuit, which installed between Salt Lake City and Tokyo in 2003. The AMHS operational service has been

used to carry all the AFTN messages between the US and Japan and it forms part of the Aeronautical Fixed Service infrastructure. The AFTN service between Salt Lake City and Tokyo has been withdrawn effective 17 June 2005.

Dual Stack ATN Router developed by China

2.2.17 The meeting noted that under an ATN Research project of CAAC, Aero-Info Technologies Co., Ltd. China had developed a dual stack ATN router. The router not only comply with the ISO/OSI protocol stacks but also supports IP protocol stacks that are extensively used by more and more civil aviation systems.

2.2.18 Hong Kong shared the experience that extensive loading tests should be conducted during system acceptance. Though data communication protocols will ensure message integrity in data links, messages can be lost within the end systems under various situations. To resolve the problem and in reducing the testing effort, protection against missing-message should be provided by refining the AMHS SARPs or the AMHS Routing Policy (to a certain extent), to be explored by the Task Force and/or the ACP WG-N. This issue will be addressed by the ATN Working Group.

ATN Implementation planning in Indonesia

2.2.19 It was noted that Indonesia was drawing up a transition plan of migration from AFTN to ATN in four phases. The ATN Routers will be installed in Jakarta and Ujung Pandang. More routers will be deployed as the next step in Denpasar, DGAC Head Quarter and NASC respectively. The ATN implementation plan would commence in September 2006.

ATN Implementation Plan in the Republic of Korea

2.2.20 It was noted that in Republic of Korea AMHS was installed in 2001 as the first step to accept the ATN standard. The AMHS is implemented as AFTN/AMHS centre for the domestic service to gain experience.

Network configuration to be used during AFTN/AMHS Transition

2.2.21 It was noted that according to the 1st Edition of Asia/Pacific Regional Interface Control Document (ICD) for ATS Message Handling System, transition plan based on a set of network configurations was considered by Sri Lanka for implementation during the transition from AFTN to AMHS.

AFTN Performance

2.2.22 New Zealand proposed that in view of the modern communication links that exceeds the actual data traffic level to the extent that circuit loading statistics are effectively insignificant and the bi-annual collection of loading statistics would not be required.

2.3.23 The meeting noted that it will not be necessary to compile and review the statistics on a routine manner for all AFTN circuits in view of the high quality, capacity and reliability of leased circuits available in the region. However, it was recognized that where circuit occupancy exceed the permissible levels specified in the Manual of Planning and Engineering of AFTN, Doc. 8259, circuit loading statistics should be compiled and exchanged to initiate remedial action before the overloading situation approaches. In view of the foregoing the meeting adopted the following conclusion:

Conclusion 16/28 - AFTN performance reports

That States operating AFTN circuits;

a) may discontinue the practice of exchanging AFTN circuit performance charts, transit time statistics and circuit loading statistics where performance requirements are satisfied consistently; and

b) exchange circuit loading statistics only for those circuits where occupancy level exceed permissible levels specified in the Manual on Planning and Engineering of AFTN, Doc. 8259.

Strategy for Implementation of ATN in the Asia/Pacific Region

2.2.24 In order to assist States in the implementation of the ground-to-ground ATN it was agreed to develop a strategy. The meeting endorsed the strategy developed by the Task Force and agreed to present to APANPRG for review and adoption. It was also recognized that the strategy needs to be reviewed from time to time in light of developments and as required. In view of the foregoing the meeting endorsed the following conclusion:

Conclusion 16/29 - Strategy for Implementation of ATN in the Asia/Pacific Region

That, the Strategy for Implementation of ATN in the Asia/Pacific Region provided in **Appendix C** to the Report on Agenda Item 2.2 be adopted and States be notified.

Terms of Reference and Subject/ Tasks List of the ATN Transition Task Force

2.2.25 While reviewing the Tasks List, it was noted that of the 10 Tasks 5 Tasks were fully completed, one items each of the 5 Tasks were on hold awaiting result of the global activities undertaken by the ACP. The Task Force was monitoring developments in the OPLINKP and ACP to seek guidance to carry out the tasks. The guidance from the OPLINK and ACP on the remaining Tasks is uncertain at this stage.

2.2.26 With regard to the two Tasks assigned to the Task Force referred to in Decision 15/22 of APANPIRG, that with respect to the meeting noted AMHS performance it was considered that AMHS Description Document would provide adequate guidance on performance.

2.2.27 The Working Group of the ATN Transition Task Force was tasked to review AMHS performance related information already contained in the documents adopted by APANPIRG and ascertain the need to consolidate information in one single document or to develop a completely new document on performance.

2.2.28 The meeting noted that the Working Group had clarified that it would only be logical to establish a sunset date for the AFTN when AMHS implementation has progressed satisfactorily in the region. The meeting recognized that it would be premature at this stage to establish a sunset date for international AFTN connections given the current lack of maturity and operational experience of AMHS.

2.2.29 Since all the major tasks had already been completed including the ATN ground-to-ground transition plan and associated FASID Tables it was proposed to dissolve the ATN Transition Task Force and assign the residual tasks to the proposed Group. In light of the above the meeting adopted the following decision:

Decision 16/30 - Dissolution of the ATN Transition Task Force

That, the ATN Transition Task Force be dissolved as it has completed major tasks and the residual work would be absorbed by the proposed ATN Implementation Co-ordination Group.

2.2.30 The meeting recognized a need to carry out coordination to ensure satisfactory transition from AFTN to ATN without causing any disruption to services and proposed to establish an ATN Implementation Co-ordination Group of APANPIRG. In addition to the new tasks the Group should also absorb the residual tasks of the ATN Transition Task Force. In view of the above the meeting proposed a new Terms of Reference of the Group and developed the Tasks List provided in **Appendix D** to the Report on Agenda Item 2.2 and adopted the decision as follows:

Decision 16/31 - Establishment of an ATN Implementation Co-ordination Group

That, an ATN Implementation Co-ordination Group be established composed of membership of the ATN Transition Task Force and any other State or organization willing to contribute to the activities of the Group with the Terms of Reference and Tasks List provided in **Appendix D** to the Report on Agenda Item 2.2.

2.2.31 Republic of Korea proposed to become member of the ATN Implementation Co-ordination Group and also offered to host the first meeting of the Group in Seoul in 2006.The meting agreed to the proposal made by the Republic of Korea and appreciated the offer made to host the first meeting.

Working Group of the ATN Transition Task Force

2.2.32 The meeting noted the decision of the Task Force to retain its Working Group, which would continue to deal with the tasks assigned to it until the first meeting of the ATN Implementation Coordination Group meeting.

2.2.33 The meeting appreciated the work done by the ATN Transition Task Force. The Task Force, in 7 years since its establishment, conducted 7 meetings, two seminars and 13 meetings of the its Working Group. It has completed required regional guidance materials, various ICDs, ATN ground-to-ground implementation plan and also developed ATN related Tables of ASIA/PAC FASID. The meeting thanked all the States who nominated Members to the Task Force and to the Members themselves for their valuable contributions.

Change of location and Location Indicator of the Tokyo AFTN COM Centre

2.2.34 The meeting noted that a new ATM Centre at Fukuoka, which will operational from October 2005. In order to relocate the Tokyo AFTN COM Center from Narita International Airport to the ATM Center in Fukuoka without affecting AFTN service with adjacent AFTN centers, JCAB has installed AFTN and AMHS systems at the ATM Center separate from the currently operating AFTN and AMHS systems at Narita. AFTN service operation will be changed from Narita to Fukuoka by switching the AFTN circuits within Japan from Narita to Fukuoka at 15:00 UTC on February 15, 2006.

2.2.35 The relocation of Tokyo AFTN COM Center from Narita to Fukuoka will therefore have no impact on AFTN service with adjacent AFTN centers. The location of the Tokyo AFTN COM Center will be changed from “RJAA” to “RJJJ” and its AFTN address will be changed from “RJAAYFYX” to “RJJJYFYX”. In addition, the name of the facility will be changed to Fukuoka

AFTN/AMHS COM Center. It was proposed to amend the name of the location of the AFTN COM Centre in the FASID document and also in other relevant documents. While noting the change in the name, Japan was advised to issue AIC in time and also coordinate the changes with the adjacent AFTN COM Centres.

South Pacific AFS network implementation

2.2.36 The United States informed the meeting that Australia, Fiji, New Zealand, Papua New Guinea, and the United States established mutual requirements to exchange air traffic data and voice communications with each other through state-of-the-art network which supports multiple services, voice compression, multiple protocols, re-routing, network security, remotely manageable, and easily expandable network. In addition to the benefits listed above, implementation of the meshed network would also allow States to potentially disconnect point-to-point circuits that would no longer be needed. It was further noted the use of a common multi-service access platform to support the exchange of air traffic data and voice communications between centres with alternate routing capability.

Air-ground communications

Review report of CNS/MET Air-Ground Data Link Study Task Force meeting

2.2.37 The meeting reviewed the report of the CNS/MET Air Ground Data Link Study Task Force meeting which was held from 19 to 20 May 2005 at the ICAO Regional Office, Bangkok, Thailand in accordance with Decision 8/13 of the Eighth Meeting of CNS/MET Sub-group of APANPIRG.

2.2.38 It was recognized that there was a lack of guidance available for the deployment of data communications and that current implementations of data link did not conform to ICAO standards. Though it did provide satisfactory service for the current applications, the technology being used will face limitations in the future. A strategy for selection and implementation of communications data links was considered to be of value to States in planning and implementation.

2.2.39 The meeting noted that the important applications of data link for uplink of MET data to aircraft are ACARS based D-ATIS and D-VOLMET. The implementation of D-VOLMET was encouraged by APANPIRG (Conclusion 13/29 refers) since D-VOLMET solves a long-standing problem for the inclusion of SIGMET in VOLMET. Recent data from Hong Kong China showed that the number of uplink requests for VHHH D-ATIS messages continue to be on an increasing trend, reaching 20,455 (14,740 for arrival D-ATIS and 5,715 for departure D-ATIS) in May 2005. It is expected that in the near future D-ATIS and D-VOLMET will gradually replace their voice predecessors.

2.2.40 Based on the information presented by States, data service providers, industries and the users, the CNS/MET Air-ground Data Link Study Task Force formulated a draft Strategy for implementation of the air-ground data link in the Asia and Pacific Regions.

2.2.41 The meeting reviewed and endorsed the strategy developed for implementation of the air-ground data link in the Asia/Pacific region provided at **Appendix E** to the Report on Agenda Item 2.2 and adopted the following Conclusion:

Conclusion 16/32 - Strategy for implementation of the air-Ground data link in the Asia/Pacific region

That, the Strategy for implementation of the air-ground data link in the Asia/Pacific Region provided in the **Appendix E** to the Report on Agenda Item 2.2 be adopted and Asia/Pacific States be informed.

2.2.42 The meeting considered that the task assigned to the CNS/MET air-ground data link Task Force has been completed. It was also noted that similar to other strategies adopted by APANPIRG, the strategy for data link should be kept dynamically as a living document and the CNS/MET Sub-group of APANPIRG can revisit and update it from time to time. Therefore the meeting endorsed the decision of the Sub-group to dissolve the Task Force.

Air-ground communication improvement in Myanmar

2.2.43 The meeting noted the progress made in improving air-ground communication in Myanmar. Due to the vast geographical area of Myanmar, the Department of Civil Aviation had to implement Remote Controlled Air Ground (RCAG) VHF stations to provide VHF coverage through out Yangon FIR.

2.2.44 In 2004, DCA, Myanmar took action to replace the RCAG system with modern digital VHF, solar powers system and VSAT links. The installation started in March 2005, and the new system has been fully operational since 9 June 2005 after a month trial, as published in AIP SUP 01/05. The frequency 133.2 MHz of sector I of Yangon ACC (the northern sector) was replaced with 126.75 MHz and the Sector II, (the southern sector) frequency 134.2 was replaced by 128.75 MHz. It was further noted that Myanmar had also replacing existing old transmitters and SELCAL system.

2.2.45 The meeting congratulated Myanmar for the successful installation and commissioning of VHF RCAG stations and associated systems for the improvement of air-ground communications in the Yangon FIR. With this improvement, the long-standing deficiency in air-ground communications in Myanmar will be resolved. IATA indicated that the user feed back report on the condition of the air-ground in the Myanmar airspace is fundamental and required. Myanmar advised that any report of communication difficulty should be provided to Myanmar within one month of the occurrence, otherwise it would be difficult to investigate and to take remedial action.

MTSAT status and reduction of longitudinal separation

2.2.46 Japan informed the meeting of JCAB's implementation plan for the reduced longitudinal separation minimum in the North and Central Pacific airspace using ADS/CPDLC. It was noted that the MTSAT-1R satellite was successfully launched on 26 February 2005 and it is expected to be operational for ATC communication in late December 2005. Further test of meteorological functions is being conducted and some of which have been operational since June 2005. It was noted that JCAB introduced 50NM longitudinal separation minimum during level changes (step climb/descent) in the oceanic airspace of Tokyo FIR on 11 April 2005. The introduction of step climb/descent resulted in increase of opportunities for aircraft to climb to their optimum levels. JCAB plans to introduce the seamless application of 50NM longitudinal separation minimum for aircraft at cruise in the Pacific airspace using ADS from December 2005 in Tokyo FIR. In this regard, it is necessary to harmonize the implementation with Anchorage and Oakland FIRs. JCAB intends to complete the ADS-C trial using Inmarsat in August 2005 leading to the next step of using MTSAT, the test operation of which is scheduled from October to December 2005.

Modernization of air-ground VHF and HF Communication in Australia

2.2.47 The meeting noted the rationalization and modernization of air-ground VHF and HF voice communication facilities being implemented in Australia. It was informed that the primary communications method for the majority of aircraft in the Enroute, Terminal and Approach phase of flight is envisaged to remain for the next ten to fifteen years to be VHF and HF voice communications. As a consequence of this restated requirement and the state of the extant infrastructure following little investment over the past 20 to 25 years, Australia is undertaking a major renewal and rationalization program on its communications infrastructure. Approximately 150 sites located at major centres and remote locations across Australia provide enroute coverage of VHF voice services down to around 20,000 ft with many areas better covered down to 10,000ft and often ground. The Upgrade project is well advanced with the pilot network and first sites installed. The project is scheduled for completion in mid to late 2006. For VHF, 25 kHz channel assignments will be introduced in stages. For HF, MWARA and RDARA services are provided from 18 separate HF transmitter and receiver sites. Similar to the VHF network, little investment had been made over the last three decades and an opportunity to significantly rationalize the number of sites was available with the use of modern technology. The central element of the new HF communications system scheduled commissioning by August 2005 uses high gain multi-modal antennas combined with modern receivers and voting technology. This has allowed the rationalization of sites down to 6 transmitter and receiver sites from the current 18.

PDC Implementation status in Hong Kong China

2.2.48 Hong Kong China provided information on the current status of PDC implementation and operation in Hong Kong China. It was informed that the Pre-Departure Clearance (PDC) Delivery function is provided to nine airlines operating in Hong Kong via data link. Over 160 flights each day use the service representing about 46% of daily departure traffic. Two more airlines are planning to use the service before October 2005. Average message transit time is less than 30 seconds. The system is being upgraded to support AEEC623 protocol and the target is to provide 60% of departure clearance delivery via data link daily.

Discussion on Implementation of DFIS and Satellite Communications

2.2.49 Singapore informed the meeting that PDC service was introduced in 1999 at Singapore and the system is being upgraded to support AEEC623 protocol. The new system will be available in 2007.

2.2.50 China informed the meeting that Air Traffic Management Bureau (ATMB) currently carried out a trial project of PDC service at Beijing Capital airport. China has a plan to implement PDC service at Shanghai, Guangzhou, Xi'an and other major airports in China. ATMB has set up a Working Group as implementation team for the PDC implementation.

2.2.51 It was observed by the meeting that without ACARS capability, aircraft would not be able to provide PDC service and this issue for fitment would need further considerations and discussion at future meetings. The meeting recalled that implementation of DFIS in the region is one of the Key Priority items for Implementation of CNS/ATM system and the target date established for implementation is by 2008.

SATCOM voice Communication

2.2.52 There was a general discussion on difficulties being experienced in the use of SATCOM voice for ATC purpose. Australia and USA had received a number of requests for the use SATCOM for ATC purpose. Hong Kong, China indicated that they had conducted several tests and identified a number of problems. A connection test was conducted with Cathay Pacific using

INMARSAT. One of the main problems identified was the connection time from ground to air direction, which would take more than 10 minutes. The high costs for SATCOM and the high connection time were matters of concern.

Navigation Systems

GNSS Implementation

2.2.53 United States provided information on the certification requirements for Department of Defense and allied aircraft and how this process was applied to military avionics including the use of GPS Precise Position Services (GPS-PPS). It was noted that military platforms conducting peacetime operations would conform to applicable rules to ensure interoperability and transparency within domestic and international controlled airspace.

2.2.54 The US DoD operates a standards program known as Military Standard Orders (MSOs) that is similar to the civilian FAA TSO program. Military Standard Order (MSO) C145 "airborne navigation sensors using the global positioning system (GPS)/precise positioning service (PPS) for area navigation (RNAV) in required navigation performance (RNP) AIRSPACE; RNP-20 RNAV through RNP-0.3 RNAV" was quoted as an example of an approximation of the civilian TSO C-145 "airborne navigation sensors using the global positioning system (GPS) augmented by the wide area augmentation system (WAAS)".

WAAS Development

2.2.55 The United States informed the meeting that it continues to aggressively work towards the operational implementation of GPS and its Wide Area Augmentation System (WAAS). WAAS capability provides improved guidance to users in the en route and departure domains. Presently, over 700 LNAV/VNAV published procedures are available which WAAS capable aircraft can fly. LNAV/VNAV is an approach procedure with vertical guidance with nominal minimums of a 350' decision height, 1½-mile visibility, 556m horizontal alert limit (HAL), and 50m vertical alert limit (VAL). The WAAS service area is the continental United States and portions of Alaska. The Enhancements to the WAAS will include:

- The integration of new reference stations at Alaskan sites in Fairbanks, Bethel, Kotzebue, and Barrow. (Q1, 2006)
- Integration of new Canadian sites in Gander, Goose Bay, Iqaluit, and Winnipeg (Q2 2005 to Q3 2006)
- Integration of new Mexican sites in LaPaz, Puerto Vallerta, Mexico City, Merida, and Tapachula (Q2 2005 to Q3 2006)
- Additional GEO satellite services

2.2.56 The completion of WAAS full LPV Capability (FOC) is expected in the late 2008 time frame. At this time, the U.S. Government plans to incorporate a second civil frequency (L5 at 1176.45 MHz) will be more solidified. When available for use, WAAS will incorporate L5 into its operation to upgrade the LPV capability available at full operational capability (FOC) to a GPS Landing System (GLS) capability. GLS is the Category I precision approach equivalent for GPS systems with aviation minimums of 200' decision height and ½ mile visibility (with proper lighting). GLS Capability is expected in the 2013 timeframe.

Australian transitioning activities

2.2.57 Australia described it plans from transition from a point-to-point navigation system to an Area Navigation system with GNSS as the enabling technology for all levels of aviation. The Australian plan is described in the second edition of the ATM Strategic Plan. The Navigation Strategy

envisages Area Navigation will be the prime means of navigation for all phases of flight except Precision Approach. A thin network of Navigation Aids (less than 200) (the backup network) will be retained to provide a backup capability for Terminal and Non-Precision Approach operations and assist older international aircraft.

2.2.58 Instrument Landing System will remain the general Precision Approach aid for at least five and probably 10 years. GPS augmented by Ground Based Augmentation System (GBAS) is expected to replace ILS; the timing will be driven by industry and is not yet clear.

2.2.59 Modern jet aircraft will use a Flight Management System supported by GPS and Inertial sensors to provide Area Navigation. A new generation of GPS Sensors and Navigators designed to FAA Technical Standards Order TSO-C145a/146a, meet the basic requirements for "only means" navigation. This equipment is suitable to provide Area Navigation in Regional, Charter and General Aviation aircraft. A CASA project, strongly supported by AsA is developing the case to support a Rule change authorising "Only Means" navigation using this equipment.

2.2.60 Navaids required in the Backup Network will be replaced and the recovered old equipment will be used to extend the life of the remaining Aids until wide spread fitment of Area Navigation is in place. Replacement Projects are underway to renew navaids required in the Backup Network to ensure continuity of service as transition to GNSS/Area navigation proceeds;

- Replacement of the Terminal VORs at Adelaide (completed), Hobart (completed), Cairns (in progress) and Canberra is underway

- Replacement of 61 NDBS and 23 VORs; Contract signed with major equipment suppliers and installation will commence towards the end of the year.

- A project to replace 14 ILS is also in progress

Regional Strategies

2.2.61 The regional strategies for implementation of GNSS air navigation capability and the provision of precision approach and landing guidance systems were reviewed and updated by the Eighth Meeting of CNS/MET Sub-group of APANPIRG in July 2004 and adopted by APANPIRG/15 in its Conclusions 15/23. The meeting reviewed that strategies based on new information available.

2.2.62 The Regional Strategy for Precision Approach and Landing Guidance Systems was considered and no changes were proposed. It was noted that new aircraft are being supplied with avionics certified for operation with Annex 10 compliant GBAS ground stations however there are no certified ground systems available on the market. The meeting encouraged States in a position to do so to facilitate the availability certified ground system.

2.2.63 The Strategy for the Implementation of GNSS Navigation Capability in the Asia/Pacific Region was revised taking into account new terminology for non-precision approach and the availability of DOC 9849 AN/457 "Global Navigation Satellite System (GNSS) Manual". Based on the comments from Japan and IATA, the meeting slightly modified item c) under the heading "Considering" to indicate RNP 1 or less as shown in **Appendix F** to the Report on Agenda Item 2.2. Accordingly, the meeting adopted the following conclusion:

Conclusion 16/33 - Revision of the Strategy for the implementation of GNSS Navigation Capability in the Asia/Pacific Region

That, the updated Strategy for the Implementation of GNSS Navigation Capability in the Asia/Pacific region provided in **Appendix F** to the Report on Agenda Item 2.2 be adopted and provided to States.

Implementation of GNSS approach with Vertical Guidance (APV)

2.2.64 Australia informed that as an outcome on CFIT studies into aircraft approach accidents, ICAO developed an additional classification of approach design – APV (approach with vertical guidance). The CFIT studies indicated that providing vertical guidance as opposed to a 'dive and drive' approach was significantly safer. The AN-Conf/11 of 2003 recommended that these approaches be the minimum level provided by states and this recommendation was adopted by ICAO. Standards for APVs have been published in DOC 8168-OPS Vol II PANS-OPS for one form of APV – Chapter 34 on baro-VNAV and work is continuing to develop further designs. Some states have already developed designs and are currently implementing SBAS supported APVs.

2.2.65 APVs may be currently divided into two types – those that use vertical guidance provided by a path derived by the baro-altimeter and the flight management systems and those where the vertical guidance is provided by a GNSS augmentation system such as SBAS.

2.2.66 The ICAO baro-VNAV APV design incorporates a sloping splay design and requires the aircraft to be fitted with a certified baro/FMC combination capable of containing the vertical error budget within the design limits. ICAO designs also allow this form of vertical guidance to be provided for RNP based designs in Chapter 35 of PANS-OPS.

2.2.67 The difference between vertical 'advisories' and vertical guidance should be noted as there have already been a number of incidents arising from this confusion.

2.2.68 In addition some states have approved RNP (baro-VNAV) designs to RNP levels less than the 0.3NM used in PANS-OPS and the US FAA has recently published Order 8260.52 to provide standards for the design and implementation of such approaches.

2.2.69 APV designs using an augmented GNSS are nominally divided into two types, APV-I and APV-II – the difference being the vertical error limits. At this time the United States is the only State to certify an SBAS system (WAAS) and to provide APV-I approaches (known in the US as an LPV). Flying these approaches requires a SBAS capable receiver such as the TSO C145 or C146 design operating within a defined SBAS service area. At present larger airline aircraft are not fitted with SBAS receivers and current indications are that no such fitments are planned.

2.2.70 The meeting discussed the implementation of the APVs and confirmed that APV were the preferred GNSS guided approach implementation. In the development of the Strategy for Implementation of GNSS Air Navigation Capability the meeting consider non-precision approaches based on GNSS without vertical guidance should be used as an intermediate step to achieving AVP approaches.

2.2.71 The requirement for either a certified baro/FMC or SBAS augmentation raised the issue that major aircraft manufacturers are not implementing SBAS on new aircraft and that IATA does not support SBAS. It was also pointed out that at least modern aircraft, according to the flight manual, required additional augmentation external to the aircraft to achieve APV operations. SBAS provides the required additional augmentation.

Amendment to Table CNS - 3 of ASIA/PAC FASID

2.2.72 The meeting noted that APANPIRG, in its Conclusion 15/24, had urged States to review and revise FASID Table CNS-3 -Navigation, to reflect comprehensive description of the future provision of radio navigation aids. It was observed that the entries of many States were either out of date or lack adequate information on their plans for transition to GNSS. The meeting noted that in accordance with the above Conclusion, States were requested to update the Table CNS-3. The responses from States were presented to the meeting. The meeting reviewed and further updated the Table. Accordingly, the meeting adopted the following conclusion:

Conclusion 16/34 -Amendment Table CNS-3 - Radio Navigation Aids

That, the Table CNS-3, Radio Navigation Aids, provided in ASIA/PAC FASID, Part IV CNS, be replaced with the updated Table CNS-3 in accordance with the established procedure.

Surveillance systems

ADS-B study and Implementation Task Force

2.2.73 The meeting reviewed the work carried out by the Third Meeting of ADS-B Study and Implementation Task Force which was held from 23 to 25 March 2005 in Bangkok. An ADS-B Seminar was also held from 21-22 March 2005 in conjunction with the Task Force. The meeting also reviewed the result of the ADS-B working group meeting held in Singapore from 13 to15 October 2004.

States' activities on trials and implementation of ADS-B

2.2.74 Airservices Australia has committed to deploying a network of ADS-B ground stations across Australia during 2005 under the UAP. This project is expected to provide near-nationwide coverage above FL300, with significant coverage at lower levels through 28 ground Stations. Integration of the high performance GPS engine in the ground station has been completed. The installation at remote sites will be progressively completed through the second half of 2005. Commissioning of the UAP network is expected to take place by the end of 2005.

2.2.75 A RAIM prediction system as a modification to the existing system has been purchased to provide predictions of when aircraft can be expected to report integrity values corresponding to HPL<0.5NM. Formal testing of the Eurocat enhancements has commenced. An ADS-B bypass system had been developed which takes ADS-B data from the ADS-B ground stations and presents it to the controller workstation directly without centralised processing. ATC procedure development had commenced. Design safety case for the UAP had been completed.

ADS-B Trial and Implementation Regulatory Aspect

2.2.76 It was noted that for the Burnett Basin Operational Trial, the Civil Aviation Safety Authority (CASA) approved the use of a 5 NM minimum horizontal separation distance between trial aircraft on 5 December 2004. A copy of the instrument authorizing ADS-B separation in the trial is available at http://www.casa.gov.au/rules/miscinst/2004/CASA559.pdf

2.2.77 It was noted that recently CASA has issued two Australian Technical Standard Orders (ATSOs) for the certification of ADS-B avionics. ATSO-C1004 is a standard for Mode A/C transponders capable of transmitting ADS-B 1090ES messages, while ATSO-C1005 is a standard for the certification of a stand-alone (non-transponder) ADS-B 1090ES transmitter. The two ATSOs are available at: http://www.casa.gov.au/avreg/aircraft/ATSO.htm.

ADS-B Validation Trials

2.2.78 ADS-B validation trials were performed based on an 1090 MHz ES Ground station installed in Toulouse Airport within EUROCONTROL ADS-B validation activities called CRISTAL. CRISTAL Toulouse has started with the participation of consortium made of French DSNA, Airbus, Thales ATM and Alticode. It includes the installation of an ADS-B ground station with good coverage of the airport and of the surrounding airspace and validation activities through data collection and analysis. Equipped aircraft are detected with a very good detection quality at 200 NM at high altitude and sometimes up to 250 NM. For French DSNA, the study will also prepare the operational implementation of ADS-B especially in La Réunion Island by gaining confidence in ADS-B data and identifying potential issues. A final public report will be delivered to Eurocontrol at the end of 2005. It was noted that the French DSNA is also involved with EUROCONTROL, ENAV (Italy), AENA (Spain) and HCAA (Greece) in the CRISTAL MED project that will deploy an ADS-B 1090 MHz ES infrastructure for the Mediterranean airspace. ADS-B will be used to allow radar-like procedures with goal to provide radar like separation even in areas without radar coverage and currently under procedural control. It is also envisaged to use ADS-B ground stations for airport surface surveillance on some major airports close to the Mediterranean area where ADS-B data could support aircraft identification and vehicle tracking for A-SMGCS.

ADS-B Project study and Implementation Plan in Fiji

2.2.79 The meeting noted the progress of ADS-B study and tentative plans for implementation of ADS-B in Fiji. The ADS-B core Project team was liaising with some of the Stakeholders to complete and Cost Benefit Analysis (CBA) study. The following tentative project plan had been developed to be provided with Cost Benefit Analysis report for approval by the State which leads to implementation of ADS-B in Fiji. The tender and contract was estimated to be done by 31 October 2005 and commissioning of ADS-B Service in Fiji is by 30 April 2006. Four VHF sites are being considered for initial location of the ADS-B Ground Stations including two remote sites at Delaikoro and Koro-o and two local sites at Nadi and Nausori Airports. The ADS-B solution for surveillance capability in Fiji is a typical example for where no radar surveillance service is provided.

ADS-B plan in Indonesia

2.2.80 It was noted that in order to extend the surveillance coverage within Indonesian airspace, in the Near-Term the DGAC, Indonesia is considering installation of ADS-B ground station for use as complementary surveillance tool. In the Long-Term will consider SSR replacement program and to explore other applications. In the near term, 20 ground stations (11 for stage 1 and 9 for stage 2) would be installed to extend radar-like coverage and replace the unserviceable radar.

ADS-B Evaluation tests in Japan

2.2.81 The evaluation tests of ADS-B and multilateration on surface and terminal areas have been conducted by the Electronic Navigation Research Institute (ENRI). The evaluation tests of multilateration on surface area conducted used the experimental vehicle. The test results were generally satisfactory in comparison with EUROCAE MOPS. The target losses observed in front of the terminal building and large errors observed at the left and right corners were caused by shielding and reflection from buildings or parking aircraft. To resolve these problems, height of an antenna was extended and a remote unit was added near the terminal building area. The tests with these improvements were conducted on September 2004. The comparison of tracking outputs near the terminal building was analyzed.

ADS-B Implementation Plan in the Republic of Korea

2.2.82 In the 2nd phase construction of Incheon International Airport, ADS-B system has been considered to enhance surveillance capability for approaching aircraft to the airport and moving vehicles on the ground by providing efficient RIMCAS (Runway Incursion Monitoring and Conflict Alert System) function and fostering smooth air traffic flow. Incheon International Airport, which is currently operating Ku-band ASDE (Airport Surface Detection Equipment) with a MRI (Multi Radar Tracking) function, will be improved by adding X-band ASDE to ensure CAT-IIIb operation. ADS-B system will be used to supplement the detection function of the ASDE which is easily influenced by blind area or by more than a 16 mm/h rainfall. The ADS-B is also considered to be integrated with ARTS (Automated Radar Terminal System) to enhance precision approach monitoring for simultaneous parallel arrivals and departures. Four sets of ground ADS-B receivers are to be established at appropriate positions in the airport to secure sufficient visual range for detecting approaching and moving aircrafts and vehicles. The ADS-B system plan will be determined after review of expert committee with consideration of international standards and then the final decision will be made in the consultation with concerned authority and organizations. The SSR Mode S 1090 MHz ES will be used and the project is anticipated to be completed by 2008.

ADS-B trial and Plan in Singapore

2.2.83 In early October 2004, Singapore took the opportunity of flight inspection to long range radar to conduct an ADS-B trial to assess performance of ADS-B. Singapore plans to implement
ADS-B in 3 phases as follows:

- Phase 1 (2006/7) involves the tracking of ground movement of vehicles with ADS-B transponders and ADS-B equipped aircraft using sensors installed at Changi Airport. The ADS-B tracking will be displayed at the Advanced Surface Movement Guidance and Control System (A-SMGCS) at Tower.

- Phase 2 (2007/8), the ADS-B coverage will be extended up to 250 NM by installing a high-gain antenna in the airport vicinity, if required.

- Phase 3 (2009/10) we will integrate ADS-B data into the new ATC system for ATC operations.

ADS-B Operational Trail in Thailand

2.2.84 In December 2004, AEROTHAI approved the budget to conduct the ADS-B operational trial. The ADS-B operational trial in Thailand will mainly focus on assessing the system's performance in the local environment utilizing targets of opportunity in Bangkok Flight Information Region and the possibility to improve the Secondary Surveillance Radar (SSR) coverage using ADS-B as an additional source. A single, non-redundant, ADS-B ground station will be installed either in Bangkok or Phuket where an existing communication link and other necessary infrastructure are available. A cost estimate for provision of a 9600 bps communication link between ADS-B site and the air traffic control centre in Thailand is about US$ 4,800 including additional hardware for supporting ADS-B traffic. The cost estimate was based on the assumption that the ADS-B system would be installed at a location, which already has a communication infrastructure (VSAT network). AEROTHAI is currently in the procurement process and expects the installation of the equipment to be completed by the third quarter of 2005. It was further noted that Thailand intends to initiate an operational trial of ADS-B for ATC surveillance from 2005 with the target time frame 2010 for full operation, operating in parallel with the existing Secondary Surveillance Radar (SSR). ADS-B is expected to provide improved radar like coverage for Bangkok FIR, as well as backup, or replace existing radar systems in Thailand.

Potential Area for using ADS-B

2.2.85 It was noted that a requirement for using ADS-B can be identified in area between D.P.R. Korea and Russian Fast East including Northern part of Japan which would be potential area to use ADS-B technology serving those flights between Republic of Korea and Russia and beyond via DPR. Korea. There is minimal procedure airspace in DPR Korea and large part of military airspace in Northwest of Japan. IATA was requested to provide details information at next Task Force meeting listing advantage and benefits by extension of surveillance coverage with the use of ADS-B ground station.

ADS-B Radar – Like Service with a Regional ADS-B Provider

2.2.86 It was informed that SITA and Airservices Australia had become partner in providing ADS-B radar like service. To minimize capital investment by ANSPs and technical/commercial ANSP risk, the ADS-B air-ground surveillance service can be provided jointly with ANSPs. For example SITA will buy, install and maintain ADS-B ground stations and operate on existing SITA RGS sites or on ANSP sites. Example of ADS-B data sharing implementation sites could be at Norfolk Island and Christmas Island of Australia and Port Blair of India.

Problem Report System

2.2.87 It was informed that an interim ADS-B problem and issue reporting database has been developed by Australia based on the proposal agreed by the Task Force. ADS-B related problems and issues may be submitted online using a data entry form on the Airservices Australia website at www.airservicesaustralia.com/adsb/issues with following user name and password. Members of the ADS-B Task Force were invited to provide any comments regarding the web page and the database.

User name:	icao
Password:	abit2004
Domain:	leave this field blank

Transponder Status

2.2.88 It was informed that Airbus certified in 2003 three new Mode S transponders, capable of ELS (Elementary Surveillance), EHS (Enhanced surveillance) and 1090ES (Extended Squitter, first implementation of ADS-B out). These three Mode S transponders ELS/EHS/ES capable are:

- ACSS XS-950, P/N 7517800-10005
- Honeywell TRA-67A, P/N 066-01127-1402
- Collins TPR-901, P/N 822-1338-021

2.2.89 Basically, Airbus aircraft are equipped with Honeywell transponder P/N: 066-01127–1101, which is not ELS-EHS capable. However, through the RFC process, new Airbus customers have the possibility of install on their aircraft an ELS-EHS capable transponder from the list above. This RFC is free of charge for customers, and the installation of a new transponder capable of extended squitter does not imply add costs to customers.

Development of Technical Standard

2.2.90 It was noted that the United States Technical Standard Order (TSO)-C166 for Extended Squitter ADS-B and TIS-B Equipment Operating on 1090 MHz became effective on 20 September 2004, which can be electronically downloaded at: http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgTSO.nsf/MainFrame?OpenFrameSet

Comparison of ADS-B vs. radar

2.2.91 The meeting noted the U.S. activities concerning comparison of ADS-B vs. radar data and plan for a national 3 NM terminal ADS-B separation standard. These activities are documented in the Plan to Obtain Approval for Automatic Dependent Surveillance - Broadcast (ADS-B) Terminal Area Separation Standards (TermSepStdPlan). (FAA, Final Coordination v1.0, 31 August 2004). Analyses were performed on the horizontal position accuracy of ADS-B and radar targets reported to the ATC automation system. Comparing ADS-B accuracy to terminal SSR cross track accuracy at 40 NM from the radar, the data indicates that ADS-B is from 18 to 60 times more accurate. Comparing ADS-B accuracy to enroute SSR cross track accuracy at 200 NM, the data indicates that ADS-B is from 90 to almost 300 times more accurate.

ADS-B Data Sharing Policies

2.2.92 The meeting noted the following two levels of service could be adopted for sharing ADS-B data.

- LEVEL 1: Use of the ADS-B data for radar like separation standards (eg. 5 NM). This requires availability, reliability, accuracy and integrity equivalent to that offered by radar.

- LEVEL 2: Use of ADS-B data for situational awareness and perhaps some automated safety alerting features such as Cleared level adherence monitoring. For this service, integrity and accuracy are most important whilst lower standards could be tolerated for availability and reliability. Accuracy and integrity are determined in most part by the system design and by the avionics. Maintenance support is not as critical for this level of service.

ASTERIX Format for sharing ADS-B data

2.2.93 It was noted that EUROCONTROL maintains ASTERIX data format standards for data sharing between Air Traffic Control automation systems. The format which has worldwide acceptance by the ATM system manufacturing industry is called ASTERIX Cat 21 for ADS-B. The meeting recognized that the ASTERIX 21 format will evolve, and should consider the potential for future upgrades in their system designs. It was informed that the version number of ASTERIX21 data format are changed every three months. It was confirmed that version 0.23 was issued in November 2004. It was further informed that the versions are now backward compatible. EUROCONTROL exercises configuration control of the standard and version 0.23 is considered the current baseline for deployment of ADS-B systems. Accordingly the meeting adopted the following conclusion:

Conclusion 16/35 - ADS-B Data Exchange format

That,

1) the Eurocontrol Cat 21 version 0.23 or later message format be adopted for ADS-B data exchange in the Asia/Pacific Region.

2) ICAO be requested to seek agreement from Eurocontrol to use the Eurocontrol Asterix Cat 21 document in the Asia/Pacific Region as was done for radar data exchange in the region.

ADS-B Implementation and operational Guidance Document (AIGD)

2.2.94 The meeting reviewed the updated draft ADS-B Implementation and operational Guidance Document –AIGD with few editorial changes. The meeting noted that the AIGD would be a living document and it should keep consistency with PANS-ATM as indicated by the Task Force. The document was fully supported by the ATM/ASI/SAR SG/15. Accordingly, the meeting adopted the following conclusion:

Conclusion 16/36 - ADS-B Implementation and Operational Guidance Document (AIGD)

That, the ADS-B Implementation and Operational Guidance Document as provided in **Appendix G** to the Report on Agenda Item 2.2 be adopted and circulated to States in the Asia/Pacific Region and International Organizations.

2.2.95 The meeting appreciated efforts made by the ADS-B Task Force in completing the AIGD.

FASID Table CNS 4 –Surveillance Systems

2.2.96 The meeting reviewed and updated the information contained in the Table CNS 4 of the ASIA/PAC Air Navigation Plan FASID. It was noted that ADS-B was marked as emerging technology and listed as one system in the table. The meeting suggested that such remark should be removed as ADS-B has been identified by APANPIRG as one enabler for new ATM concept and system. It was also proposed to add a new column called A-SMGCS to reflect the current requirement.

2.2.97 Considering that States were encouraged by APANPIRG to implement ADS-B at sub-regional bases with target date commencing from 2006 and information contained in the Regional Plan for the CNS/ATM System needs to be gradually transferred into the tables of FASID. The meeting endorsed the following Conclusion formulated by the ADS-B SITF.

Conclusion 16/37 –Amendment to Table CNS-4–Surveillance System

That, the existing Table CNS-4 – Surveillance System provided in ASIA/PAC FASID, Part IV CNS be replaced with an updated Table in accordance with established procedure.

Subject/Tasks list of the ADS-B Study and Implementation Task Force

2.2.98 The meeting reviewed the Subject/Tasks list of the ADS-B SITF. The meeting considered the need to continue its efforts in cost benefit study. The sub-regional based ADS-B implementation plan and project should be developed and issues emerged during the trial and implementation stages should be appropriately addressed in a harmonized manner. The exchanging information and experiences gained during the trial and implementation of ADS-B should be further encouraged. Accordingly, the meeting reached the decision as follows:

Decision 16/38 - ADS-B Study and Implementation Task Force Subject/Tasks List

That, the updated subject/Tasks list for ADS-B Task Force as provided in **Appendix H** to the Report on Agenda Item 2.2 be adopted.

2.2.99 It was noted that in order to attract more participants from the Industry from other region, ADS-B air-to-air surveillance service should also be addressed by the Task Force.

2.2.100 It was informed that the next meeting of ADS-B SITF will be held in Nadi Fiji from 24-28 October 2005 hosted by Airports Fiji limited.

D*esignated Contact Persons for ADS-B*

2.2.101 The meeting noted the an action item agreed by 41st DGCA Conference on ADS-B and updated the list of Designated Contact Persons Responsible for ADS-B Study and Implementation in the Asia/Pacific Region which is at the Appendix M to this report.

Advanced Technologies and Oceanic Procedures (ATOP) IOC

2.2.102 The United States informed the meeting that on June 30, 2004, Initial Operating Capability (IOC) of the Advanced Technologies and Oceanic Procedures (ATOP) system was declared at the Oakland Air Route Traffic Control Center (ARTCC). The ATOP system provides a new automation platform for the provision of air traffic control (ATC) services in the Oakland oceanic flight information region (FIR). It is planned to transition to full twenty four hours a day, seven days a week use in the entire Oakland FIR by October 2005. The ATOP system is also installed at the New York ARTCC and was declared operational on March 31, 2005. Finally, the ATOP system is planned to go operational in the Anchorage ARTCC in March, 2006. It was informed that aircraft tracked in the ATOP system is by means of a cleared four dimensional (4-D) profile. An automated conflict probe ensures that all 4-D profiles being maintained by the system are separated from each other, both in space and time. The ADS-C application is used in the ATOP system as the primary surveillance means. The meeting recognized that the implementation of a satellite-based surveillance system using ADS-C in the oceanic area can not be substituted by ADS-B.

Safe Flight 21 (SF-21) Programme

2.2.103 The US updated the information on the progress of Safe Flight 21 (SF-21) program. As a result of SF-21demonstration activities in Alaska, along the East Coast and in the Ohio River Valley, progress has been made toward implementing operational enhancements and applications related to the use of GPS, ADS-B, TIS-B, FIS-B, and the multi-functional display in the cockpit. The Airport Map Database (AMDB) will supply current digital airport maps to cockpit avionics and airport vehicle displays to enhance airport surface situational awareness and improve runway safety. In April, the FAA published a Notice to Airmen (NOTAM) to announce initial ADS-B availability along the East Coast, and in locations in the upper Midwest and in Arizona. In 2005 MOPS compliant GBTs were installed in the Bethel area and aircraft avionics were changed out to be compatible with the GBTs. The FAA ADS-B link decision will recognize a national deployment of 900 ADS-B ground based transceivers by 2012. Further detailed information about the Safe Flight 21 program and Capstone program is provided at the following FAA websites:

http://www.faa.gov/safeflight21 and
http://www.alaska.faa.gov/capstone

Spectrum management

Preparation for WRC-2007

2.2.104 The First Meeting of the Regional Preparatory Group for WRC-2007 was held in Bangkok from 17 to 25 February 2005 in conjunction with Working Groups F and B of the Aeronautical Communications Panel (ACP) and the Spectrum Sub- Group of the Navigation Systems Panel (NSP), as proposed by APANPIRG/15.

Regional preparation for WRC-2007

2.2.105 The meeting noted the preparatory activities for WRC 2007 carried out in the ICAO Asia/Pacific Regional Office. It was noted that the 41st Conference of Directors General of Civil Aviation (DGCAs), Asia and Pacific Regions formulated action item 41/3 urging States to designate a focal point of contact in each administration and to ensure participation by aviation representatives at national level discussions to incorporate ICAO Position in State's position paper and to attend regional forms and WRC 2007

2.2.106 It was further noted that the APANPIRG/14 Meeting held in Bangkok from 4 to 8 August 2003 adopted the following Conclusion 14/24 to assign high priority to the spectrum management and initiate actions for preparation for WRC-2007 including involvement in national level discussions and participation at regional forums.

2.2.107 From these activities, the meeting agreed that all preparatory activities that could be undertaken by the Regional Office were in place. The list of contact points was updated at the meeting.

Asia-Pacific Telecommunity (APT) Conference Preparatory Group (APG) Meetings for WRC-2007

2.2.108 The regional preparatory activities undertaken by the APT including its organization for the preparatory work for WRC 2007 was noted. APT had planned to convene five APG meetings for WRC-2007. ICAO participated at the first meeting (APG2007-1) held in Bangkok from 11 to 12 November 2003. ICAO presented an information paper on the draft ICAO Position for WRC 2007 at the second meeting (APG2007-2) held in Bangkok from 28 February to 3 March 2005. . The third meeting (APG 2007-3) will be held in February 2006 in Malaysia. The meeting will update APT provisional views and draft proposals on WRC-2007 agenda items.

Preparatory activities in Australia and USA

2.2.109 The meeting noted the Australian positions for WRC-07, which were preliminary and would mature as the results of the ITU-R studies progress. There were significant issues that have implications for aviation in the Agenda for WRC-07 including new co-primary allocations in the 9 000 – 9 500 MHz band used for aeronautical radar, spectrum requirements for UAV and aircraft flight test programmes, air-ground voice communication and other safety of life aeronautical applications, and modernization of civil aviation telecommunication systems through current satellite allocations. It was advised that States should carefully consider requirements for aeronautical services identified in the WRC-07 Agenda and adopt national positions in support of the ICAO position to ensure the availability and protection of this spectrum for aviation use. States were also urged to actively participate and support aeronautical spectrum issues through national, regional and international fora including the APT Conference Preparatory Meetings for WRC 2007 and ITU-R World Radio Conference 2007

2.2.110 United States highlighted the areas of critical concern to aviation at WRC 2007 in Agenda Items 1.1, 1.2, 1.3, 1.6 and 7.2. It was emphasized that civil aviation will need to insure that such allocations proposed under agenda item 1.2 and 1.3 do not limit current aeronautical usage or future enhancements to aviation systems. It was stated that among other things, agenda item 1.6 may be used to study the spectrum needs of the universal access transceiver (UAT), the potential for Airport Network and Location Equipment, aeronautical fixed links in the 5091-5150 MHz band, and allocations for new technologies to support aeronautical mobile communications requirements. Agenda Item 7.2 was also considered important as it deals with problem of lack of an appropriate communication infrastructure that meets the evolving requirements of modern civil aviation.

IATA view for WRC-2007

2.2.111 IATA expressed the view to provide strong support to the ICAO position for WRC-2007 and emphasized the need for States representatives to participate at the ICAO Regional Preparatory Meetings, APT Preparatory Group Meetings. States were encouraged to work closely with the respective radio regulators to have the aviation position reflected in the State's position paper to be presented at the APT meetings and also at WRC-2007. In the event that aviation representatives would not able to attend the meeting they should ensure in coordination with the regulators, that aviation position is incorporated in the national position paper.

Review of the implementation of WAFS

SADIS development

2.2.112 The meeting was informed that as a result of SADISOPSG Conclusion 9/15, United Kingdom launched the SADIS 2G service on 12 November 2004. This new service was available to new and current SADIS users. There were a number of benefits of SADIS 2G for the users, the most important of which was the use of the latest technology and up-to-date hardware making the service much more cost effective - savings in excess of 50 % off the cost of current generation SADIS hardware.

2.2.113 It was recalled that SADIS 1G service would be available in addition to the SADIS 2G service until 31 December 2008. Initial guidance material for users accessing the SADIS 2G broadcast has already been sent together with the ICAO State letter to assist States in planning for the transition. The meeting was informed that an update of the guidance material was recently available.

2.2.114 The meeting agreed that, in order to foster the transition to SADIS 2G, a SADIS 2G seminar should be held at the ICAO Regional Office during July 2006, back-to-back with CNS/MET SG/10 meeting. The main purpose of this seminar was to assist users in the procurement of SADIS 2G hardware. GRIB/BUFR visualization software suppliers would also be present at the event to advise users about the range of services and products which could be provided. The meeting adopted the following Conclusion in this regard:

Conclusion 16/39 - Fostering transition to SADIS 2G service in the Asia/Pacific Region

That,

1) ICAO urges the Asia/Pacific SADIS user States to plan for the replacement of their SADIS 1G receiving systems well in advance to the planned discontinuation of SADIS 1G by 31 December 2008; and

2) the SADIS Provider State, in coordination with ICAO and WMO, be invited to organize a SADIS 2G seminar for the Asia/Pacific States to be held back-to-back with the CNS/MET SG/10 meeting in July 2006.

Notes: 1) Updated guidelines on the transition from SADIS 1G to SADIS 2G is provided in **Appendix I** to the Report on Agenda Item 2.2

2) It is expected that the SADIS 2G seminar will cover also the visualization software for GRIB and BUFR coded WAFS forecasts.

2.2.115 The meeting considered that the proposed seminar would also be useful for the users of the ISCS service since they were using the same or similar GRIB/BUFR visualization software. Therefore, the participation in the seminar should not be limited to the SADIS user States, but the invitation should also be forwarded to the ISCS user States in the Asia/Pacific Region.

Long-term planning of SADIS development

2.2.116 To assist Asia/Pacific States in planning for maintaining and upgrading their SADIS receiving systems, the meeting considered it very useful for the SADISOPSG to develop a long-term plan for SADIS development. Information including the life expectancy of the related services and systems would be particularly relevant for States to justify the expenditures needed for upgrading their systems. Other key planning issues such as the period over which different WAFS products would continue to be distributed through the SADIS and ISCS satellite broadcasts would also be important. In this connection, the meeting adopted the following Conclusion:

Conclusion 16/40 - Long-term planning of SADIS development

That, in order to facilitate SADIS user States' planning for maintaining and upgrading their SADIS receiving systems, the SADISOPSG be invited to consider development of a long-term plan for the SADIS development, including the life expectancy of the related services and systems.

Note: To ensure harmonized development of the two satellite broadcasts, the ISCS Provider State would be consulted in the development of the SADIS long-term plan.

SADIS Strategic Assessment Tables

2.2.117 The meeting updated the strategic assessment tables, 2006 – 2009, for the Asia/Pacific Region as presented at SADISOPSG/10 meeting.

ISCS Developments

2.2.118 As a follow up of APANPIRG Conclusion 15/31, the Secretariat, in coordination with the ISCS Provider State, developed a procedure and questionnaire for the conduct of an annual ISCS/2 operational efficacy survey in a similar manner to the one for the SADIS operational efficacy. The first ISCS/2 survey was conducted in May and June 2005. In response to the survey, the ISCS users States also designated ISCS focal points. It was expected that the annual operational efficacy surveys would provide valuable feedback to the ISCS Provider State to facilitate the resolution of the observed implementation problems.

2.2.119 As regards the ISCS transition from X.25 to TCP/IP protocol, the meeting was informed that the ISCS terrestrial network had been upgraded to minimize the loss of data experienced on the TCP/IP broadcast. Currently, the loss was considered small enough and a test of the TCP/IP broadcast was being conducted. The X.25 broadcast would be terminated upon successful completion of the test and the ISCS Provider State would notify ICAO of any change in status.

Transition to GRIB and BUFR coded WAFS products

WAFSOPSG/2 outcomes in relation to GRIB and BUFR migration

2.2.120 WAFSOPSG/2 concurred with APANPIRG Conclusion 15/32 and decided that the issuance of SIGWX forecasts in T4 chart form should be continued, in parallel with the use of BUFR code form, for a limited period of time until 30 November 2006. On the other hand, it was emphasized that this extension did not concern the GRIB code form, i.e. the exclusive use of the GRIB code form for the Wind/Temp forecasts within the WAFS had taken place on 1 July 2005 as scheduled. WAFSOPSG/2 also decided that ICAO Regional Offices should carry out a survey in May 2006 to verify the implementation of the reception and utilization of BUFR-coded SIGWX forecasts by States.

2.2.121 As a follow up of WAFSOPSG conclusion 2/13, WAFC London SIGWX forecasts in PNG format had been made available on the SADIS FTP server since May 2005. WAFS Washington SIGWX forecasts in PNG format have been made available also on the USA NWS FTP server since June 2005. Action was being taken by WAFC London to add PNG versions of the WAFS SIGWX charts to the SADIS satellite broadcasts in addition to the SADIS FTP server.

2.2.122 States' feedback on the trial PNG formatted SIGWX charts would be sought in the regional survey to be conducted in May 2006 to ascertain if the provision of these charts should be continued after 30 November 2006.

2.2.123 In response to APANPIRG Conclusion 15/34, WAFSOPSG/2 agreed that WAFC London should amend the Guidelines for representing WAFS SIGWX data in BUFR by adding a requirement for the WAFS visualization software to automatically generate compliant SIGWX charts from the BUFR code for the standard ICAO areas and bring the amended guidelines to the attention of software vendors. WAFC London updated the Guidelines (Version 2.6) correspondingly. Further update to the Guidelines (Version 2.7) was recently made to incorporate some relatively minor changes and the users should check with the BUFR visualization software vendors whether these changes would require another software update/upgrade.

Regional progress

2.2.124 CNS/MET SG/9 meeting reviewed the progress of WAFS implementation in the Asia/Pacific Region against the "Indicative Timetable for Implementation of WAFS" given in the "ASIA/PAC WAFS Implementation Plan and Procedures". The meeting noted that the exclusive use of the GRIB code form for the Wind/Temp forecasts within the WAFS had already been achieved on 1 July 2005 even though a user reported that it was obtaining the Wind/Temp forecast charts available on the Internet. As regards GRIB/BUFR training, the meeting was pleased to note that the SADIS and ISCS Provider States had provided a conjoint training on the operational use of GRIB and BUFR coded WAFS products for both SADIS and ISCS user States in the Asia/Pacific Region at the ICAO Regional Office in January 2005.

2.2.125 As regards BUFR coded SIGWX forecasts, the satellite distribution of SWM for limited geographical areas in BUFR format was achieved by WAFC London in early April 2005. The satellite distribution of SWH and SWM in BUFR format by WAFC Washington was also achieved by

the end of June 2005. Development work was carried out at both WAFCs to ensure that production methods were consistent with current working practices and the methodologies employed to produce the BUFR encoded SWH data.

2.2.126 In view of the need of continuous monitoring of the progress of BUFR migration and SADIS 2G transition in the Asia/Pacific Region, the meeting agreed that the ASIA/PAC WAFS Implementation Plan and Procedures and the work programme of the WAFS/I TF should be updated, and formulate corresponding Decision (Decision 9/22 refers).

2.2.127 The meeting was informed that WMO were currently processing 17 requests under the WMO VCP from user States (9 ISCS user States and 8 SADIS user States) for assistance in upgrading their WAFS processing system to achieve GRIB and BUFR compliance.

Airline Survey in Hong Kong, China

2.2.128 During 30 November – 23 December 2004, Hong Kong, China conducted a survey to collect feedback from airlines operating at the Hong Kong International Airport (HKIA) on the new SIGWX charts generated from BUFR coded WAFS data using one of the visualization software packages evaluated by WAFC London. The majority of the airlines found the new BUFR charts an improvement over the existing T4 charts and supported them replacing the existing T4 charts.

Long-term planning of WAFS

2.2.129 The meeting recalled that a number of changes to the BUFR encoding sequence were made during 2004 and 2005 which necessitated changes to end users' software. This impact on the end users was a natural consequence and disadvantage of using the BUFR code where the responsibility for SIGWX chart production shifted from central control by the WAFC to the end users. The meeting noted with concern that the WAFS visualization software was still undergoing frequent changes, some of them done without sufficient advanced notice to users. It was stressed that changes to WAFS operations, especially those having financial implications for the users, should be part of a long-term plan, including an established schedule of the system changes. It was also agreed that the number of changes should be minimized and preferably be aligned with the Annex 3 amendment cycle. In view of this, the meeting adopted the following Conclusion:

Conclusion 16/41 - Long-term planning of the WAFS implementation

That, WAFSOPSG be invited to consider development of a long-term plan for the WAFS, establishing a schedule for the changes, which require upgrade/update of the users' systems. In order to minimize the frequency of changes and the corresponding operational and financial implications to the users, the schedule of changes should adhere to the ICAO Annex 3 amendment cycle.

Use of WAFS products in flight documentation

2.2.130 The meeting reviewed some of the current national practices in the provision of Wind/Temp charts and SIGWX charts in flight documentation and noted that there were certain significant differences in the interpretation of the validity of these fixed time forecasts with reference to the time and duration of the flight concerned. The issues included: (a) whether or not a forecast would be useable within plus or minus 3 hours either side of the validity time; (b) whether or not a forecast from an earlier model run would be automatically cancelled by a forecast from a later model run; and (c) what Wind/Temp charts and SIGWX charts would be considered to form the "best set" for flight documentation. The meeting agreed that additional guidance should be sought from ICAO on these issues and formulated the following Conclusion:

Conclusion 16/42 - Guidance on the use of WAFS products in the flight documentation

That, WAFSOPSG be invited to consider development of additional guidance on the harmonized use of the fixed time WAFS forecasts in the flight documentation, with reference to the time and duration of the flight.

Exchange of OPMET Information

Review of the report of OPMET/M TF/3 meeting

2.2.131 The third meeting of the ASIA/PAC OPMET Management Task Force (OPMET/M TF/3) was held in Bangkok, Thailand from 2 to 4 March 2005. Electronic version of the full report of the 3rd meeting of the Task Force with relevant Appendices was available on the ICAO web at: http://www.icao.int/cgi/goto_m_apac.pl?/apac/meetings.htm.

2.2.132 The meeting appreciated some important achievements, such as the finalization and publication of the new editions of the *ROBEX Handbook* and the *ASIA/PAC OPMET Data Banks ICD*. Both documents were distributed in hard copy and CD-ROM to all ASIA/PAC and MID States, as well as posted on the ICAO web site.

AIREP Survey

2.2.133 The AIREP Team of the OPMET/M TF conducted a survey on the AIREP exchange in the Asia/Pacific Region in order to verify the current exchange procedures and to check the availability and correctness of the AIREP bulletins. A survey questionnaire was developed and sent to ROBEX centres, with the survey conducted over a 10-day sampling period from 1 to 10 November 2004. The scope of the survey was the exchange of air-reports received by voice communication compiled as UA-type bulletins and exchanged between the ROBEX centres. The meeting noted that the total number of UA bulletins during the survey period was 6,662 with 43,252 individual AIREP messages included.

2.2.134 More than 30% of the replies to AIREP survey indicated different non-compliances with Annex 3 provisions related to air-reporting. Most of the identified deficiencies of the AIREP exchange should be resolved by providing advice and additional guidance to the corresponding ROBEX centres. On the other hand, the insufficient number of special air-reports was considered as serious deficiency influencing the provision of the safety-related SIGMET information by the States. It was recognized that the availability of special air-reports at the Meteorological Watch Offices depended on their regular issuance by the pilots and the transmission of the messages received by the ACCs to the MWOs. Therefore, the meeting agreed that, in order to improve the availability of special air-reports, the airlines, the ATS provider units and the MWOs should be reminded of their obligations related to the provision of special air-reports, and adopted the following Conclusion:

Conclusion 16/43 - Special air-reports

That, ICAO be invited to:

1) urge the Asia/Pacific States to implement the requirements for the reception and exchange of the special air-reports received via voice communication, as specified in the Annex 3; and

2) request IATA to encourage airlines to improve the availability of the special air-reports for safety critical meteorological phenomena, such as volcanic ash clouds.

Note: The requirements in p. 1) above are to be addressed by both the States' MET and ATS authorities/providers.

Amendment to FASID Tables related to OPMET exchange

2.2.135 Proposals for amendment of FASID Tables MET 4A, 4B and 4C related to the ROBEX Scheme have been developed. The format of the new FASID Table MET 4A, which was consolidated from the original Tables MET 4A and 4B, was harmonized with the new edition of the ROBEX Handbook. Similar changes had been made to FASID Table MET 4C, which was renamed to MET 4B.

2.2.136 The meeting discussed further the need for amendments to FASID Tables MET 2A and 2B. It was noted that these tables were introduced in the regional ANP long ago and under entirely different communication environment, i.e., before the establishment of the RODBs and before the introduction of the satellite broadcasts SADIS and ISCS that were now used for global distribution of OPMET data.

2.2.137 In view of the above, it was agreed that FASID Table MET 2A could be replaced by the ASIA/PAC part of the SADIS User Guide (SUG) Annex 1, so that the requirements for OPMET data from Asia/Pacific Region stated by the users were reflected in the regional ANP.

2.2.138 As regards FASID Table MET 2B which specified requirements for exchange of SIGMET, the meeting considered it obsolete. In view of this, the meeting recommended that the Secretariat consider, after consultation with the other ICAO regions, deletion of FASID Table MET 2B from the regional plan as obsolete.

2.2.139 Based on the above discussion, the meeting adopted the following Conclusion:

Conclusion 16/44 - Amendment of the OPMET related regional procedures in ASIA/PAC Basic ANP and FASID, Doc 9673

That, the ASIA/PAC Basic ANP and FASID (Doc 9673) be amended as indicated in **Appendix J** to the Report on Agenda Item 2.2.

Issues related to TAF with extended period of validity

2.2.140 APANPIRG/15 meeting formulated Conclusion 15/39 on the feasibility of extending the validity of TAF to 30 hours in order to meet the planning requirements for the very long haul flights (18 hours or more). The meeting was informed that the task for developing the necessary provisions for the extended TAF was undertaken by the Secretariat with the assistance of the Aerodrome Meteorological Observing Systems Study Group (AMOSSG).

2.2.141 The planned introduction of TAF with validity of up to 30 hours raised some concerns regarding the possible impact such a change could have on the meteorological offices and users. In particular, it was considered necessary that the introduction of the new provisions should be supported with the relevant changes to the TAF code; information for these changes should be made available well in advance of the applicability date in order to provide time for the necessary preparations.

Migration to BUFR-coded aeronautical meteorological messages

2.2.142 The meeting recalled that APANPIRG Decision 15/40, had tasked the OPMET/M TF and the ATN Transition TF to address the issued related to the regional planning for the transition to BUFR coded OPMET information. The meeting was informed in this regard that the two task forces at their meetings in 2005 discussed the BUFR transition and identified that due to the complexity of the issues the regional planning would take more time than initially envisaged by APANPIRG. To expedite the work, the OPMET/M TF/4 meeting would be held jointly with the Working Group of the ATN/T TF in March 2006.

2.2.143 The ATN Transition Task Force clarified that the current operational AMHS service was a basic AMHS, which processed AFTN messages and might not be able to support the extended service required for the BUFR code. It was confirmed that for the commissioned AMHSs software changes might be necessary to support the emerging requirement. Additional studies were required in order to determine the necessary changes enabling BUFR code support.

2.2.144 In order to provide a better understanding of the requirements for transition to BUFR code, which was a precondition for the effective regional planning of the transition, the ATN/T TF had assigned a task to its Working Group to study the capability of AMHS being introduced in the Region and detailed requirement for the BUFR code. The result of the study would be presented to the next OPMET/M Task Force meeting to be held in March 2006.

TOR and work programme of the OPMET Management Task Force

2.2.145 The meeting reviewed the terms of reference and the composition of the OPMET/M Task Force and agreed on the request by Viet Nam to become a member of the group. The regional planning for the transition to BUFR coded OPMET information was included in the work programme of the group. The following Decision was adopted:

Decision 16/45 - Terms of reference and work programme of OPMET/M TF

That, the terms of reference, work programme and composition of the OPMET Management Task Force be amended as shown in **Appendix K** to the Report on Agenda Item 2.2.

Implementation of ICAO Warning Systems

SIGMET Tests

2.2.146 The meeting recalled APANPIRG Conclusion 15/42, which called for ICAO to invite all States in the Region to participate in the SIGMET tests. As a follow up, two regional SIGMET tests were conducted in early 2005: test for SIGMET for volcanic ash on 18 January 2005, and test for SIGMET for tropical cyclones on 18 February 2005.

2.2.147 The tests revealed some problems in the issuance and dissemination of SIGMET by the Asia/Pacific States, as follows:

- Some States missed to issue test SIGMETs;
- wrong format of SIGMET bulletins;
- problems with AFTN addressing.

2.2.148 The meeting concluded that the SIGMET tests provided very useful information which would be used in resolving the existing SIGMET deficiencies in the Region. It was agreed that regular tests should continue with a 6-month frequency.

Update of ASIA/PAC Regional SIGMET Guide

2.2.149 It was recalled that to assist States, ICAO issued a new version of the *ASIA/PAC Regional SIGMET Guide* in September 2003. An amended version has been prepared to reflect changes invoked by Amendment 73 of Annex 3, which became applicable in November 2004, as well as other necessary changes since September 2003.

Issues related to SIGMET format and procedures

2.2.150 The meeting reviewed a list of issues related to SIGMET procedures and format, raised by Asia/Pacific States, and agreed that these issues needed to be addressed by an appropriate ICAO body. It was desirable to include additional guidance on SIGMET provisions in the Manual on Aeronautical Meteorological Practice, ICAO Doc 8896, and to consider some amendments to the respective Annex 3 provisions. Based on this, the meeting formulated the following Conclusion:

Conclusion 16/46 - Facilitating the implementation of SIGMET provisions

That, ICAO be invited to consider further improvements of the SIGMET provisions, by providing additional guidance and/or amendments to the SIGMET related SARPs, as necessary, in order to resolve identified difficulties in implementing SIGMET, as shown in the **Appendix L** to the Report on Agenda Item 2.2.

Actions to improve SIGMET availability

2.2.151 Improving the implementation of the SIGMET service by the States had been a priority task pursued by the CNS/MET SG during the last few years. Though some progress had been achieved, the issuance of SIGMET was still one of the main MET deficiencies identified by APANPIRG. The meeting discussed possible ways to provide assistance to States experiencing difficulties in providing the required meteorological services including SIGMET.

2.2.152 The meeting appreciated the proposal by Australia for issuing a poster for volcanic ash SIGMET to be used by MWOs for reference. It was felt that a similar poster should be produced for other types of SIGMET, such as, SIGMET for tropical cyclones and for other hazardous en-route meteorological phenomena. In response, Hong Kong, China informed that Hong Kong Observatory had the capability to prepare and produce such a poster. The proposals was also supported by New Zealand and Japan, who offered their expertise in preparing the posters. It was confirmed that ICAO could assist by distributing the posters to the States and WMO would also be involved in the coordination of the content of the posters. The meeting expressed full support to the proposal for SIGMET posters and adopted the following Conclusion:

Conclusion 16/47 - Production of SIGMET posters

That, in order to enhance the availability and quality of the SIGMET information, Australia and Hong Kong, China be invited to produce in 2006, in coordination with the VA/TC Implementation TF, and in consultation with ICAO, WMO and the TCAC and VAAC Provider States in Asia/Pacific Region, SIGMET posters describing the SIGMET procedures

for volcanic ash clouds, tropical cyclones and other hazardous meteorological phenomena, to be used as training material and quick reference tools by the MWOs.

Implementation of IAVW

2.2.153 Proposals for amendment of FASID Table 3B, Volcanic Ash Advisory Centres, FASID Table MET 1B, Meteorological Watch Offices, and a new FASID Table MET 3C, Selected Volcano Observatories, prepared by the Secretariat, were presented. It was explained that for the new FASID Table MET 3 some States were yet to designate their volcano observatories for inclusion in the Regional Plan. However, in order to expedite the processing of the FASID amendment, the table was considered sufficient for starting the consultation process with the States and organizations. Therefore, the meeting agreed on the proposed draft amendments and adopted the following Conclusion:

Conclusion 16/48 - Amendment of the regional procedures related to SIGMET and advisories in ASIA/PAC FASID

That, the ASIA/PAC FASID (Doc 9673) be amended as indicated in **Appendix M** to the Report on Agenda Item 2.2

Quality assurance in the MET field

2.2.154 The meeting was informed that the WMO Executive Council approved in June 2005 the proposal for the QMS seminar to be hosted by Hong Kong, China as the local organizer and stressed on the need to ensure as broad participation as possible, with emphasis on developing countries. Funds were made available by WMO to support the seminar. It was decided that the seminar would be held from 22 to 25 November 2005.

MET support for operations at aerodromes and terminal areas

Aerodrome warnings

2.2.155 The meeting reviewed a suggestion by the users to include the surface wind direction in the aerodrome warning for strong surface wind and gusts. The wind direction information was considered important to pilots since there was directional dependence of the turbulence intensity due to effects of surrounding terrain under strong wind conditions. The information was also considered important to aerodrome operators for planning of ground operations of aircraft and cargoes, especially for airports affected by the passage of tropical cyclones when the surface wind speed and direction could change and affect different operators differently.

2.2.156 To address the users' feedback, it was proposed to revise the template for aerodrome warnings in Table A6-2 of Annex 3 to include the surface wind direction, in addition to the surface wind speed and gusts under the phenomenon section. The meeting agreed that consideration should be given to the inclusion of the surface wind direction in the aerodrome warning as an optional parameter and adopted the following Conclusion:

Conclusion 16/49 - Revision to the Annex 3 Template for Aerodrome Warnings

That, ICAO be invited to consider including the surface wind direction, in addition to the surface wind speed and gusts, under the phenomenon section of the template for aerodrome warnings in Table A6-2 of Annex 3, as indicated in **Appendix N** to the Report on Agenda Item 2.2

Note: a possible way to include the surface wind direction information is in the form of "SFC WIND n[n] nn[n]KMH MAX nn[n]".

CNS/ATM systems implementation

2.2.157 The chairman of METATM Task Force of the CNS/MET SG presented to the meeting the work of the task force since the CNS/MET SG/8 meeting in July 2004.

MET/ATM Coordination Seminar

2.2.158 As a follow-up of APANPIRG Conclusion 14/45 the preparation of a MET/ATM coordination seminar has been discussed. A tentative programme for the seminar (reproduced in **Appendix O** to the Report on Agenda Item 2.2) has been developed. Noting the importance of the METATM seminar in further developing of the MET component of the CNS/ATM systems in the Region, the meeting agreed that the seminar should be held at the ICAO Regional Office, Bangkok, in January-February 2006. The meeting was pleased to note that the US would consider ways to provide assistance in support of the seminar. It was stressed that the ATM should be adequately represented at the seminar to ensure successful exchange of views and ideas.

MET developments in support of ATM

2.2.159 The meeting noted with interest the recent developments of MET products in support of ATM:

- Graphical depiction of forecast conditions critical to ATM operations (Japan)
- Terminal area thunderstorm information (Japan)
- Terminal meteorological (TerMET) forecast (Hong Kong, China)
- Terminal area convection information (Australia)
- Near real-time convective information in relation to aircraft position (US)

Automated aircraft observations

2.2.160 The meeting reviewed a proposal to extend the provision of automated aircraft observations to also cover the approach phase of flight, in addition to the climb-out and en-route phases, and to increase the resolution of the observations during the climb-out and approach phases for wind shear warning application.

2.2.161 The meeting noted that while Annex 3 recommended that evidence of the existence of wind shear should be derived from, amongst other data sources, aircraft observations during the climb-out or approach phases of flight, there was currently no Annex 3 provision requiring routine aircraft observations during the approach phase of flight, no matter whether automatic data downlink or voice communications were used. The only means was thus through pilot reports of wind shear which was based on subjective assessment of the pilots and might be complicated by a number of factors (e.g. difference between airspeed change and headwind change, effects of flight control inputs). It was therefore considered highly desirable for the evidence of the existence of low-level wind shear to be derived from automated aircraft observations of the wind during both the climb-out or approach phases of flight.

2.2.162 As regards the resolution of the automated aircraft observations, the current specification of 30 seconds in Annex 3 was equivalent to approximately 2.5 km at typical aircraft approach speed. While this was within the typical spatial scale range of wind shear (400 m to 4 km), smaller-scale events such as terrain-induced wind shear would possibly be missed unless the resolution of the observations was increased to adequately cover the lower end of the scale range. Considering the typical aircraft approach speed, one suggestion was to increase the temporal

resolution of automated aircraft observations from 30 seconds to 4 seconds when the aircraft was between runway level and 500 m above that level – the altitude range over which low-level wind shear warning was required by Annex 3.

2.2.163 Considering the benefits of the proposals to low-level wind shear warning, the meeting adopted the following Conclusion:

Conclusion 16/50 - Extending the Provision of Automated Aircraft Observations for Wind Shear Warning Application

That, ICAO be invited to consider, for low-level wind shear warning application, extending the provision of automated aircraft observations to:

a) cover the approach phase of flight; and
b) increase the resolution during the climb-out and approach phases when the aircraft is between runway level and 500 m above that level.

Format of D-ATIS messages

2.2.164 The meeting was informed about a feedback from airline users regarding duplication of numeric values and words for the same values in the D-ATIS messages provided by some airports. The meeting further noted that some work was taking place in drafting guidance material for the format of D-ATIS messages as part of the *ATS Planning Manual* (Doc 9426). In this draft guidance material, the format presented was similar to the template provided in Annex 3 in respect of the local routine and local special reports (Table A3-1 of Appendix 3 to Annex 3). In this connection, the above-mentioned duplication had been confirmed to be unnecessary. In view of the progressive implementation of D-ATIS in the Asia/Pacific Region and the user's need for guidance on the format of the messages, the meeting adopted the following Conclusion:

Conclusion 16/51 - Guidance on implementation of D-ATIS

That, ICAO be invited to expedite the publication of the guidance material on the format of D-ATIS messages.

Note: The guidance material on the format of D-ATIS messages forms part of the ATS Planning Manual (Doc 9426).

Data link for uplinking graphical MET information

2.2.165 The meeting was informed that a number of developments in meteorological products for uplinking had been made. The METLINK SG/8 meeting held during 1-4 February 2005 had developed draft model templates for the graphical display of SIGMET information for volcanic ash, tropical cyclones and for all of the other required phenomena. Subject to finalization by WMO, the model templates for graphical SIGMET would be included in Appendix 1 to Annex 3 as part of Amendment 74, which would become applicable in 2007. Concurrently, further work was being progressed in the development of guidance material for the display of meteorological information in the cockpit, and development of draft model template for the graphical display of turbulence and wind shear information. As regards the encoding/decoding of graphical meteorological products for uplink, the use of the BUFR code form had been specified in Annex 3 for uplinking graphical SIGMET information.

2.2.166 In view of the progress in enabling graphical MET information uplink, there remained an outstanding task to identify the appropriate data link to support future uplinking of graphical MET information in the Asia/Pacific Region. At present, MET information uplink applications, including D-ATIS and D-VOLMET, were exclusively implemented on the ACARS VHF data link which had significant constraints in the transmission of high-data-volume graphical information. On the other hand, VDL-Mode 2 had been supported to be introduced in the near term (now to 10 years) in the Asia/Pacific Region as laid down in the draft strategy for implementation of the air-ground data link in the Asia/Pacific Region. In this connection, the meeting adopted the following Conclusion:

Conclusion 16/52 – Air-Ground Data Link Supporting Graphical Meteorological Information Uplink

That, ICAO be invited to identify a data link to support future uplinking of graphical meteorological information and to develop relevant SARPs and guidance to facilitate implementation.

Use of Mode S extended squitter (ES) in automatic MET air-reporting

2.2.167 The meeting was informed that, arising from APANPIRG Conclusion 14/44, the METLINK SG had been invited to consider the application of the Mode S datalink in automatic air-reporting as an alternative to ADS over areas covered by surveillance radars and to consider ways to facilitate its implementation in the Asia/Pacific Region. Subsequently, METLINK SG included the use of Mode S in automatic MET air-reporting in the draft Amendment 74 to Annex 3.

2.2.168 On the other hand, the meeting noted that there was currently no intent to implement Mode S in the near term in the Region. Subject to confirmation, the meeting was advised that both SSR Mode S radar and 1090 MHz extended squitter (ES) ADS-B could be used for downlinking the contents of the MET data blocks. It therefore appeared that in the Asia/Pacific Region, ADS-B (using 1090 MHz ES) would be more likely to become widely implemented, and for that reason, it might be more suitable for automated MET air-reporting. The meeting agreed that it had always been the intent of using ADS-B for automated MET air-reporting but in view of the need to confirm the technical details on implementation, the meeting formulated a Decision requesting the ADS-B Study and Implementation task Force to study the use of 1090 MHz extended squitter (ES) ADS-B for automatic MET air-reporting in the Asia/Pacific Region (Decision 9/37 refers).

Regional Contingency Planning in the CNS and MET fields

2.2.169 The meeting in the knowledge of the December 2004 Tsunami shared ideas and experiences in developing and implementing contingency arrangements for the provision of CNS and MET services during crises situations, due to natural disasters or other causes, with the view of developing regional guidance.

2.2.170 A presentation of the effects on aviation of the Tsunami highlighted three main areas, these were:

- the direct impact and damage on airports and air navigation infrastructure;
- participation of aviation in the disaster relief operations-SAR, relocation/evacuation, delivery of humanitarian aid to affected areas; and
- effects on air travel related to reduced tourist flows.

2.2.171 Response actions in the CNS/MET field identified during discussion were:

- availability of specialist personnel to restore, operate and expand capacity of effected aerodromes, contingency aerodromes and supporting facilities. It was noted that many local personnel may be unavailable due to personal tragedy or already fully committed to the relief effect;
- Provision of specialist equipment such as deployable communications, navigation, surveillance, meteorology and control tower equipment; and
- In the recovery phase the expeditious provision of long lead time items, for example from project stock.

2.2.172 The meeting proposed the following suggestions for consideration in the development of an aviation response:

- That, the CAAs of Asia/Pacific States be invited to provide data to the regional Office in order to prepare a catalogue of resources and services which will facilitate the coordination of provision of help

- The development of a catalogue of organisations with the ability to contribute to a response capability. The catalogue would be similar to the existing regional catalogue of flight inspection services maintained by the Regional Office and provide details contact points, general description of facilities and services available and arrangements under which services would be provided (ie government to government, commercial, humanitarian);

- The Regional Office acting as a facilitator; and

- The development of RNAV(GNSS) approaches to vulnerable aerodromes or aerodromes servicing vulnerable areas. These GNSS approaches would be designed and validated as part of a disaster preparedness program.

2.2.173 The meeting noted with admiration the role aviation played in the response to and the recovery from the December 2004 Tsunami. In view of the discussion on the necessary contingency planning, the meeting agreed on the following Conclusion:

Conclusion 16/53 - Regional Contingency Arrangement in support to continuity of aviation operations in the events of natural disasters or other crisis situations

That,

a) Asia/Pacific States be invited to provide data to the ICAO Regional Office regarding availability of resources and services which could be readily made available in the event of natural disaster and other crisis situations to the States in need and to support international humanitarian relief operations involving aviation;

b) Based on the data received from the States, ICAO Regional Office develop a catalogue and act as a facilitator and coordinator of the international aviation operations in response to disasters and other crises. The catalogue would provide details regarding contact points, general description of facilities and services available and arrangements under which services would be provided (i.e. government to government, commercial, humanitarian, etc.); and

c) States consider implementing RNAV (GNSS) approaches procedures as an alternate to ground-based radio navaids in particular for areas prone to natural disasters, such as tsunami, tropical cyclones, volcanic eruptions, etc.

Future Work Programme

2.2.174 the meeting recalled that APANPIRG/15 while adopting the proposed changes to the Subject/Tasks List noted that of the 41 Tasks, 29 Tasks were completed and the completed Tasks were deleted from the List.

2.2.175 The meeting reviewed the TOR and Subject/Tasks List Tasks List in light of the work accomplished and the revised Key Priority items in the CNS/MET fields. The meeting agreed to add three items in the List to deal with the Tasks relating to the preparation for WRC 2007, implementation of data link and updating of Table CNS-2 of the ASIA/PAC FASID and adopted the following Decision:

Decision 16/54 - Updated Subject/Tasks List of the CNS/MET Sub -Group

That, the Subject/Tasks List of the CNS/MET Sub-group presented in **Appendix P** to the Report on Agenda Item 2.2 be adopted.

Special Implementation Project (SIP) sub regional Seminars

2.2.176 The Secretariat informed the meeting that in accordance with Conclusion 13/23 of APANPIRG/13 three Special Implementation Project (SIP) Sub- Regional Seminars on Identification and Filing of Differences to ICAO Standards were held in Delhi, India from 4 to 6 October 2004, Beijing, China from 11 to 13 October 2004, and Bangkok, Thailand from 6 to 8 December 2004. The Seminars were attended by 87 participants from Asia/Pacific region. The Seminar was conducted by the Secretariat with the assistance of a database expert provided by Australia.

2.2.177 The Seminars dealt thoroughly with the following items:

a) organization and function of ICAO;
b) process involved in the development and adoption of SARPs;
c) State's responsibility with respect to Article 38 of the Convention on International Civil Aviation – "Notification of Differences";
d) need for the State to review and update Civil Aviation regulation, as required;
e) delegation of responsibility to different organizations involved in the implementation of concerned Annexes and establishment of reporting channels to ensure timely submission of differences;
f) use of IT as much as possible;
g) ensure that ICAO is notified of the differences and also publish differences in AIP;
h) difference between SARPs and deficiency was identified;
i) the use of database in identification and filing of differences; and
j) participants were made familiar wit the use of database.

2.2.178 The Seminars provided all the required information to participants to assist them in identifying and filing of differences. Participants were made thoroughly familiar with the use of a database developed to identify and file differences. States are expected to set up an appropriate process to ensure timely evaluation, verification and notification of difference to SAPRs with the assistance of the database. This process is expected to facilitate development of national legislation and also implementation of SARPs.

ATN Seminar

2.2.179 The meeting was informed that Aerothai was hosting an ATN Seminar in Chiang Mai from 6 to 9 December 2005 in coordination with ICAO. The meeting appreciated the initiative taken by Aerothai as it was in accordance with the item 7 of the Key Priorities in which emphasis was placed on sharing information and providing training opportunity to foster implementation.

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

ASIA/PACIFIC
ATS Message Handling System (AMHS) Naming Plan

THIRD EDITION - APRIL 2005

EXECUTIVE SUMMARY

This document provides planning and technical guidance on the naming convention for the transition of ground Aeronautical Fixed Telecommunication Network (AFTN) services to the ATS Message Handling System (AMHS) within the ASIA/PAC Region.

Based upon the ATN SARPs as published in ICAO Annex 10 and ICAO Doc. 9705, naming and addressing plans are required to be developed by ICAO regions concerned. These Regional Plans will provide guidance to States in the assignment and registration of addresses and names to be used for the Aeronautical Telecommunication Network (ATN).

The ASIA/PAC ATN AMHS Naming Plan aligns itself with the global AMHS naming scheme.

To maintain compatibility within the region, the Common AMHS Addressing Scheme (CAAS) Address format should be adopted where States are about to start their AMHS implementation programmes. This will ensure compatibility with the proposed global AMHS naming scheme.

A formal registration authority is established within ICAO, which will maintain a register for registering all Private Management Domains (PRMDs).

This document was adopted by 12th Meeting of APANPIRG held in 2001 for distribution to States in the ASIA/PAC and adjacent regions. It was further updated in April 2005 to include a comprehensive elaboration on the Common AMHS Addressing Scheme (CAAS), in particular the Private Management Domain Name value for States in the ASIA/PAC region.

1. INTRODUCTION

This document presents the naming assignment conventions for allocating Originator/Recipient (O/R) names to be used for the ATS Message Handling System (AMHS) in the ASIA/PAC Region.

The information contained in this document is drawn from a number of developments from the third meeting of the ATN Panel and planning activities in Europe.

1.1 Objectives

The objective of the document is to provide guidance in the naming convention to be used for the AMHS in the ASIA/PAC Region.

1.2 Scope

The scope of the document includes:

- Describing the attributes of the AMHS address format, and
- Recommending the values for the relevant attributes that are to be used in the AMHS address.

The ASIA/PAC Regional ATN AMHS naming convention presented here will comply with the relevant formats as specified in ICAO Doc. 9705.

The ASIA/PAC Regional ATN AMHS Naming Plan defines the method for assigning values to each of the relevant attributes of the AMHS address. States may choose to assign their AMHS addresses based upon the recommendations made here.

1.3 References

Reference 1 Manual of Technical Provisions for the ATN (Doc 9705-AN/956) Third Edition

Reference 2 ICAO Location Indicators – Document 7910

1.4 Definitions

MF-Address (MHS-form address) is the Originator/Recipient name of an AMHS user.

CAAS-Address (Common AMHS Address Scheme) is a MF-Address of which the organization-name attribute identifying the user within an AMHS Management Domain is selected by the Management Domain itself and shall be supplied to ICAO for publication.

XF-Address (Translated-form address) is a particular MF-Address of which all attributes identifying the user within an AMHS Management Domain may be converted by an algorithmic method to and from an AFTN form address.

1.5 Abbreviations

The following abbreviations are used in this document:

ADMD	Administration Management Domain
AFTN	Aeronautical Fixed Telecommunication Network
AMHS	ATS Message Handling System
ATSMHS	ATS Message Handling Service
APANPIRG	Asia Pacific Air Navigation Planning and Implementation Regional Group
ATN	Aeronautical Telecommunication Network
ATNTTF	APANPIRG ATN Transition Task Force
ATS	Air Traffic Service
ATSO	Air Traffic Service Organizations
CAAS	Common AMHS Addressing Scheme
ICAO	International Civil Aviation Organization
ITU-T	International Telecommunication Union Telecommunication Standardization Sector
MHS	Message Handling Service
MF	MHS Form
MTA	Message Transfer Agent
O/R	Originator/Recipient
PRMD	Private Management Domain
SARP	Standards and Recommended Practices
XF	Translated Form

2. AMHS NAMING CONVENTION

The Asia Pacific AMHS naming convention is based on a number of factors that have arisen from the third meeting of the ATN Panel held in Montreal during the 7th to 18th of February 2000 and the results from other AMHS planning activities developed by other regions.

To ensure continuity and compatibility with other AMHS naming conventions, the AMHS naming convention for the ASIA/PAC Region was developed based upon the outcome of the European SPACE[1] Project.

2.1 MHS Addressing Scheme

There are four types of address form in CCITT X.400 Message Handling System. The addressing scheme of AMHS adopts the mnemonic form address and the attributes contain in this from are described in the table below:

[1] SPACE (Study and Planning of AMHS Communications in Europe) is a project supported by the European Commission and is the combined efforts of the participating countries and organizations from EUROCONTROL, France, Germany, Spain and the United Kingdom.

Table 2-1 Mnemonic form address attributes of MHS

Attribute	Notation	Maximum Length	Comment
Country-name	C	3	
ADMD	A	16	
PRMD	P	16	
Organization-name	O	64	
Organizational Unit name	OUn	4 x 32	n = 1 – 4
Common name	CN		
Personal name	S	40	Surname
	G	16	Given name
	I	5	Initials
	GQ	3	Generation Qualifier
Domain-defined-attributes	DDA	Varies	(DDA type) = (DDA Value), up to 4 attributes

2.2 MF-Addressing Scheme in AMHS

Each AMHS user within an AMHS Management Domain is assigned an Originator/Recipient (O/R) name, which is referred to as a MF-address (MHS-form address).

Two types of MF-address in AMHS are defined in Doc9705 (reference 1), namely Common AMHS Addressing Scheme (CAAS) and XF (Translated-form) Addressing Scheme. They differ in the number of attributes being selected from mnemonic form of MHS addressing scheme,

The MF-address of an AMHS user (no matter CAAS or XF) shall comprise:

a) a set of attributes identifying the AMHS Management Domain of which the AMHS user, either direct or indirect, is a service-user; and
b) a set of attributes identifying unique AMHS user within the AMHS Management Domain,

2.3 Naming Convention For CAAS Format

It is recommended that ICAO register with the ITU-T the ADMD name “ICAO” as an international ADMD under the “XX” country code. It was also recommended that ICAO establishes and maintains a register of PRMDs allocated by air traffic service providers according to the “XX” + “ICAO” address structure. The management of this register would be established and maintained in the same way as the Location Indicators (Doc 7910) and Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services (Doc 8585).

The Air Navigation Commission on the 1st of June 2000 approved these recommendations. On the basis of these recommendations, the ASIA/PAC Region accepted the format for the allocation of the first two attributes used in the O/R name. It was proposed that a common naming convention be used worldwide to help stream line the addressing scheme and to ensure compatibility and consistency with other neighboring

regions. This scheme would be based on the work that has been ongoing in Europe. It was also stressed that if States have not already started their implementation programmes for AMHS that when planning to do so they should adopt the CAAS-Address format and not the XF-Address format.

The ASIA/PAC Region will adopt the proposed worldwide CAAS-Address format, which uses the following attributes to define the O/R name during the transition phase from AFTN to AMHS:

1. Country-name;
2. ADMD;
3. PRMD;
4. Organization-name;
5. Organizational-unit-name 1; and
6. Common Name.

2.3.1 Country Name

The country name is a mandatory requirement and shall consist of the two alphanumeric ISO 3166 Country Code "XX" encoded as a Printable String. The country code "XX" has been adopted, as this is a special code registered by the ITU-T for the purpose of allocation to international organizations, which do not reside within any particular country.

2.3.2 ADMD

The administrative domain is a mandatory requirement and shall consist of the Printable String "ICAO". ICAO has registered "ICAO" as the ADMD with the ITU-T. By providing the "ICAO" ADMD will allow the addressing schemes to be independent of any constraints that may be imposed by management domains in the global MHS or national regulations that may vary from region to region.

2.3.3 PRMD

The private management domain is an optional requirement as documented in the relevant ITU-T Standards. However, this attribute is mandatory for implementation of AMHS by States in the ASIA/PAC Region as part of the worldwide CAAS-Address format scheme.

The contents of this field can include the ICAO Location Indicator specified in ICAO Document 7910 or the name of the Air Traffic Service Organization (ATSO) that has been registered with ICAO. Where an ATSO has not yet assigned their PRMD then a default value will be allocated, which will use either one or two letters of the ICAO Country Indicator specified in ICAO Document 7910. This has been chosen for its simplistic and non-ambiguous format, which is already managed by ICAO. Hence providing an easier management role for ICAO who will be responsible for maintaining the register of all PRMDs allocated under the ADMD of "ICAO".

2.3.4 Organization Name

The organization name is used to define the local or national geographical routing information. This information is to be assigned by the ATSO (for example can be based on the ICAO location indicator as specified in ICAO Document 7910 or some other value determined by an ATSO and published by ICAO). Figure 2 - 1 provides a pictorial view of how the organization name can be used in relation with the lower attribute structure.

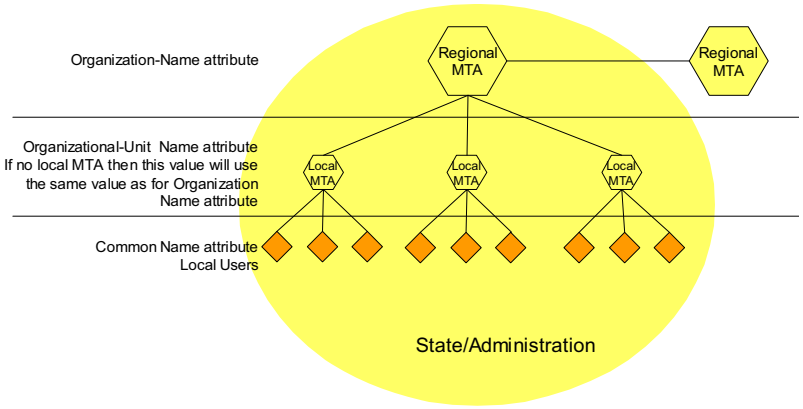


Figure 2 -1 Lower Attribute Structure

2.3.5 Organizational Unit Name OU1

Each State or organization is allocated a unique ATS message organizational name. As all States are familiar with the ICAO four character location indicator defined in ICAO document 7910. It is proposed that the organization unit name 1 use the location indicator to identify the Message Transfer Agent (MTA) site, encoded as a Printable String.

Note: The MTA site may be the MTA name of the server. However there are security issues that need to be addressed to ensure that this arrangement does not cause any unnecessary concerns with service providers that allow the MTA name to be broadcast in this fashion.

2.3.6 Common Name

It is proposed that during the AFTN transition to AMHS that the common name attribute be used to contain the 8-character alphabetical value of the AFTN address indicator of the user, encoded as a Printable String. This shall apply for AFTN users only. Possible example of an O/R address is shown in Table 2-2

Table 2- 2 Example of a CAAS-Address AMHS Naming Convention

Attribute	Assigned By	Value	Comment
Country-name (C)	ITU-T	XX	International Organization
ADMD (A)	ICAO	ICAO	ICAO Responsibility to register
PRMD (P)	ATSO	e.g. THAILAND	ATSO registered private domain with ICAO.
Organization name (O)	ATSO	e.g. VTBB	Local/national geographical information, which can be based on ICAO Location Indictors (Doc 7910)
Organizational-Unit name (OU1)	ATSO	e.g. VTBB	ICAO Location Indicator (Doc 7910)
Common Name (CN)	ATSO	e.g. VTBBYFYX	AFTN address

Note: It is proposed that for a direct AMHS user that an ATSO should be able to assign a suitable name to that user without being restricted to an AFTN address indicator.

2.4 Naming Convention For XF-Address Format

The attributes to be used for the XF-Address format are as described in ICAO Document 9705 and presented below as follows:

1. Country-name;
2. ADMD;
3. PRMD;
4. Organization-name; and
5. Organizational-unit-name 1.

2.4.1 Country Name

As proposed in Section 2.3.1

2.4.2 ADMD

As proposed in Section 2.3.2

2.4.3 PRMD

As proposed in Section 2.3.3

2.4.4 Organization Name

This field has already been defined by ICAO Document 9705. The value of this field contains the encoded printable string “AFTN”.

2.4.5 Organizational Unit Name OU1

The organizational unit name 1 attribute is used to contain the 8-character alphabetical value of the AFTN address indicator of the user, encoded as a Printable String.

Possible example of an O/R address is shown in Table 2-3

Table 2-3 Example of XF-Address AMHS Naming Convention

Attribute	Assigned By	Value	Comment
Country-name (C)	ITU-T	XX	International Organization
ADMD (A)	ICAO	ICAO	ICAO Responsibility to register
PRMD (P)	ATSO	e.g. Y	ICAO Country Indicator or ATSO registered private domain with ICAO
Organization-name (O)	ATSO	AFTN	AFTN name
Organizational-Unit name (OU1)	ATSO	e.g. YBBBYFYX	AFTN address indicator

2.5 General Use of X.400 O/R Addresses

Note: The address format of X.400 O/R address attributes for sending general non-operational AMHS traffic is a local matter for States/Administrations to implement if they wish to do so and no further advice is provided in this plan.

3. PRMD-name values and Address Scheme Registration

As it is important to have the proper address developed well before the AMHS implementation in the Region, a comprehensive draft of PRMD value and AMHS Addressing Scheme for each State/ATSO in the ASIA/PAC region are developed below. Examples and tables given would assist State/ATSO to understand XF and CAAS address scheme. State/ATSO are recommended to follow the proposal and register to deploy CAAS as early as possible.

3.1 XF Addressing Scheme

XF is only intended for transitional arrangement when both AFTN and AMHS systems co-exist during the initial implementation of AMHS. States/ATSOs declare the use of XF could still maintain an AFTN system for routing of messages to and from local and international AFTN users before the sunset date (to be decided by ICAO),whereas messages to and from the ATN are routed through the AFTN/AMHS gateway for format conversion.

The XF Addressing Scheme is simple to implement because the *organization-name* always takes the fixed value "AFTN" and the *organization-unit-name-1* is used to store the AFTN address. Hence, only the *PRMD-name* is required for AFTN to XF address translation and there are no more than 200 of such entries. The ATN SARPs Edition 2 provided the XF addressing requirements. However, the XF scheme does not support the addressing of multiple MTAs within a MD for more operational choice by States/ATSO. For example, having two MTAs as entry/exit points of a MD can serve the purpose of load balancing as well as providing a hot-backup site to enhance the performance and availability of the AMHS service. The drawback on the use of XF is that, unlike the CAAS that allows multiple *organization-name* values, XF supports only one value. Hence an AMHS initially using XF addressing will need to be changed back to CAAS addressing at a later time (when the system will be in operation delivering live traffic). With this in conjunction with the limited value (i.e. for simplicity) of XF addressing, the ATN SARPs Edition 3 encourages the direct use of CAAS addressing right in the beginning of AMHS implementation.

3.2 Common AMHS Addressing Scheme

CAAS supports both transitional (AFTN plus AMHS) and pure AMHS environment. In a pure AMHS environment, only CAAS addresses are used and the routing decision rests on the router and/or MTA depending on the MTA routing policy. No address conversion is needed and hence XF address does not play any role here.

The CAAS offers greater flexibility in assigning values to the *organization-unit-name-1 (OU1)* and *common-name (CN)* attributes. It opens up the possibility for the MD to select any desirable values on *OU1* and *CN* after the sunset date and hence give rise to a user-friendly address and more importantly, higher scalable service even down to personal level.

To facilitate smooth migration, *OU1* attribute is initially used to store 4-letter location indicator(s) categorized under *organization* attribute whereas *CN* is deployed to keep the existing AFTN address during the transition period. After the transition period, the values of *OU1* and *CN* could be changed or re-assigned by the respective MDs in accordance with the guidelines to be developed by ICAO.

The CAAS requires each AMHS MD to maintain and update the latest *organization-name* and additional *organization-unit-name-1* values declared by all AMHS MDs. The complexity of maintenance and updating of these values will grow with the size of AMHSs in use globally. To ease the problem on address resolution in CAAS, Directory Service (DIR), which is an Extended AMHS function, should be used. For information, DIR had been included as one of the optional elements in the ATN SARPs.

4. PRMD-name value

PRMD-name takes either ICAO Nationality Letters as specified in Doc7910 or values declared by respective AMHS MD. The Nationality Letters will be taken as the default values if States/ATSOs do not respond to ICAO's State Letter. Hence, values of the *PRMD-name* may take any one of the following three forms: -

(a) Value declared by AMHS MD which is different from Nationality Letter, e.g. Hong Kong, China declared

the value "HongKong" as *PRMD-name.*

(b) Value declared by AMHS MD but follows the Nationality Letter, e.g. New Zealand declared the value "NZ" as *PRMD-name.*

(c) Value from the default Nationality Letter assigned by ICAO when the AMHS MD does not respond to the ICAO State Letter, e.g. value "RP" is assigned to Philippine as *PRMD-name* by ICAO.

4.1 PRMD-name value for XF

In the XF Addressing Scheme, the *organization-name* value is fixed as "AFTN" and there is no *common-name* attribute. Therefore, only the *PRMD-name* is required by AMHS MD for AFTN/XF address translation. To streamline the choice of *PRMD-name* value and to simplify the conversion, it would be more convenient and logical to make use of the Nationality Letters in AFTN location indicator as the *PRMD-name* value. Table 1a gives the suggested values if States/ATSOs in ASIA/PAC choose to use XF for the time being.

4.2 PRMD-name value for CAAS

In CAAS, the *organization-name* value is not fixed. To minimize the influence of the legacy AFTN address structure on CAAS and to present explicitly the name of the States/ATSOs administering the AMHS MD, it would be advisable to use full name of the States/ATSOs as the *PRMD-name* value. This is given in Table 1b.

5. Defining *Organization-name* and *Organization-unit-name-1* for CAAS

On top of *PRMD-name*, *organization-name* is also required for AFTN to CAAS address resolution. It may take a value that represents a geographical unit or identifies an organization. The syntax and values are to be defined by the States/ATSOs. States/ATSOs selecting CAAS are required to provide at the same time a group of 4-letter location indicators associated to the selected *organization-name* value. These location indicators constitute the *organization-unit-name-1* values to facilitate address conversion and therefore shall also be provided to ICAO for publication. Examples on CAAS deployment in the Asia Pacific Region are given below:

Example 1 : CAAS with *organization-name* to identify an organization

State/ATSO: A

PRMD-name	B
Organization-name	*x*
Organization-unit-name-1	[XXXX]

B= name of State/ATSO in alphanumeric characters

x = name of the organization in alphanumeric characters. The syntax and value are to be defined by the considered State/ATSO.

[XXXX] = 4-letter AFTN location indicator(s) that is associated with the organization

e.g. COUNTRYABCD

PRMD-name	COUNTRYABCD
Organization-name	CAANAME
Organization-unit-name-1	VKKK VKKA VKSA VKSP

Example 2 : CAAS with *organization-name* to represent a geographical unit

State/ATSO: A

PRMD-name	B
Organization-name	[PPPP]
Organization-unit-name-1	n[XXXX]

[PPPP] = 4-letter AFTN location indicator representing a geographical unit

n[XXXX] = n number of 4-letter AFTN location indicator(s) that is associated with the unit

e.g. COUNTRYMNPQ

PRMD-name	COUNTRYMNPQ
Organization-name	VZSS
Organization-unit-name-1	VZAC VZAG VZAH VZAP VZAR VZAT VZJC VZSL VZSS

The above examples involve one single MTA. However, it is possible to deploy multiple MTAs within the AMHS MD when the area of the States/ATSOs or the size of the organizations is big enough for consideration of segregation. In this case, more than one *organization-name* value, each associated with a number of location indicators shall be defined and provided to ICAO for publication.

Example 3 : CAAS with *organization-name* to represent a geographical unit and more than one MTA within the MD

State/ATSO: A

PRMD-name	B
Organization-name	m[PPPP]
Organization-unit-name-1	n[XXXX] per [PPPP]

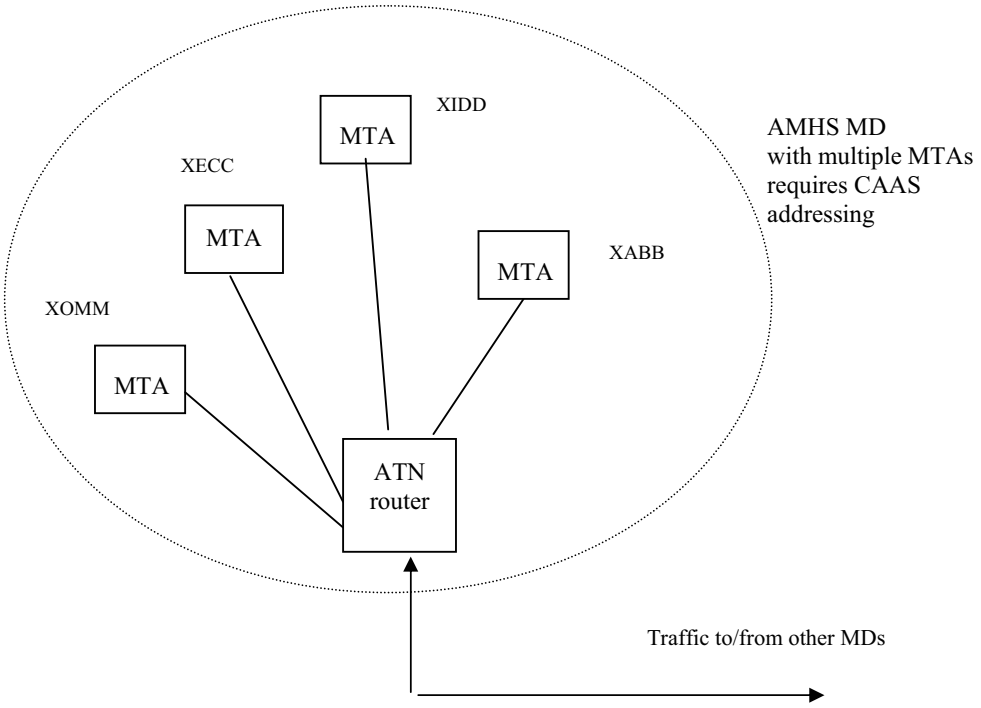
m[PPPP] = m number of 4-letter location indicator each representing different geographical unit

n[XXXX] = n number of 4-letter location indicator(s) that are associated with a particular geographical unit

e.g. COUNTRYXYZ

PRMD-name	COUNTRYXYZ			
Organization-name	XECC	XABB	XOMM	XIDD
Organization-unit-name-1	XE**	XA**	XO**	XI**

Wildcard.(*) may be used to reduce the number of entries in Organsiation-unit-name-1 field.



Note: 1. Each MTA, as an end system, should have its own NSAP address.

2. Traffic between MTAs within the domain is a local matter.

Table 2a provides suggested values for the CAAS for all States/ATSOs in the ASIA/PAC region assuming each State deploys one MTA. Table 2b provides examples of CAAS for some States/ATSOs in ASIA/PAC region assuming multiple MTAs are deployed. States/ATSOs shall refer to the examples given to develop their own CAAS address scheme for single or multiple MTAs option.

Table 1a

Suggested *PRMD-name* values of the AMHS MD in ASIA/PAC region assuming all States/ATSOs using XF

States	AMHS Address Specification			
	Nationality Letters or Designator	**Country-name attribute**	**ADMD-name attribute**	**PRMD-name attribute**
American Samoa	NST*	XX	ICAO	NST
Australia	Y*	XX	ICAO	Y
Bangladesh	VG	XX	ICAO	VG
Bhutan	VQ	XX	ICAO	VQ
Brunei Darussalam	WBSB, WBAK	XX	ICAO	WB
Cambodia	VD	XX	ICAO	VD
China	ZP, ZS, ZU, ZW, ZG,ZH,ZL, ZY, ZB	XX	ICAO	ZB
Cook Islands	NC	XX	ICAO	NC
Dem. People's Rep. Of Korea	ZK	XX	ICAO	ZK
Democratic Republic of Timor-Leste	WP	XX	ICAO	WP
Fiji	NF	XX	ICAO	NF
French Polynesia	NT	XX	ICAO	NT
Hong Kong (China)	VH	XX	ICAO	VH
Wallis and Futuna Island (France)	NL	XX	ICAO	NL
India	VA, VI, VO, VE	XX	ICAO	VA
Indonesia	WA,WI,WR	XX	ICAO	WA
Japan	RJ,RO	XX	ICAO	RJ
Kiribati	NG	XX	ICAO	NG
Lao People's Dem. Rep.	VL	XX	ICAO	VL
Macau (China)	VM	XX	ICAO	VM
Malaysia	WB	XX	ICAO	WB
Malaysia (Peninsular)	WM	XX	ICAO	WM
Maldives	VR	XX	ICAO	VR
Marshall Islands (U.S.)	PK	XX	ICAO	PK

Micronesia (Federated States of)	PT	XX	ICAO	PT
Mongolia	ZM	XX	ICAO	ZM
Myanmar	VY	XX	ICAO	VY
Nauru	AN	XX	ICAO	AN
Nepal	*VN*	XX	ICAO	VN
New Caledonia (France)	NW	XX	ICAO	NW
New Zealand	NZ	XX	ICAO	NZ
Niue Island (New Zealand)	NI	XX	ICAO	NI
Pakistan	OP	XX	ICAO	OP
Palau Islands (U.S.)	PTR*	XX	ICAO	PTR
Papua New Guinea	AY	XX	ICAO	AY
Philippines	RP	XX	ICAO	RP
Rep. Of Korea	RK	XX	ICAO	RK
Samoa	NS	XX	ICAO	NS
Singapore	WS	XX	ICAO	WS
Solomon Islands	AG	XX	ICAO	AG
Sri Lanka	VC	XX	ICAO	VC
Tai Wan (China)	RC	XX	ICAO	RC
Thailand	VT	XX	ICAO	VT
Tonga	NFT*	XX	ICAO	NFT
Tuvalu	NGF*	XX	ICAO	NGF
Vanuatu	NV	XX	ICAO	NV
Viet Nam	VV	XX	ICAO	VV

Table 1b

Suggested *PRMD-name* values of the AMHS MD in ASIA/PAC region assuming all States/ATSOs using CAAS

States	AMHS Address Specification			
	Nationality Letters or Designator	Country-name attribute	ADMD-name attribute	PRMD-name attribute
American Samoa	NST*	XX	ICAO	SAMOA-US
Australia	Y*	XX	ICAO	AUSTRALIA
Bangladesh	VG	XX	ICAO	BANGLADESH
Bhutan	VQ	XX	ICAO	BHUTAN
Brunei Darussalam	WBSB, WBAK	XX	ICAO	BRUNEI
Cambodia	VD	XX	ICAO	CAMBODIA
China	ZP, ZS, ZU, ZW, ZG,ZH,ZL, ZY, ZB	XX	ICAO	CHINA
Cook Islands	NC	XX	ICAO	COOK-IS
Dem. People's Rep. Of Korea	ZK	XX	ICAO	DP-REP-KOREA
Democratic Republic of Timor-Leste	WP	XX	ICAO	EAST-TIMOR
Fiji	NF	XX	ICAO	FIJI
French Polynesia	NT	XX	ICAO	POLYNESIA
Hong Kong (China)	VH	XX	ICAO	HONGKONG
Wallis and Futuna Island (France)	NL	XX	ICAO	WALLIS-IS
India	VI, VA, VO, VE	XX	ICAO	INDIA
Indonesia	WA,WI,WR	XX	ICAO	INDONESIA
Japan	RJ,RO	XX	ICAO	JAPAN
Kiribati	NG	XX	ICAO	KIRIBATI
Lao People's Dem. Rep.	VL	XX	ICAO	LAO
Macau (China)	VM	XX	ICAO	MACAU
Malaysia	WB	XX	ICAO	MALAYSIA
Malaysia (Peninsular)	WM	XX	ICAO	MALAYSIA-PENIN
Maldives	VR	XX	ICAO	MALDIVES
Marshall Islands (U.S.)	PK	XX	ICAO	MARSHALL

Micronesia (Federated States of)	PT	XX	ICAO	MICRONESIA
Mongolia	ZM	XX	ICAO	MONGOLIA
Myanmar	VY	XX	ICAO	MYANMAR
Nauru	AN	XX	ICAO	NAURU
Nepal	VN	XX	ICAO	NEPAL
New Caledonia (France)	NW	XX	ICAO	NEW-CALEDONIA
New Zealand	NZ	XX	ICAO	NEW-ZEALAND
Niue Island (New Zealand)	NI	XX	ICAO	NIUE-IS
Pakistan	OP	XX	ICAO	PAKISTAN
Palau Islands (U.S.)	PTR*	XX	ICAO	PALAU-IS
Papua New Guinea	AY	XX	ICAO	PAPUA-NG
Philippines	RP	XX	ICAO	PHILIPPINES
Rep. Of Korea	RK	XX	ICAO	REP-KOREA
Samoa	NS	XX	ICAO	SAMOA
Singapore	WS	XX	ICAO	SINGAPORE
Solomon Islands	AG	XX	ICAO	SOLOMON-IS
Sri Lanka	VC	XX	ICAO	SRI-LANKA
Tai Wan (China)	RC	XX	ICAO	TAIBEI
Thailand	VT	XX	ICAO	THAILAND
Tonga	NFT*	XX	ICAO	TONGA
Tuvalu	NGF*	XX	ICAO	TUVALU
Vanuatu	NV	XX	ICAO	VANUATU
Viet Nam	VV	XX	ICAO	VIETNAM

Table 2a

Suggested CAAS Addressing Scheme
assuming all States/ATSOs in ASIA/PAC deploy one MTA

States	AMHS Address Specification				
	Country-name attribute	ADMD-name attribute	PRMD-Name attribute	Organization-name	Organisation-unit-name-1
American Samoa	XX	ICAO	SAMOA-US	NSTU	All 4-letter location indicators of the State contained in Doc7910
Australia	XX	ICAO	AUSTRALIA	YSSY	Ditto
Bangladesh	XX	ICAO	BANGLADESH	VGZR	Ditto
Bhutan	XX	ICAO	BHUTAN	VQPR	Ditto
Brunei Darussalam	XX	ICAO	BRUNEI	WBSB	Ditto
Cambodia	XX	ICAO	CAMBODIA	VDPP	Ditto
China	XX	ICAO	CHINA	ZBBB	Ditto
Cook Islands	XX	ICAO	COOK-IS	NCRG	Ditto
Dem. People's Rep. Of Korea	XX	ICAO	DP-REP-KOREA	ZKKK	Ditto
Democratic Republic of Timor-Leste	XX	ICAO	EAST-TIMOR	WPAT	Ditto
Fiji	XX	ICAO	FIJI	NFFN	Ditto
French Polynesia	XX	ICAO	POLYNESIA	NTAA	Ditto
Hong Kong (China)	XX	ICAO	HONGKONG	HKGCAD	Ditto
Wallis and Futuna Island (France)	XX	ICAO	WALLIS-IS	NLWW	Ditto
India	XX	ICAO	INDIA	VABB	Ditto
Indonesia	XX	ICAO	INDONESIA	WAAA	Ditto
Japan	XX	ICAO	JAPAN	RJAA	Ditto
Kiribati	XX	ICAO	KIRIBATI	NGTA	Ditto
Lao People's Dem. Rep.	XX	ICAO	LAO	VLVT	Ditto
Macau (China)	XX	ICAO	MACAU	VMMC	Ditto
Malaysia	XX	ICAO	MALAYSIA	WBFC	Ditto
Malaysia (Peninsular)	XX	ICAO	MALAYSIA-PENIN	WMKK	Ditto
Maldives	XX	ICAO	MALDIVES	VRMM	Ditto

Marshall Islands (U.S.)	XX	ICAO	MARSHALL	PKMJ	Ditto
Micronesia (Federated States of)	XX	ICAO	MICRONESIA	PTKK	Ditto
Mongolia	XX	ICAO	MONGOLIA	ZMUB	Ditto
Myanmar	XX	ICAO	MYANMAR	VYYY	Ditto
Nauru	XX	ICAO	NAURU	ANAU	Ditto
Nepal	XX	ICAO	NEPAL	VNKT	Ditto
New Caledonia (France)	XX	ICAO	NEW-CALEDONIA	NWWW	Ditto
New Zealand	XX	ICAO	NEW-ZEALAND	NZAA	Ditto
Niue Island (New Zealand)	XX	ICAO	NIUE-IS	NIUE	Ditto
Pakistan	XX	ICAO	PAKISTAN	OPKC	Ditto
Palau Islands (U.S.)	XX	ICAO	PALAU-IS	PTRO	Ditto
Papua New Guinea	XX	ICAO	PAPUA-NG	AYPY	Ditto
Philippines	XX	ICAO	PHILIPPINES	RPLL	Ditto
Rep. Of Korea	XX	ICAO	REP-KOREA	RKSI	Ditto
Samoa	XX	ICAO	SAMOA	NSFA	Ditto
Singapore	XX	ICAO	SINGAPORE	WSSS	Ditto
Solomon Islands	XX	ICAO	SOLOMON-IS	AGGH	Ditto
Sri Lanka	XX	ICAO	SRI-LANKA	VCCC	Ditto
Tai Wan (China)	XX	ICAO	TAIBEI	RCTP	Ditto
Thailand	XX	ICAO	THAILAND	VTBB	Ditto
Tonga	XX	ICAO	TONGA	NFTF	Ditto
Tuvalu	XX	ICAO	TUVALU	NFGU	Ditto
Vanuatu	XX	ICAO	VANUATU	NVVV	Ditto
Viet Nam	XX	ICAO	VIETNAM	VVVV	Ditto

Table 2b

Suggested sample CAAS Addressing Scheme for some States/ATSOs in ASIA/PAC deploying multiple MTAs

States	AMHS Address Specification				
	Country-name attribute	**ADMD-name attribute**	**PRMD-name attribute**	**Organization-name**	**Organisation-unit-name-1**
Australia	XX	ICAO	AUSTRALIA	YBBN	YA*, YB*, YC*, YD*,YE*,YF*, YH*, YI*, YJ*, YK*
				YSSY	YL*, YM*, YN*, YO*, YP*, YQ*, YR*, YS*, YT*, YU*, YV*,YW*, YY*
China	XX	ICAO	CHINA	ZBBB	ZB*, ZS*, ZW*, ZY*, ZU*
				ZGGG	ZG*, ZJ*, ZH*, ZL*, ZP*
Japan	XX	ICAO	JAPAN	RJAA	RJ*
				ROAH	RO*
Thailand	XX	ICAO	THAILAND	VTBB	VTB*, VTC*
				VTSS	VTP*, VTS*, VTU*

* * * * *

AMHS NAMING REGISTRATION FORM
Table 1a - AMHS MTA and User Agent Register

Explanation of the Table 1a

Legend:	
Contracting State :	Authority administering the MTA.
MTA ID :	Numbering scheme where each MTA is assigned with an ordinal number.
User Agent ID :	Sub-ordinate number assigned to the User Agent Name registered under a MTA.
Addressing scheme :	Addressing scheme recommended by ATN SARPS. Values are limited to XF or CAAS.
Country-name :	The “C” value of AMHS MD identifier.
Administration-domain-name :	The “A” value of AMHS MD identifier.
Private-domain-name :	The “P” value of AMHS MD identifier.
Organization name :	The “O” value of attributes identifying an geographical unit or an organization within MD. The value is fixed for XF addressing scheme. (O=AFTN)
Organization-unit-name-1 :	The “OU1” value of attributes identifies 4-letter location indicator within the organization “O”. Depending upon the prevailing condition, some letters can be represented by wildcard (*).
User Agent (Direct User only) :	The “CN” value (Common Name) of attributes identifies a User Agent (UA) i.e. direct user within MD. It is presented in 8-character AFTN address format to enable the UA to receive message from AFTN indirect user. This field will be blanked when the OU1 is not equipped with UA.
Description of user :	Brief description of the UA, the direct user. NOC = network operating centre

Legend:	
MTA Name :	The name of the MTA hosting the AMHS user. (Used in AMHS binds.)
NSAP address :	NSAP address of the MTA. The NSAP address assignments should follow the ICAO recommendation in ASIA/PAC ATN Network Service Access Point (NSAP) Addressing Plan
TSEL value :	TSEL value of the MTA.
Capability :	The type of services supported by the MTA and the edition of relevant document (the number in parenthesis). Basic Service =A, File Transfer Body Part =B, Directory Service =C, Security = D; System Management = F, AMHS/AFTN Gateway=H

Table 1a – AMHS MTA and User Agent Register

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Contracting State	**MTA ID**	**User Agent ID**	**Addressing scheme**	**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**	**TSEL value**	**Capability**
			CAAS/XF	**(C)**	**(A)**	**(P)**	**(O)**	**(OU1)**	**(CN)**					
China	**1**		**CAAS**	**XX**	**ICAO**	**China**	ZBBB	ZB*			**zbmta**	**47002781815A4200010101020202028002010001**	**MHS**	**A(2) C(2)**
CAAS with multiple MTA								ZS*						
								ZW*						
								ZY*						
								ZU*						
		1.1						ZBBB	ZBBBYFUA	NOC operator				
		1-2						ZBAA	ZBAAYMUA	MET UA				
		1.3						ZSSS	ZSSSYFUA	NOC operator				
	2		**CAAS**	**XX**	**ICAO**	**China**	ZGGG	ZG*			**zgmta**	**47002781815A4200010102020202028002010001**	**MHS**	**A(2), C(2)**
								ZH*						
								ZL*						
								ZP*						
								ZJ*						
		2.1						ZGGG	ZGGGYFUA	NOC Operator				
		2.2						ZJHK	ZJHKYFUA	NOC Operator				
Hong Kong, China	**3**		**CAAS**	**XX**	**ICAO**	**Hong Kong**	HKGCAD	VH*			**hkgmta**	**470027818156480001010102020202800201000 1**	**MHS**	**A(2), B(1), C(2)**
(CAAS with single MTA)		3.1						VHHH	VHHHYFUA	NOC operator				
		3.2						VHHH	VHHHYFUB	NOC operator				
		3.3						VHHH	VHHHCPAU	UA at CPA				

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Contracting State	**MTA ID**	**User Agent ID**	**Addressing scheme**	**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**	**TSEL value**	**Capability**
			CAAS/XF	**(C)**	**(A)**	**(P)**	**(O)**	**(OU1)**	**(CN)**					
Macau China	**4**		**XF**	**XX**	**ICAO**	**VM**	AFTN				**mcumta**	**47002781815648000101010202020028002010001**	**MHS**	**A(2)**
Thailand	**5**		**XF**	**XX**	**ICAO**	**VT**	AFTN				**thmta**	**47002781815654000101010202020028002010001**	**MHS**	**A(2)**
Philippines	**6**		**XF**	**XX**	**ICAO**	**RP**	AFTN				**phmta**	**47002781815651000101010202020028002010001**	**MHS**	**A(2)**

Important Note: All data shown in the forms are for illustration only, not the actual data for operational use.

AMHS NAMING REGISTRATION FORM
Table 1b - AMHS MTA Administrator Contact List

Explanation of the Table 1b

Legend:	
Contracting State :	Authority administering the MTA.
MTA ID :	Numbering scheme where each MTA is assigned with an ordinal number.
MTA Name	The name of the MTA hosting the AMHS user. (Used in AMHS binds.)
Point of contact :	Name of person responsible for the administration of the MTA.
Contact e-mail address :	E-mail address of the Office or person responsible for the administration of the MTA.
Contact telephone number & Fax number:	Telephone number of the Office or person responsible for the administration of the MTA.
Contact mailing address	Official correspondence address of the Office or person responsible for the administration of the MTA.

Table 1b – AMHS MTA Administrator Contact List

a	b	c	d	e	f	g
Contracting State	**MTA ID**	**MTA Name**	**Point of contact**	**Contact e-mail address**	**Contact telephone number & Fax Number**	**Contact mailing address**
China	1	bjmta	Mr. LI Xin	Lixin@atmb.net.cn	861-0-87786912 861-0-87786014 (Fax)	12# East San-han Road middle, Chaoyang district, Beijing, China
	2	zjmta	Mr. Zhang sheng-zhi	Zhangsz@atmb.net.cn	862-0-86122803 862-0-86122310 (Fax)	Air Traffic Management Bureau of Middle & Southern Region of China, Bai Yun International Airport, Guangzhou, China
Hong Kong, China	3	hkgmta	Mr. Steven Chan	wmchan@cad.gov.hk	(852) 29106211 (852) 29101160 (Fax)	2/F., Telecommunications Unit, Air Traffic Control Complex, Hong Kong International Airport, Hong Kong, China
Macau China	4.	mcumta	Mr. Freeman V. T. Lo	Aacm@macau.ctm.net	(853) 511213 (853) 511200 (Fax)	Rue. Dr. Pedro José Lobo, 1-3 Edificio. Luso International, 26° andar, MACAO, China
Thailand	5	thmta	Mr. Somnuk Rongthong	somnuk@aerothai.co.th	66-0-2285 9904 66-0-2285 0240 (Fax)	102 Ngamduplee, Tungmahamek, Sathorn, Bangkok 10120, Thailand
Philippines	6	phmta	Mr. Jose. J. Luna	jet_luna@hotmail.com	632-8799191 632-8799110 (Fax)	Air Transportation Office, Manila AFS, 2/F AFC Building, Old MIA Road, Pasay City 1300, Philippines

Important Note: All data shown in the forms are for illustration only, not the actual data for operational use.

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

Considering that:

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

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

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

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

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

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

g) the lack of SARPs for an alternative TCP/IP protocol for immediate use and introduction of material on the use of TCP/IP for air-ground application, require significant technical work, which is not likely to be completed in the near future for amendment to Annex 10 SARPs and associated technical provisions in ATN documentations;

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

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

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

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

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

c) Strategically deploy the ATN infrastructure with a limited number of ATN Backbone routers to support other ground-to-ground and air-ground applications;

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

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

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

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

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

Title and Terms of Reference

Title: AERONAUTICAL TELECOMMUNICATION NETWORK IMPLEMENTATION CO-ORDINTION GROUP (ATNICG)

Terms Of Reference (TOR):

Coordinate ATN implementation and transitional issues in the Asia and Pacific region and address relevant system management, operational procedures and emerging issues that may arise.

Composition:

The Group will be composed of experts nominated by:

Australia, China, Hong Kong, China, Fiji, India, Indonesia, Japan, New Zealand, Republic of Korea, Singapore, Thailand and United States.

Reporting:

The Group will present its report to APANPIRG through the CNS/MET Sub-group.

SUBJECT/TASKS LIST OF ATN IMPLEMENTATION COORDIANTION GROUP

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
1		Subject: ATN Implementation coordination Task: Review of implementation problems and develop coordinated solutions	A	-States to report and share implementation and operational experience gained; -Analyze problems and develop coordinated solutions.	Continiues/2008
2		Subject: ATN Operational procedures Task: Develop appropriate ATN operational procedures.	A	To review existing AFTN transitional/operational procedures and develop a new transitional and operational procedures applicable to the operation and use of the AMHS. - To developed coordinated AFTN routing change with AMHS routing change procedures; - To coordinate AMHS MTA routing tables	2007
3		Subject: ATN Certification and validation process. Task: Development of ATN validation and certification procedure.	A	Develop ATN System integrity	Monitor development in ACP
4		Subject: ATN Documentation Task: Development of ATN ICDs.	A	Development of ATN Documents: - AIDC ICD	2007 Monitor development in ACP

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
5		Subject: Use of IP Task: Develop guidance material for the use of IP as a Sub-Network for ATN	B	In accordance with the work being performed by ACP, develop guidance material for the support of IP as a Sub-Network of the ATN, with particular emphasis on system compatibility between adjacent centers and security.	2007 Monitor development in ACP
6		Subject: AMHS operational management system Task: Development of interim database for directory services		To develop procedures for completing the Form	2007 Monitor development in ACP
7		AMHS performance			

STRATEGY FOR IMPLEMENTATION OF THE AIR-GROUND DATA LINK IN THE ASIA/PAC REGION

Considering:

a) the benefit of data communications to improve safety, efficiency and capacity through the reduction of voice communications and process automation to meet the operational requirement and consistent with the Air Traffic Management Operational Concept;

b) current operation application of data link to support CPDLC, ADS-C, PDC and D-FIS, the need to maintain the functional service of these applications;

c) current technology such as VHF ACARS, VDL-Mode 2 AoA (ACARS over Aviation VHF Link Control), VDL-Mode 2 ATN, Satellite datalink, HF data link being acceptable for operations and standardized in SARPs and/or industry standards;

d) availability of standardized VDL-Mode 3, VDL-Mode 4, Mode S data links and future standardized technology such as Universal Access Transceiver (UAT);

e) the future growth of data communications to improve operations and the exchange of information including graphical meteorological information; and

f) the need to assure global interoperability and harmonization.

THE GENERAL STRATEGY FOR THE IMPLEMENTATION OF THE AIR-GROUND DATA LINK INFRASTRUCTURE AND ASSOCIATED APPLICATIONS IN THE ASIA/PAC REGION SHOULD BE AS FOLLOWS:

a) maintain or ensure compatibility of existing data links to support all current ATM and meteorological applications without change to the application or application specific system.

b) new installation of VHF datalink systems should be capable of supporting VDL-Mode 2 and as an interim step provide the bridging application of AoA.

c) in the near term there is no intent to implement VDL-Mode 3, VDL-Mode 4 or Mode S.

d) undertake and monitor research and development of communications technology for the future evolution of data link services.

e) States should work co-operatively to assist each other on a multinational basis to implement the air-ground ATN compliant VDL-Mode 2 service and ensure system inter-operability.

Note:
Near-Term: now to 10 years
Long-Term 15+

– – – – – – – – – –

STRATEGY FOR THE IMPLEMENTATION OF GNSS NAVIGATION CAPABILITY IN THE ASIA/PACIFIC REGION

Considering that:

1) Safety is the highest priority;

2) Elements of Global Air Navigation Plan for CNS/ATM system on GNSS and requirements for the GNSS implementation have been incorporated into the CNS part of FASID;

3) GNSS SARPs, PANS and guidance material for GNSS implementation are available;

4) The availability of avionics including limitations of some receiver designs; the ability of aircraft to achieve RNP requirements and the level of user equipage;

5) Development of GNSS systems including satellite constellations and improvement in system performance;

6) Airworthiness and operational approvals allowing the current GNSS to be used for en-route and non precision approach phases of flight without the need for augmentation services external to the aircraft;

7) Development status of aircraft-based augmentation systems;

8) Regional augmentation systems include both satellite-based (SBAS) and ground-based systems (GBAS);

9) Human, environmental and economic factors will affect the implementation of GNSS;

10) The vulnerability of GNSS to radio interference and adverse effect of ionosphere; and

11) The regional navigation requirements are:

(a) RNP10/RNP4 for en-route;
(b) RNP4 for *transition to* terminal phase of flight;
(c) RNP1 or less for terminal phase of flight;
(d) ~~NPA/APV for~~ RNP/RNAV based arrivals ~~approaches~~ and departures; ~~and~~
(e) APV (with interim RNAV (GNSS) for approaches); and
~~(e)~~ (f) Precision approaches at selected airports.

The general strategy for the implementation of GNSS in the Asia/Pacific region is detailed below:

1) There should be an examination of the extent to which the GNSS system accessible in the Region can meet the navigational requirements of ATM service providers and aircraft operators in the Region;

2) Evolutionary introduction of GNSS Navigation Capability should be consistent with the Global Air Navigation Plan for CNS/ATM Systems;

3) During transition to GNSS, sufficient ground infrastructure for current navigation systems must remain available. Before existing ground infrastructure is considered for removal, users should be given reasonable transition time to allow them to equip with GNSS to attain equivalent navigation service;

4) Implementation shall be in full compliance with ICAO SARPs and PANS;

5) Introduce the use of GNSS for en-route, terminal and approach navigation. States should coordinate to ensure that harmonized separation standards and procedures are developed and introduced concurrently in all flight information regions along major traffic flows to allow for a seamless transition to GNSS-based navigation;

6) States are encouraged to implement future GNSS approvals based on SBAS receiver standards or equivalents;

7) To the extent possible, States should work co-operatively on a multinational basis to implement GNSS augmentation systems in order to facilitate seamless and inter-operable systems;

8) States consider segregating traffic according to navigation capability and granting preferred routes to aircraft with better navigation performance**,** taking due consideration of the need of State aircraft;

9) ~~As GNSS is introduced for en-route navigation, States should coordinate to ensure that harmonized separation standards and procedures are developed and introduced concurrently in all flight information regions along major traffic flows to allow for a seamless transition to GNSS-based navigation;~~ The introduction of GNSS offers the possibility to remove conventional ground-based navigation aids. However States should approach this with caution to ensure that safety is not compromised, such as by performance of safety assessment and consultation with users through regional air navigation planning process;

~~10) The introduction of GNSS offers the possibility to remove conventional ground-based navigation aids. However States should approach this with caution to ensure that safety is not compromised, such as by performance of safety assessment and consultation with users through regional air navigation planning process;~~

~~11)~~ 10) States undertake a co-coordinated R & D programme on GNSS implementation and operation;

~~12)~~11) ICAO and States should undertake education and training to provide necessary knowledge in GNSS theory and operational application, including RNP, and

~~13)~~ 12) States establish multidisciplinary GNSS implementation teams, using ~~section 6.10.2 of ICAO Circular 267, Guidelines for the Introduction and Operational Approval of the GNSS~~, Attachment A to Appendix C of Doc 9849 AN/457, the Global Navigation Satellite System (GNSS) Manual, as a guide.

Note1: Identified SBAS systems are EGNOS, MSAS and WAAS. The MSAS is expected to be available for providing augmentation for the Asia/Pacific region.

International Civil Aviatin Organization
Asia and Pacific Office

ADS-B Implementation and Operations Guidance Document

Edition 1.0

August 2005

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1. INTRODUCTION

This ADS-B Implementation and Operations Guidance Document (AIGD) provides guidance material for the implementation and operational application of ADS-B technology in the Asia and Pacific Regions.

The procedures and requirements for ADS-B operations are detailed in the relevant States' AIP. The AIGD is intended to provide key information on ADS-B performance, integration, principles, procedures and collaboration mechanisms.

The content is based upon the work to date of the APANPIRG ADS-B Study and Implementation Task Force (SITF) and various ANC Panels developing provisions for the operational use of ADS-B. It should be noted that this edition of the document has been produced ahead of anticipated amendments to PANS-ATM (Doc 4444) and Annexes 2, 4, 11 and 15 to the convention. It is therefore likely that some amendment to the guidance material will be required as SARPs and PANS are published.

1.1 ARRANGEMENT OF THE AIGD

The AIGD consists of the following Parts:

Section 1	Introduction and Document Management
Section 2	Acronyms
Section 3	System Integrity and Monitoring
Section 4	ADS-B Data Message Set
Section 5	ADS-B Procedures
Section 6	Emergency and Non-Routine Procedures
Section 7	ADS-B Implementation
Section 8	Endnotes

1.2 DOCUMENT HISTORY AND MANAGEMENT

This document is managed by the APANPIRG. It was introduced as draft to the first Working Group meeting of the ADS-B SITF in Singapore in October 2004, at which it was agreed to develop the draft to an approved working document that provides implementation guidance for States. The first edition was presented to APANPIRG for adoption in August 2005. It is intended to supplement SARPs, PANS and relevant provisions contained in ICAO documentation and it will be regularly updated to reflect evolving provisions.

1.3 COPIES

Paper copies of this AIGD are not distributed. Controlled copies can be found at the following web site: http://www.icao.int//apac/edocs/

Copy may be freely downloaded from the web site, or by emailing APANPIRG through the ICAO Asia and Pacific Regional Office who will send a copy by return email.

1.4 CHANGES TO THE AIGD

Whenever a user identifies a need for a change to this document, a Request for Change (RFC) Form (see Section 1.6 below) should be completed and submitted to APANPIRG through the ICAO Asia and Pacific Regional Office.

When an RFC has been approved by a meeting of the ADS-B Study and Implementation Task Force then a new version of the AIGD will be published, with the changes marked by an "|" in the margin, and an endnote indicating the relevant RFC, so a reader can see the origin of the change. If the change is in a table cell, the outside edges of the table will be highlighted; e.g.:

In those cases where a change is initiated by the editor and relates to document format rather than functional content, the change may not have an associated RFC, but the change will be marked and annotated in the same way.

1.5 EDITING CONVENTIONS

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1.6 AIGD REQUEST FOR CHANGE FORM

RFC Nr:	

Please use this form when requesting a change to any part of this AIGD. This form may be photocopied as required, emailed, faxed or e-mailed to ICAO Asia and Pacific Regional Office (+66) 2 5378199 or icao_apac@bangkok.icao.int.

1. SUBJECT:			
2. REASON FOR CHANGE:			
3. DESCRIPTION OF PROPOSAL: [expand / attach additional pages if necessary]			
4. REFERENCE(S):			
5. PERSON INITIATING:		**DATE:**	
ORGANISATION:			
TEL/FAX/EMAIL:			

6. CONSULTATION	**RESPONSE DUE BY DATE:**		
Organization	**Name**	**Agree/Disagree**	**Date**
7. ACTION REQUIRED:			
8. AIGD EDITOR		**DATE REC'D:**	
9. FEEDBACK PASSED		**DATE:**	

1.7 AMENDMENT RECORD

Amendment Number	Date	Amended by	Comments
0.1	24 December 2004	W Blythe H Anderson	Modified draft following contributions from ADS-B SITF Working Group members. Incorporated to TF/3 Working paper #3.
0.2 (1.0)	24 March 2005	H Anderson	Final draft prepared at ADS-B SITF WG/3
0.3 (1.1)	03 June 2005	Nick King	Amendments following SASP WG/WHL meeting of May 2005.
0.4	15 July 2005	CNS/MET SG/9	Editorial changes made
1.0	26 August 2005	APANPIRG/16	Adopted as the first Edition

2. ACRONYM LIST & GLOSSARY OF TERMS

2.1 ACRONYM LIST

ACID	Aircraft Identification
ADS-B	Automatic Dependent Surveillance - Broadcast
AIGD	ADS-B Implementation and Operations Guidance Document
AIP	Aeronautical Information Publication
AIT	ADS-B Implementation Team
AMSL	Above Mean Sea Level
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ARINC	Aeronautical Radio Incorporate
ATC	Air Traffic Control (or Air Traffic Controller)
ATM	Air Traffic Management
ATS	Air Traffic Services
ATSP	ATS Provider
ATSU	ATS unit
CNS	Communications, Navigation, Surveillance
CRC	Cyclic Redundancy Check
CDTI	Cockpit Display Traffic Information
DAIW	Danger Area Infringement Warning
FIR	Flight Information Region
FLTID	Flight Identification
FMS	Flight Management System
FOM	Figure of Merit used in ASTERIX messaging
GPS	Global Positioning System (USA)
HPL	Horizontal Protection Level
ICAO	International Civil Aviation Organization
MSAW	Minimum Safe Altitude Warning
MTBF	Mean Time Between Failures
MTCA	Medium Term Conflict Alert
MTTR	Mean Time To Restore
NAC	Navigation Accuracy Category
NIC	Navigation Integrity Category
PRS	Problem Reporting System
RAI	Restricted Area Intrusion
RAM	Route Adherence Monitoring
RAIM	Receiver Autonomous Integrity Monitoring
RFC	Request for Change
RNP	Required Navigation Performance
SIL	Surveillance Integrity Level
SITF	Study and Implementation Task Force
STCA	Short Term Conflict Alert

2.2 GLOSSARY OF TERMS

ADS-B In	An ADS-B system feature that enables the display of real time ADS-B tracks on a situation display in the aircraft cockpit.
ADS-B Out	An ADS-B system feature that enables the frequent broadcast of accurate aircraft position and vector data together with other information.
Asterix 21	Eurocontrol standard format for data message exchange
FOM (Figure of Merit)	A numeric value that is used to determine the accuracy and integrity of associated position data.
HPL (Horizontal Position Limit)	The containment radius within which the true position of the aircraft will be found for 95% of the time (See DO229c) .
NAC (Navigational Accuracy Category)	Subfield used to announce the 95% accuracy limits for the horizontal position data being broadcast.
NIC (Navigational Integrity Category)	Subfield used to specify the containment radius integrity associated with horizontal position data.
NUCp (Navigation Uncertainty Category)	A numeric value that announces the integrity of the associated horizontal position data being broadcast.
SIL (Surveillance Integrity Level)	Subfield used to specify the probability of the true position lying outside the containment radius defined by NIC without being alerted.

3. SYSTEM INTEGRITY AND MONITORING

3.1 INTRODUCTION

The Communications, Navigation, Surveillance and Air Traffic Management (CNS/ATM) environment is an integrated system including physical systems (hardware, software, and communication networks), human elements (pilots and controllers), and the procedures for use by pilots and controllers. ADS-B is a surveillance system that is may be integrated with other surveillance technologies or may also operate as an independent source for surveillance monitoring within the CNS/ATM system.

Because of the integrated nature of such system and the degree of interaction among its components, comprehensive system monitoring is recommended. The procedures described in this section aim to ensure system integrity by validation, identification, reporting and tracking of possible problems revealed during system monitoring.

These procedures do not replace the ATS incident reporting procedures and requirements, as specified in PANS-ATM (Doc 4444), Appendix 4; ICAO's Air Traffic Services Planning Manual (Doc 9426), Chapter 3; or applicable State regulations, affecting the reporting responsibilities of parties directly involved in a potential ATS incident.

3.2 PERSONNEL LICENSING AND TRAINING

Prior to operating any element of the ADS-B system operational and technical personnel shall undertake appropriate training as determined by the States, including compliance with the Convention on International Civil Aviation where applicable.

Notwithstanding the above requirement and for the purposes of undertaking limited trials of the ADS-B system, special arrangements may be agreed between the operator and an Air Traffic Services Unit (ATSU).

3.3 REFERENCE DOCUMENTS

Id	Name of the document	Reference	Date	Origin	Domain
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

3.4 SYSTEM PERFORMANCE CRITERIA FOR AN ATC SEPARATION SERVICE

A number of States have started to introduce ADS-B for the provision of Air Traffic Services, including 'radar-like' separation. The ICAO Separation and Airspace Safety Panel (SASP) has been assessing the suitability of ADS-B for various applications using a comparative assessment methodology and, together with the ICAO Operational Data Link Panel (OPLINKP), is drawing on the experience of early implementers to develop operational provisions. It is anticipated that PANS-ATM (Doc 4444) will be amended to include ADS-B separation minima in 2007.

States intending to introduce ADS-B separation minima not published in PANS-ATM or Regional Supplementary Procedures (Doc 7030) should comply with the provisions of Annex 11 paragraph 3.4.1. States should adopt the guidelines contained in this document unless conformance with PANS-ATM specifications requires change.

3.5 ATC SYSTEM VALIDATION

3.5.1 Safety Assessment Guidelines

To meet system integrity requirements, States should conduct a validation process that confirms the integrity of their equipment and procedures. Such processes shall include:

a) A system safety assessment for new implementations is the basis for definitions of system performance requirements. Where existing systems are being modified to utilize additional services, the assessment demonstrates that the ATS Provider's system will meet safety objectives.

b) Integration test results confirming interoperability for operational use of airborne and ground systems; and

c) Confirmation that the ATS Operation Manuals are compatible with those of adjacent providers where the system is used across a common boundary.

3.5.2 System safety assessment

The objective of the system safety assessment is to ensure the State that introduction and operation of ADS-B is safe. This can be achieved through application of the provisions of Annex 11 paragraph 2.26 and PANS-ATM Chapter 2. The safety assessment should be conducted for initial implementation as well as any future enhancements and should include:

a) Identifying failure conditions;
b) Assigning levels of criticality;
c) Determining risks/ probabilities for occurrence; and
d) Identifying mitigating measures.
e) Categorising the degree of acceptability of risks.
f) Operational hazard ID process

Following the safety assessment, States should institute measures to offset any identified failure conditions that are not already categorized as acceptable. This should be done to reduce the probability of their occurrence to an acceptable level. This could be accomplished through automation or procedures.

3.5.3 Integration test

States should conduct trials with suitably equipped aircraft to ensure they meet the operational and technical requirements. To provide an ATS alternatively, they may be satisfied by test results and analysis conducted by another State or organisation deemed competent to provide such service. Where this process is followed, the tests conducted by another State or organisation should be comparable (i.e. using similar equipment under similar conditions).Reference to Doc9689

3.5.4 ATS Operation Manuals

States should coordinate with adjacent States to confirm that their ATS Operation Manuals contain standard operating procedures to ensure harmonization of procedures that impact across common boundaries.

3.5.5 ATS System Integrity

With automated ATM control systems, data changes, software upgrades, and system failures can affect adjacent units. States shall ensure that:

a) A conservative approach is taken to manage any changes to the system.

b) Aircrew, aircraft operating companies and adjacent ATSU(s) are notified of any planned system changes in advance, where that system is used across a common boundary.

c) ATSUs have verification procedures in place to ensure that following any system changes, displayed data is both correct and accurate.

d) In cases of system failures or where upgrades (or downgrades) or other changes may impact surrounding ATS units, ATSUs should have a procedure in place for timely notification to adjacent units. Such notification procedures will normally be detailed in Letters of Agreement between adjacent units.

e) ADS-B surveillance data is provided with equal to or better level of protection and security than existing surveillance radar data.

3.6 SYSTEM MONITORING

During the initial period of implementation of ADS-B technology, routine collection of data is necessary in order to ensure that the system continues to meet or exceed its performance, safety and interoperability requirements, and that operational service delivery and procedures are working as intended. The monitoring program is a two-fold process. First, summarised statistical data should be produced periodically showing the performance of the system. This is accomplished through ADS-B Periodic Status Reports. In addition, as problems or abnormalities arise, they should be identified, tracked, analyzed and corrected and information disseminated as required, utilizing the ADS-B Problem Report.

3.6.1 Problem Reporting System (PRS)

The Problem Reporting System is tasked with the collection, storage and regular dissemination of data based on reports received from ADS-B SITF members. The PRS tracks

problem reports and publish information from those reports to ADS-B SITF members. Problem resolution is the responsibility of the appropriate ADS-B SITF members.

The PRS Administrator shall:

a) prepare consolidated problem report summaries for each ADS-B SITF meeting;
b) collect and consolidate ADS-B Problem Reports; and
c) maintain a functional website (with controlled access) to manage the problem reporting function.

3.6.2 The monitoring process

When problems or abnormalities are discovered, the initial analysis should be performed by the organization(s) identifying the problem. In addition, a copy of the problem report should be entered in to the PRS which will assign a tracking number. As some problems or abnormalities may involve more than one organization, the originator should be responsible for follow-up action to rectify the problem and forward the information to the PRS. It is essential that all information relating to the problem is documented and recorded and resolved in a timely manner.

The following groups should be involved in the monitoring process and problem tracking to ensure a comprehensive review and analysis of the collected data:

a) ATS Providers;
b) Organizations responsible for ATS system maintenance (where different from the ATS provider);
c) Relevant State regulatory authorities;
d) Communication Service Providers being used;
e) Aircraft operators; and
f) Aircraft and avionics manufacturers.

3.6.3 Distribution of confidential information

It is important that information that may have an operational impact on other parties be distributed by the authorised investigator to all authorised groups that are likely to be affected, as soon as possible. In this way, each party is made aware of problems already encountered by others, and may be able to contribute further information to aid in the solution of these problems. The default position is that all states agree to provide the data which will be de-identified for reporting and record keeping purposes.

3.6.4 ADS-B problem reports

Problem reports may originate from many sources, but most will fall within two categories; reports based on observation of one or more specific events, or reports generated from the routine analysis of data. The user would document the problem, resolve it with the appropriate party and forward a copy of the report to the PRS for tracking and distribution. While one occurrence may appear to be an isolated case, the receipt of numerous similar reports by the PRS could indicate that an area needs more detailed analysis.

To effectively resolve problems and track progress, the problem reports should be sent to the nominated point of contact at the appropriate organisation and the PRS. The resolution of the identified problems may require:

a) Re-training of system operators, or revision of training procedures to ensure compliance with existing procedures;

b) Change to operating procedures;
c) Change to system requirements, including performance and interoperability; or
d) Change to system design.

3.6.5 ADS-B periodic status report

The ATS Providers should complete the ADS-B Periodic Status Report annually and deliver the report to the regional meeting of the ADS-B SITF. The Periodic Status Report should give an indication of system performance and identify any trend in system deficiencies, the resultant operational implications, and the proposed resolution, if applicable.

Communications Service Providers, if used, are also expected to submit Periodic Status Reports on the performance of the networks carrying ADS-B data at the annual regional meeting of the ADS-B SITF. These reports could also contain the details of planned or current upgrades to the network.

3.6.6 Processing of Reports

Each group in the monitoring process should nominate a single point of contact for receipt of problem reports and coordination with the other parties. This list will be distributed by the PRS Administrator to all parties to the monitoring process.

Each State should establish mechanisms within its ATS Provider and regulatory authority to:

a) Assess problem reports and refer them to the appropriate technical or operational expertise for investigation and resolution;
b) Coordinate with aircraft operators;
c) Develop interim operational procedures to mitigate the effects of problems until such time as the problem is resolved;
d) Monitor the progress of problem resolution;
e) Prepare a report on problems encountered and their operational implications and forward these to the PRS;
f) Prepare the ADS-B periodic status report at pre-determined times and forward these to the Secretary of the annual meeting of the ADS-B SITF; and
g) Coordinate with any Communication Service Providers used.

3.7 APANPIRG

APANPIRG shall oversee the monitoring process to ensure the ADS-B system continues to meet its performance and safety requirements, and that operational procedures are working as intended. The APANPIRG'S objectives are to:

a) review Periodic Status Reports and any significant Problem Reports;
b) highlight successful problem resolutions to ADS-B SITF members;
c) monitor the progress of outstanding problem resolutions;
d) prepare summaries of problems encountered and their operational implications; and
e) assess system performance based on information in the PRS and Periodic Status Reports.

3.8 LOCAL DATA RECORDING AND ANALYSIS

3.8.1 Data recording

It is recommended that ATS Providers and Communication Service Providers retain the records defined below for at least 30 days to allow for accident/incident investigation processes. These records should be made available on request to the relevant State safety

authority. Where data is sought from an adjacent State, the usual State to State channels should be used.

These recordings shall be in a form that permits a replay of the situation and identification of the messages that were received by the ATS system.

3.8.2 Local data collection

ATS providers and communications service providers should identify and record ADS-B system component failures that have the potential to negatively impact the safety of controlled flights or compromise service continuity.

3.9 ADS-B PROBLEM REPORT

3.9.1 Report Form

			PRS #
Date UTC		**Time UTC**	
Registration		**Aircraft ID**	
Flight ID		**ICAO 24 Bit Code**	
Aircraft Type			
Flight Sector/ Location			
ATS Unit			
Description / additional information			
Originator		**Originator Reference**	
Organization			

3.9.2 Description of Fields

Field	Meaning
Number	A unique identification number assigned by the PRS Administrator to this problem report. Organizations writing problem reports are encouraged to maintain their own internal list of these problems for tracking purposes. Once the problems have been reported to the PRS and incorporated in the database, a number will be assigned by the PRS and used for tracking by the ADS-B SITF.
Date UTC	UTC date when the event occurred.
Time UTC	UTC time (or range of times) at which the event occurred.
Registration	Registration number (tail number) of the aircraft involved.
Aircraft ID (ACID)	Coded equivalent of voice call sign as entered in FPL Field 7.
ICAO 24 Bit Code	Unique aircraft address expressed in Hexadecimal form (e.g. 7432DB)
Flight ID (FLTID)	The identification transmitted by ADS-B for display on a controller situation display or a CDTI.
Flight Sector/Location	The departure airport and destination airport for the sector being flown by the aircraft involved in the event. These should be the ICAO identifiers of those airports. Or if more descriptive, the location of the aircraft during the event.
Originator	Point of contact at the originating organization for this report (usually the author).
Aircraft Type	The aircraft model involved.
Organization	The name of the organization (airline, ATS provider or communications service provider) that created the report.
ATS Unit	ICAO identifier of the ATC Center or Tower controlling the aircraft at the time of the event.
Description	This should provide as complete a description of the situation leading up to the problem as is possible. Where the organization reporting the problem is not able to provide all the information (e.g. the controller may not know everything that happens on the aircraft), it would be helpful if they would coordinate with the other parties to obtain the necessary information. The description should include: A complete description of the problem that is being reported The route contained in the FMS and flight plan Any flight deck indications Any indications provided to the controller when the problem occurred Any additional information that the originator of the problem report considers might be helpful but is not included on the list above If necessary to contain all the information, additional pages may be added. if the originator considers it might be helpful, diagrams and other additional information (such as printouts of message logs) may be appended to the report.

3.10 ADS-B PERFORMANCE REPORT FORM			
Originating Organization			
Date of submission		**Originator**	
Report Period			
TECHNICAL ISSUES			
OPERATIONAL ISSUES			
GENERAL COMMENTS			

4. ADS-B DATA

The Eleventh ICAO Air Navigation Planning Conference recommended that States recognize ADS-B as an enabler of the global ATM concept bringing substantial safety and capacity benefits; support the cost-effective early implementation of it; and ensuring it is harmonized, compatible and interoperable with operational procedures, data linking and ATM applications.

APANPIRG has decided to use 1090MHz Extended Squitter data link for ADS-B data exchange in the Asia and Pacific Regions. In the longer term an additional link type may be required.

ADS-B data requirements for aircraft transmissions are contained in Annex 10 Vol IV. ADS-B data requirements for ground-ground messaging shall be determined by States. International exchange of ground-ground messaging should use ASTERIX 21 Version 0.23 format.

5. ADS-B PROCEDURES

5.1 INTRODUCTION

ADS-B involves the transmission of specific data messages from aircraft and vehicle systems. These data messages are broadcast at approximately 0.5 second intervals and received at compatible ground stations that relay these messages to ATSU(s) for presentation on ATS situation displays. The following procedures relate to the use of ADS-B data in ATS ground surveillance applications.

The implementation of the ADS-B system will support the provision of high performance surveillance, enhancing flight safety, facilitating the reduction of separation minima and supporting user demands such as user-preferred trajectories.

5.2 FACTORS TO BE CONSIDERED WHEN USING ADS-B

5.2.1 Use of ADS-B Level data

The accuracy and integrity of pressure altitude derived level information provided by ADS-B are equivalent to Mode C level data provided through an SSR sensor and subject to the same operational procedures as those used in an SSR environment. Where the ATM system converts ADS-B level data to display metric equivalent level data, the displayed data should not be used to determine vertical separation until the data is verified by comparison with a pilot reported metric level.

5.2.2 Position Reporting Performance

The ADS-B data from the aircraft will include a NUC/NIC/SIL categorization of the accuracy and integrity of the horizontal position data. This figure is determined from NIC/ NAC/ SIL values for DO260A compliant avionics and NUC values for DO260/ED102 compliant avionics.

In general, if the NUC is less than 5 (or NIC is less than 6, or SIL is less than 2) the data is unlikely to be of comparable quality to that provided by a single monopulse SSR. ADS-B data should not be used for separation unless a suitable means of determining data integrity is used.

ADS-B reports with low integrity may be presented on situation displays, provided the controller is alerted (e.g. by a change in symbology and/or visual alert) to the change and the implications for the provision of separation. An ANS Provider may elect not to display ADS-B tracks that fail to meet a given position reporting performance criterion.

5.2.3 GNSS Integrity Prediction Service

Early implementations of ADS-B are expected to use GNSS for position determination. As such, availability of GNSS data has a direct influence on the provision of a surveillance service.

ATS Providers may elect to use a GNSS integrity prediction service to assist in determining the future availability of useable ADS-B data. The integrity prediction service alerts users to potential future loss or degradation of the ADS-B service in defined areas. When these alerts are displayed, the system is indicating to its users that at some time in the future the ADS-B positional data may be inadequate to support the application of ADS-B separation. It is recommended that the prediction service is made available to each ATSU that is employing ADS-B to provide a separation service, to ensure that air traffic controllers are alerted in

advance of any predicted degradation of the GNSS service and the associated reduction in their ability to provide ADS-B separation to flights that are within the affected area. This is similar to having advance warning of a planned radar outage for maintenance.

ADS-B should not be used to provide separation between aircraft that will be affected by an expected period of inadequate position reporting integrity.

If an unpredicted loss of integrity occurs (including a RAIM warning report from aircrew) then;

(a) ADS-B separation should not be applied by ATC to the particular aircraft reporting until the integrity has been assured; and

(b) The controller should check with other aircraft in the vicinity of the aircraft reporting the RAIM warning, to determine if they have also been affected and establish alternative forms of separation if necessary.

5.2.4 Sharing of ADS-B Data

Member States should consider the benefits of sharing ADS-B data received from aircraft operating in the proximity of their international airspace boundaries with adjacent States that have compatible technology in an effort to maximize the service benefits and promote operational safety. Any agreement on the sharing of surveillance data should be incorporated in Letters of Agreement between the States concerned.

5.3 Reporting Rates

5.3.1 General

The ADS-B system shall maintain a reporting rate that ensures at least an equivalent degree of accuracy, integrity and availability as for a radar system that is used to provide a similar ATC service. The standard reporting rate is approximately 0.5 second from the aircraft, but the rate of update provided to the ATM system (for the situation display) may be less frequent (e.g. 5 seconds), provided the equivalency with radar is preserved.

5.4 SEPARATION

5.4.1 General

ADS-B data may be used in combination with data obtained by other means of surveillance (such as radar, flight plan track, ADS-C) for the application of separation provided appropriate minima as determined by the State are applied. It should be noted that the quality of communications will have a bearing on the determination of appropriate minima.

All safety net features (MSAW, STCA, MTCA, RAM and DAIW/ RAI etc) should possess the same responsiveness as equivalent radar safety net features.

5.4.2 Identification Methods

Some of the methods approved by ICAO for establishing identification with radar, may be employed with ADS-B (see PANS-ATM chapter 8). One or more of the following identification procedures are suggested:

a) direct recognition of the aircraft identification in an ADS-B label;
b) transfer of ADS-B identification;

c) observation of compliance with an instruction to TRANSMIT ADS-B IDENT.

Note: In automated systems, the "IDENT" feature may be presented in different ways, e.g. as a flashing of all or part of the position indication and associated label.

5.4.3 ADS-B Separation

ADS-B Separation minima will be promulgated by ICAO in PANS-ATM (Doc 4444), or in Regional Supplementary Procedures (Doc 7030),

In a mixed surveillance environment, States should use the larger separation standard applicable between aircraft in the conflict pair being considered.

5.4.4 Vertical separation

5.4.4.1 Introduction

The ADS-B level data presented on the controllers situation display shall normally be derived from barometric pressure altitude. In the event that geometric altitude data is presented on the situation display, the controller should be alerted to the fact that this data should not be used for vertical separation.

5.4.4.2 Vertical tolerance standard

The vertical tolerances for ADS-B level information should be consistent with those applied to Mode C level information.

5.4.4.3 Verification of ADS-B level information

The verification procedures for ADS-B level information shall be the same as those employed for the verification of Mode C level data in a radar environment.

5.5 AIR TRAFFIC CONTROL CLEARANCE MONITORING

5.5.1 General

ADS-B track data can be used to monitor flight path conformance with air traffic control clearances.

5.5.2 Deviations from ATC clearances

The ATC requirements relating to monitoring of ADS-B traffic on the situation display should be similar to those contained in PANS-ATM Ch.8.

5.6 ALERTING SERVICE

For ADS-B equipped aircraft, the provision of an alerting service should be based on the same criteria as applied within a radar environment.

5.7 POSITION REPORTING

5.7.1 Pilot position reporting requirements in ADS-B coverage

States should establish voice and/or CPDLC position reporting procedures consistent with those applicable with radar for aircraft that have been identified by ATC.

5.7.2 Meteorological reporting requirements in ADS-B airspace

ATSUs may promulgate in the AIP meteorological reporting requirements that apply within the nominated FIR. The meteorological reporting data required and the transmission methods to be used by aircrew shall be specified in AIP.

5.8 PHRASEOLOGY

5.8.1 Phraseology Standard

States should note the requirement for ADS-B specific phraseology equivalent to radar specific phraseology as well as the opportunity to use generic phraseology applicable to multiple systems.

Until such time as PANS ATM Chapter 12 is amended to include ADS-B provisions, the following phraseology is recommended for consideration by States:

ADS-B EQUIPMENT DEGRADATION
ADS-B OUT OF SERVICE (appropriate information as necessary).

TO REQUEST THE CAPABILITY OF THE ADS-B EQUIPMENT
a) ADVISE ADS-B CAPABILITY;
*b) ADS-B TRANSMITTER (data link);
*c) ADS-B RECEIVER (data link);
*d) NEGATIVE ADS-B.
* Denotes pilot transmission.

TO REQUEST RESELECTION OF AIRCRAFT IDENTIFICATION
REENTER [ADS-B or MODE S] AIRCRAFT IDENTIFICATION.

TERMINATION OF RADAR AND/OR ADS-B SERVICE
IDENTIFICATION LOST [reasons] (instructions).

TO REQUEST THE OPERATION OF THE ADS-B IDENT FEATURE
TRANSMIT ADS-B IDENT.

TO REQUEST TERMINATION OF SSR TRANSPONDER AND/OR ADS-B TRANSMITTER OPERATION
a) STOP SQUAWK. [TRANSMIT ADS-B ONLY];
b) STOP ADS-B TRANSMISSION [SQUAWK (code) ONLY].

Note: In some cases the ADS-B transmitter cannot be operated independently of the SSR transponder and the loss of SSR and ACAS surveillance derived from the operation of the SSR transponder should be considered.

5.9 FLIGHT PLANNING

5.9.1 ADS-B Flight Planning Requirement – Flight Identity

The aircraft identification (ACID) must be accurately recorded in section 7 of the ICAO Flight Plan form as per the following instructions:

Aircraft Identification, not exceeding 7 characters is to be entered both in item 7 of the flight plan and replicated exactly when set in the aircraft (for transmission as Flight ID) as follows: Either,

a) The ICAO three-letter designator for the aircraft operating agency followed by the flight identification (e.g. KLM511, BAW213, JTR25), when:

in radiotelephony the callsign used consists of the ICAO telephony designator for the operating agency followed by the flight identification (e.g. KLM 511, SPEEDBIRD 213, HERBIE 25).

Or,

b) The registration marking of the aircraft (e.g. EIAKO, 4XBCD, OOTEK), when:

1) in radiotelephony the callsign used consists of the registration marking alone (e.g. EIAKO), or preceded by the ICAO telephony designator for the operating agency (e.g. SVENAIR EIAKO),

2) the aircraft is not equipped with radio.

Note 1 No zeros, dashes or spaces are to be added when the Aircraft Identification consists of less than 7 characters.

Note 2 Appendix 2 to PANS-ATM refers. ICAO designators and telephony designators for aircraft operating agencies are contained in ICAO Doc 8585.

5.9.2 ADS-B Flight Planning Requirements

5.9.2.1 Flight Notification

Until such time as amendments are made to the ICAO flight plan to incorporate ADS-B designators, a remark shall be entered in section 18 of the fight plan to indicate that the flight is capable of transmitting ADS-B messages via the Mode S Extended Squitter data link. The format of the remark should be:

RMK/ADSB

Note: Only flights with ADS-C capability should use the surveillance equipment indicator“D”and only flights with CPDLC capability should use the equipment indicator “J”.

5.9.2.2 Aircraft Address (24 Bit Code)

Where required, the aircraft address (in hexadecimal format)_may be recorded in section 18 of the ICAO flight plan as per the following example:

CODE/7C432B

States should note that use of hexadecimal code may be prone to human error and is less flexible in regard to airframe changes for a notified flight.

6. EMERGENCY PROCEDURES

ATC surveillance systems should provide for the display of safety-related alerts and warnings, including conflict alert, minimum safe altitude warning, conflict prediction and unintentionally duplicated SSR codes and aircraft identifications].

The ADS-B avionics may transmit emergency status messages to any ADS-B ground station within coverage. The controller receiving these messages should determine the nature of the emergency, acknowledge receipt if appropriate, and initiate any assistance required. An aircraft equipped with ADS-B might operate the emergency and/or urgency mode as follows:

a) emergency;
b) no communications;
c) unlawful interference;
d) minimum fuel; and/or
e) medical.

Executive control responsibility

The responsibility for control of the flight rests with the ATSU within whose airspace the aircraft is operating. However, if the pilot takes action contrary to a clearance that has already been coordinated with another sector or ATSU and further coordination is not possible in the time available, the responsibility for this action would rest with the pilot in command, and performed under the pilot's emergency authority.

Emergency procedures

The various circumstances surrounding each emergency situation preclude the establishment of exact detailed procedures to be followed. The procedures outlined in PANS-ATM Chapter 15 provide a general guide to air traffic services personnel and where necessary, should be adapted for the use of ADS-B.

7. ADS-B IMPLEMENTATION

7.1 INTRODUCTION

7.1.1 Planning

There are a range of activities needed to progress ADS-B implementation from initial concept level to operational use. This section addresses the issues of collaborative decision making, system compatibility and integration, while the second section of this chapter provides a checklist to assist States with the management of ADS-B implementation activities.

7.1.2 Implementation team to ensure international coordination

7.1.2.1 Any decision to implement ADS-B by a State should include consultation with the wider ATM community. Moreover, where ADS-B procedures or requirements will affect traffic transiting between states, the implementation should also be coordinated between States and Regions, in order to achieve maximum benefits for airspace users and service providers.

7.1.2.2 An effective means of coordinating the various demands of the affected organizations is to establish an implementation team. Team composition may vary by State or Region, but the core group responsible for ADS-B implementation planning should include members with multidiscipline operational expertise from affected aviation disciplines, with access to other specialists where required.

7.1.2.3 Ideally, such a team should comprise representatives from the ATS providers, regulators and airspace users, as well as other stakeholders likely to be influenced by the introduction of ADS-B, such as manufacturers and military authorities. All identified stakeholders should participate as early as possible in this process so that their requirements can be identified prior to the making of schedules or contracts.

7.1.2.4 The role of the implementation team is to consult widely with stakeholders, identify operational needs, resolve conflicting demands and make recommendations to the various stakeholders managing the implementation. To this end, the implementation team should have appropriate access to the decision-makers.

7.1.3 System compatibility

7.1.3.1 ADS-B has potential use in almost all environments and operations and is likely to become a mainstay of the future ATM system. In addition to traditional radar-like services, it is likely that ADS-B will also be used for niche application where radar surveillance is not available or possible. The isolated use of ADS-B has the potential to foster a variety of standards and practices that, once expanded to a wider environment, may prove to be incompatible with neighbouring areas.

7.1.3.2 Given the international nature of aviation, special efforts should be taken to ensure harmonization though compliance with ICAO Standards and Recommended Practices (SARPs). The choice of systems to support ADS-B should consider not only the required performance of individual components, but also their compatibility with other CNS systems.

7.1.3.3 The future concept of ATM encompasses the advantages of interoperable and seamless transition across flight information region (FIR) boundaries and, where necessary, ADS-B implementation teams should conduct simulations, trials and cost/benefit analysis to support these objectives.

7.1.4 Integration

7.1.4.1 ADS-B implementation plans should include the development of both business and safety cases. The adoption of any new CNS system has major implications for service providers, regulators and airspace users and special planning should be considered for the integration of ADS-B into the existing and foreseen CNS/ATM system. The following briefly discusses each element.

7.1.4.2 Communication system

7.1.4.2.1 The communication system is an essential element within CNS. An air traffic controller can now monitor an aircraft position in real time using ADS-B where previously only voice position reports were available. However, a communication system that will support the new services that result from the improved surveillance may be necessary. Consequently, there is an impact of the ongoing ADS-B related work on the communication infrastructure developments.

7.1.4.3 Navigation system infrastructure

7.1.4.3.1 ADS-B is dependent upon the data obtained from a navigation system (typically GNSS), in order to enable its functions and performance. Therefore, the navigation infrastructure should fulfill the corresponding requirements of the ADS-B application, in terms of:

a) Data items; and
b) Performance (e.g. accuracy, integrity, availability etc.).

7.1.4.3.2 This has an obvious impact on the navigation system development, which evolves in parallel with the development of the surveillance system.

7.1.4.4 Other surveillance infrastructure

7.1.4.4.1 ADS-B may be used to supplement existing surveillance systems or as the principal source of surveillance data. Ideally, surveillance systems will incorporate data from ADS-B and other sources to provide a coherent picture that improves both the amount and utility of surveillance data to the user. The choice of the optimal mix of data sources will be defined on the basis of operational demands, available technology, safety and cost-benefit considerations.

7.2 Implementation checklist

7.2.1 Introduction

The purpose of this implementation checklist is to document the range of activities that needs to be completed to bring an ADS-B application from an initial concept to operational use. This checklist may form the basis of the terms of reference for an ADS-B implementation team, although some activities may be specific to individual stakeholders.

7.2.2 Activity Sequence

The activities are listed in an approximate sequential order. However, each activity does not have to be completed prior to starting the next activity. In many cases, a parallel and iterative process should be used to feed data and experience from one activity to another. It should be noted that not all activities will be required for all applications.

7.2.3 Concept Phase

a) construct operational concept:

1) purpose;
2) operational environment;
3) ATM functions; and
4) infrastructure;

b) identify benefits:

1) safety enhancements;
2) efficiency;
3) capacity;
4) environmental;
5) cost reductions;
6) access; and
7) other metrics (e.g. predictability, flexibility, usefulness);

c) identify constraints:

1) pair-wise equipage;
2) compatibility with non-equipped aircraft;
3) need for exclusive airspace;
4) required ground infrastructure;
5) RF spectrum;
6) integration with existing technology; and
7) technology availability;

d) prepare business case:

1) cost benefit analysis; and
2) demand and justification.

7.2.4 Design Phase

a) identify operational requirements:

1) security; and
2) systems interoperability;

b) identify human factors issues:

1) human-machine interfaces;
2) training development and validation;

3) workload demands;
4) role of automation vs. role of human;
5) crew coordination/pilot decision-making interactions; and
6) ATM collaborative decision-making;

c) identify technical requirements:

1) standards development;
2) data required;
3) functional processing;
4) functional performance; and
5) required certification levels;

d) equipment development, test, and evaluation:

1) prototype systems built to existing or draft standards/specifications;
2) developmental bench and flight tests; and
3) acceptance test parameters; and
4) select and procure technology;

e) develop procedures:

1) pilot and controller actions and responsibilities;
2) phraseologies;
3) separation/spacing criteria and requirements;
4) controller's responsibility to maintain a monitoring function, if appropriate;
5) contingency procedures;
6) emergency procedures; and
7) develop AIP and Information documentation

f) prepare design phase safety case:

1) safety rationale;
2) safety budget and allocation; and
3) functional hazard assessment.

7.2.5 Implementation phase

a) prepare implementation phase safety case;

b) conduct operational test and evaluation:

1) flight deck and ATC validation simulations; and
2) flight tests and operational trials;

c) obtain systems certification:

1) aircraft equipment; and
2) ground systems;

d) obtain regulatory approvals:

1) flight operations; and
2) air traffic certification of use;

e) implementation transition:

1) Promulgate procedures and deliver training
2) continue data collection and analysis;
3) resolve any unforeseen issues; and
4) continue feedback into standards development processes;

f) performance monitoring to ensure that the agreed performance is maintained.

7.2.5.1 Once the implementation project is complete, ongoing maintenance and upgrading of both ADS-B operations and infrastructure should continue to be monitored, through the appropriate forums.

SUBJECT TASK LIST OF THE ADS-B STUDY AND IMPLEMENTATION TASK FORCE

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
1	APANPIRG Concl.13/19 TOR	Subject: Selection of links for near term and long term Task: 1) Select near term link; 2) Select long tern link.	A	1) SSR Mode S 1090 ES has been selected for the near term 2) Additional data links may be specified as necessary	Completed TBD
2	APANPIRG Concl.14/21	Subject: Guidance material for implementation of ADS-B in Asia and Pacific regions Task: Develop a guidance package	A	1) Sample Business case component; 2) Based on OPLINKP Concept of use and other ICAO Docs for ADS-B air-ground surveillance service.	2006 Completed
3	APANPIRG Concl. 14/21	Subject: Report of ADS-B problem. Task: Establish a problem reporting system	A	Develop a database and a form of report	Completed
4		Subject: Draft amendment proposal to SUPPs 7030 Regional Supplemental Procedures Task: Prepare a draft for consideration by ATM/AIS/SAR Sub Group of APANPIRG	B	Prepare a draft for amendment to Doc7030 for implementation of ADS-B in the Asia and Pacific regions pending separation criteria developed by relevant ICAO panel.	2005/Australia
5	APANPIRG Concl.14/21	Subject: ASIA/PAC ADS-B operational manual Task: Develop operational procedure manual for using ADS-B.	A	Develop a draft operational manual (include material on NOTAM and available manual data)	Completed

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
6	APANPIRG Concl. 14/21	Subject: Coordination between States at planning level Task: Coordination for timing of implementation and designate focal point of contact, points of contact for regulators, airframes & ground systems.	A	1) Develop an coordinated implementation plan by cities pairs; 2) Inform ICAO regional office names of designated focal point of contact.	2005/States concerned Completed
7	APANPIRG Concl. 14/21	Subject: Regional implementation plan Task: Develop a Regional implementation plan taking into account the individual national plans in accordance with a coordinated plan between cities pairs.	B	1) States present their ADS-B plans (including any necessary associated air ground voice communication) as WPs to ADS-B study and implementation Task Force. 2) Implementation date, sites being considered and plans for mandates (if any) should be specified. 3) Develop optimal regional plan based on State inputs	2005
8		Subject: Number of airframes fitted Task: Report on number of airframes fitted	A	Collect and report to the Task Force information on types, operators (numbers of each) and NUC (NIC/NAC/SIL)	2005/USA

Annex 1 - Guidance Material for Users Accessing the SADIS 2G Broadcast

What do I need to do to access SADIS 2G?

A) Existing SADIS customers who want to access SADIS 2G

1) Visit the SADIS web site - http://www.metoffice.gov.uk/sadis/index.html for the latest information. Review the hardware and software procurement guidelines available at - http://www.metoffice.gov.uk/sadis/news/sadis_s_h_procure.html
Note: the current SADIS service will be terminated on 31 December 2008.

2) Contact the Met Office (Richard Orrell: Telephone +44 (0)1392 884892; Fax +44 (0)1392 885681; Email richard.orrell@metoffice.gov.uk) to register your intent to move to the SADIS 2G service.

3) Contact the SADIS 2G hardware suppliers – see attachment for contact details - with a view to obtaining quotations for an upgrade to the 2G service. Users will need to purchase the following components:-

- a 2G compatible receiver; and
- a MegaPAC.

Note 1: L-Teq can provide a "one-box" solution for the 2G receiver and MegaPAC which incorporates the two components inside one physical unit. This unit can be supplied as a hardened case if required.

Note 2: Users located very close to the edge of the SADIS footprint may have to purchase a new low noise block (LNB) and/or antenna. Discuss this potential requirement with the hardware suppliers.

4) Please inform the Met Office (Contact: Richard Orrell) when complete migration to the SADIS 2G service has taken place.

B) New SADIS users wanting to access the SADIS 2G service

1) Visit the SADIS web site - http://www.metoffice.gov.uk/sadis/index.html for the latest information. Review the hardware and software procurement guidelines available at - http://www.metoffice.gov.uk/sadis/news/sadis_s_h_procure.html

2) Contact the Met Office (Richard Orrell: Telephone +44 (0)1392 884892; Fax +44 (0)1392 885681; Email richard.orrell@metoffice.gov.uk) to register your intent to access the SADIS 2G service.

3) Contact your State Meteorological Authority to seek written authorisation that a SADIS system can be operated by your organisation within your State. Please send copies of this authorisation to:-

- Bernard Perry, UK Met Authority, Civil Aviation Authority, CAA House., 45-59 Kingsway, London WC2B 6TE.
- Your regional ICAO office.
- Richard Orrell, Met Office, Fitzroy Road, Exeter, EX1 3PB, UK.

4) Contact the SADIS 2G hardware suppliers – see appendix for contact details– with a view to obtaining quotations for a full SADIS 2G VSAT (very small aperture terminal). Users will need to purchase, as a minimum, the following components:-

- a 2G compatible receiver;
- a MegaPAC;
- an LNB (low noise block);
- an antenna (2.4 metre is the standard diameter sizes); and
- appropriate low loss cable.

Note 1: L-Teq can provide a "one-box" solution for the 2G receiver and MegaPAC which incorporates the two components inside one physical unit. This unit can be supplied as a hardened case if required.

Note 2: Users located very close to the edge of the SADIS footprint may have to purchase a new low noise block (LNB) and/or antenna. Discuss this potential requirement with the hardware suppliers. Users located towards the centre of the satellite footprint may be able to use a smaller sized antenna. Seek guidance from the hardware suppliers prior to making your purchase.

5) Please inform the Met Office (Contact: Richard Orrell) when your system has been installed.

Contact Details for Supplier of SADIS 2G Hardware

Contact details for a second supplier and integrator will be published shortly on the SADIS web site at URL http://www.metoffice.gov.uk/sadis/hardware/suppliers/index.html

L-Teq

Services provided:-

- Provision of antennas, LNBs, 2G compatible receivers*, configured MegaPAC units.
- On-site installation and training.
- Support and maintenance.
- Hardware repair.
- General satellite communications provision and troubleshooting.

**Note: the 2G compatible receivers can be provided as standalone units, or incorporated into a single unit along with a MegaPAC.*

Contact Details: Stuart Derricott
L-Teq
Lapwing 440, Frimley Business Park, Frimley, Surrey, GU16 7SZ, UK.
Telephone: +44 (0)1276 686566
Fax: +44 (0)1276 686550
E-mail sderricott@lteq.com
Web: www.lteq.com

ASIA/PAC FASID **6-4A-1**

FASID TABLE MET 4A — REGIONAL OPMET BULLETIN EXCHANGE (ROBEX) SCHEME – ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

EXPLANATION OF THE TABLE

Column

1. Name of the ROBEX Centre
2. ICAO location indicator of ROBEX Centre
3. Name of aerodromes in the ROBEX Centre's area of responsibility
4. ICAO location indicator of the aerodromes in column 3
5. Indication of collection of METAR, SPECI and AIREP
6. Indication of collection of TAF

ASIA/PAC FASID **6-4A - 2**

ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

Name	CCCC	Aerodrome	CCCC	SA/SP/UA*	FT
1	2	3	4	5	6
Bangkok	**VTBB**	BANGKOK/Bangkok Intl	VTBD	x	x
		CHIANG MAI/Chiang Mai Intl	VTCC	x	x
		DANANG/Danang	VVDN	x	x
		DHAKA/Zia Intl	VGZR		x
		HANOI/Noibai	VVNB	x	x
		HO-CHI-MINH/Tan-Son Nhat	VVTS	x	x
		MANDALAY/Mandalay	VYMD	x	
		PHNOM PENH/Pochentong	VDPP	x	x
		PHUKET/Phuket Intl	VTSP	x	x
		RAYONG/U-Tapao Intl	VTBU	x	x
		SIEM REAP/Siem Reap	VDSR	x	
		SONGKHLA/Hat Yai Intl	VTSS	x	x
		VIENTIANE/Wattay	VLVT	x	x
		YANGON/ Yangon Intl	VYYY	x	x
Beijing	**ZBBB**	BEIJING/Capital	ZBAA	x	x
		CHANGCHUN/Dafangshen	ZYCC	x	x
		CHANGSHA/Huanghua	ZGHA	x	x
		CHENGDU/Shuangliu	ZUUU	x	x
		CHONGQING/Jiangbei	ZUCK	x	x
		DALIAN/Zhoushuzi	ZYTL	x	x
		GUANGZHOU/Baiyun	ZGGG	x	x
		GUILIN/Liangjang	ZGKL	x	x
		HAIKOU/Meilan	ZJHK	x	x
		HANGZHOU/Xiaoshan	ZSHC	x	x
		HARBIN/Yanjiangang	ZYHB	x	x
		HEFEI/Luogang	ZSOF	x	x
		HOHHOT/Baita	ZBHH	x	x
		KASHI	ZWSH	x	x
		KUNMING/Wujiaba	ZPPP	x	x
		LANZHOU/Zhongchuan	ZLLL	x	x
		NANJING/Lukou	ZSNJ	x	x
		NANNING/Wuxu	ZGNN	x	x
		QINGDAO/Liuting	ZSQD	x	x
		SANYA/Fenghuang	ZJSY	x	
		SHANGHAI/Hongqiao	ZSSS	x	x
		SHANGHAI/Pudong	ZSPD	x	x
		SHANTOU/Shantou	ZGOW	x	x
		SHENYANG/Taoxian	ZYTX	x	x
		SHENZHEN/Baoan	ZGSZ	x	x
		TAIYUAN/Wusu	ZBYN	x	x
		TIANJING/Binhai	ZBTJ	x	x
		ULAANBAATOR/Bryant-Ukhaa	ZMUB	x	x
		URUMQI/Diwopu	ZWWW	x	x
		WUHAN/Tianhe	ZHHH	x	x

ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

Name	CCCC	Aerodrome	CCCC	SA/SP/UA*	FT
1	2	3	4	5	6
		XIAMEN/Gaoqi	ZSAM	x	x
		XIAN/Xianyang	ZLXY	x	x
Brisbane	**YBBN**	SYDNEY/Kingsford Smith Intl	YSSY	x	x
		MELBOURNE/Melbourne Intl	YMML	x	x
		BRISBANE/Brisbane	YBBN	x	x
		ADELAIDE/Adelaide	YPAD	x	x
		DARWIN/Darwin	YPDN	x	x
		PERTH/Perth int	YPPH	x	x
		CAIRNS/Cairns	YBCS	x	x
		ALICE SPRINGS/Alice Springs	YBAS	x	x
		LEARMONTH/Learmonth	YPLM	x	x
		TOWNSVILLE/Townsville	YBTL	x	x
		COCOS ISLD/Cocos Isld	YPVV	x	x
		CHRISTMAS ISL/Cristms Isl	YPXM	x	x
		TINDAL /Tindal RAAF	YPTN	x	x
		KUNUNURRA/Kununurra	YPKU	x	
		CANBERRA/Canberra	YSCB	x	x
		COOLANGATTA/Coolangatta	YBCG	x	x
		AVALON/Avalon	YMAV	x	x
		ROCKHAMPTON/Rockhampton	YBRK	x	x
		KALGOORLIE/Kalgoorlie	YPKG	x	x
		PORT HEDLAND/Port Hedland	YPPD	x	x
		BROOME/Broome	YBRM	x	
		NORFOLK ILS/Norfolk Isl	YSNF	x	
		DUBBO/Dubbo	YSDU	x	
		RICHMOND/Richmond	YSRI	x	
		WILLIAMTOWN/Williamtown	YWLM	x	
		LAUNCESTON/Launceston	YMLT	x	
		HOBART/Hobart	YMHB	x	
		PEARCE/Pearce	YPEA	x	x
		CURTIN-DERBY/Curtin-Derby	YCIN	x	
		FORREST/Forrest	YFRT	x	
		GOVE/Gove	YPGV	x	
		AMBERLEY/Amberley RAAF	YAMB	x	
		HAMILTON ISLD/Hamilton Isld	YBHM	x	
		MOUNT ISA/Mount Isa	YBMA	x	
Colombo	**VCCC**	COLOMBO/Katunayake	VCBI	x	
		MALE/Male Intl	VRMM	x	
Delhi	**VIDP**	DELHI/Indira Gandhi Intl	VIDP	x	
		LUCKNOW	VILK	x	
		AMRITSAR/Amritsar	VIAR	x	
		VARANASI/Varanasi	VIBN	x	
		JAIPUR	VIJP	x	

ASIA/PAC FASID **6-4A - 4**

ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

Name	CCCC	Aerodrome	CCCC	SA/SP/UA*	FT
1	2	3	4	5	6
Hong Kong	**VHHH**	HONG KONG/Hong Kong Intl	VHHH	x	x
		TAIBEI/Taibei Intl	RCTP	x	x
		GAOXIONG/Gaoxiong	RCKH	x	x
		TAIBEI/Sungshan	RCSS	x	x
		MACAU/Macau Intl	VMMC	x	x
		MANILA/Ninoy Aquino Intl	RPLL	x	x
		LAPU LAPU/Mactan Cebu Intl	RPVM	x	x
		DAVAO/Francisco Bangoy Intl	RPMD	x	x
		SUBIC BAY/Subic Bay Intl	RPLB	x	x
		LAOAG/Laoag Intl	RPLI	x	x
		ZAMBOANGA/Zamboanga Intl	RPMZ	x	x
Incheon	**RKSI**	SEOUL/Incheon Intl	RKSI	x	x
		SEOUL/Gimpo Intl	RKSS	x	x
		JEJU/Jeju Intl	RKPC	x	x
		BUSAN/Gimhae Intl	RKPK	x	x
		CHEONGJU/Cheongju Intl	RKTU	x	x
		YANGYANG/Yangyang Intl	RKNY	x	x
		DAEGU/Daegu Intl	RKTN	x	x
Jakarta	**WIII**	UJUNG PANDANG/Hasanuddin	WAAA	x	
		BIAK/Frans Kaisieppo	WABB	x	
		JAKARTA/Halim	WIIH	x	
		JAKARTA/Soekarno-Hatta	WIII	x	
		BATAM/Hang Nadim	WIKB	x	
		MEDAN/Polonia	WIMM	x	
		DENPASARx	WRRR	x	
		SURABAYA/Juanda	WRSJ	x	
		MANADO/Sam Ratulangi	WAMM	x	
		PEKAN BARU/Simpangtiga	WIBB	x	
		TANJUNG PINNAG/Kijang	WIKN	x	
		PADANG/Tabing	WIMG	x	
		PONTIANAK/Supadio	WIOO	x	
		PALEMBANG/Sultan Mahmud Badaruddin II	WIPP	x	
		BANJARMASIN/Syamsudin Noor	WRBB	x	
		BALIKPAPAN/Sepinggan	WRLL	x	
		MATARAM/Selaparang	WRRA	x	
		TIMIKA/Tembegapura	WABP	x	
		JAYAPURA/Sentani	WAJJ	x	
		MERAUKE/Mopah	WAKK	x	
		AMBON/Pattimura	WAPP	x	
		SEMARANG/Achmad Yani	WIIS	x	
		BANDAR LAMPUNG/Branti	WIIT	x	
		KUPANG/El-Tari	WRKK	x	
		TARAKEN	WRLR	x	

ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

Name	CCCC	Aerodrome	CCCC	SA/SP/UA*	FT
1	2	3	4	5	6
Kolkata	**VECC**	KOLKATA/Netaji Subhash Chandra Bose Intl	VECC	x	
		PATNA/Patna	VEPT	x	
		DHAKA/Zia Intl	VGZR	x	
		CHITTAGONG/M. A. Hannan Intl	VGEG	x	
		KATHMANDU/Tribhuvan Intl	VNKT	x	
Karachi	**OPKC**	KARACHI/Quaid-E-Azam Intl	OPKC	x	x
		ISLAMABAD/Chaklala	OPRN	x	x
		LAHORE/Lahore	OPLA	x	x
		NAWABSHAH	OPNH	x	x
		GAWADAR	OPGD	x	x
		PESHAVAR	OPPS	x	x
Kuala Lumpur	**WMKK**	KUALA LUMPUR/Kuala Lumpur Intl	WMKK		x
		SINGAPORE/Changi	WSSS		x
		SINGAPORE/Paya Lebar	WSAP		x
		PENANG/Bayan Lepas	WMKP		x
		KOTA KINABALU/Kota Kinabalu Intl	WBKK		x
		KUCHING/Kuching	WBGG		x
		BANDAR SERI BEGAWAN /Brunei Intl	WBSB		x
Mumbai	**VABB**	AHMADABAD/Ahmadabad	VAAH	x	x
		MUMBAI/Jawaharlal Nehru Intl	VABB	x	x
		NAGPUR/Nagpur	VANP	x	x
		CALCUTTA/Calcutta	VECC		x
		PATNA/Patna	VEPT		x
		AMRITSAR/Amritsar	VIAR		x
		VARANASI/Varanasi	VIBN		x
		DELHI/Indira Gandhi Intl	VIDP		x
		JAIPUR/Jaipur	VIJP		x
		LUCKNOW/Lucknow	VILK		x
		COLOMBO/Katunayake	VCBI		x
		KATHMANDU/Tribhuvan Intl	VNKT		x
		COCHIN/Cochin Intl	VOCI		x
		CALICUT/Calicut	VOCL		x
		HYDERABAD/Hyderabad	VOHY	x	x
		CHENNAI/Chennai	VOMM	x	x
		TIRUCHCHIRAPALLI/Tiruchchirapalli	VOTR	x	x
		TRIVANDRUM/Trivandrum	VOTV	x	x
Nadi	**NFFN**	NADI/Intl	NFFN		x
		NOUMEA/La Tontouta	NWWW		x
		PAGO PAGO/Intl, Tutuila I.	NSTU		x
Port Moresby	**AYPY**	PORT MORESBY/Jacksons	AYPY	x	
		MADANG	AYMD	x	

ASIA/PAC FASID **6-4A - 6**

ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

Name	CCCC	Aerodrome	CCCC	SA/SP/UA*	FT
1	2	3	4	5	6
		WEWAK	AYWK	x	
Singapore	**WSSS**	SINGAPORE/Changi	WSSS		x
		SINGAPORE/Paya Lebar	WSAP		x
		KUALA LUMPUR/Kuala Lumpur Intl	WMKK		x
		DENPASAR/Ngurah Rai (Bali Intl)	WRRR		x
		JOHOR BAHRU/Sultan Ismail	WMKJ		x
		PENANG/Bayan Lepas	WMKP		x
		SURABAYA/Juanda	WRSJ		x
		JAKARTA/Halim	WIIH		x
		JAKARTA/Soekarno-Hatta	WIII		x
		SUBANG/Sultan Abdul Aziz Shah	WMSA		x
		SINGAPORE/Changi	WSSS		x
Tokyo	**RJTD**	TOKYO/Narita Intl	RJAA	x	x
		TOKYO/Tokyo Intl	RJTT	x	x
		NAHA/Naha	ROAH	x	x
		OSAKA/Osaka Intl	RJOO	x	x
		OSAKA/Kansai Intl	RJBB	x	x
		NAGOYA/Nagoya	RJNN	x	x
		SENDAI/Sendai	RJSS		x
		SAPPORO/New Chitose	RJCC	x	x
		HAKODATE/Hakodate	RJCH	x	
		FUKUOKA/Fukuoka	RJFF	x	x
		KAGOSHIMA/Kagoshima	RJFK	x	x
		OITA/Oita	RJFO		x
		KUMAMOTO/Kumamoto	RJFT		x
		NAGASAKI/Nagasaki	RJFU		x
		NAGASAKI/Nagasaki	RJFU	x	
		NAGOYA/Nagoya	RJNN		x
		HIROSHIMA/Hiroshima	RJOA		x
		OKAYAMA/Okayama	RJOB		x
		TAKAMATSU/Takamatsu	RJOT		x
		NIIGATA/Niigata	RJSN		x
Wellington	**NZKL**	WELLINGTON/Wellington Intl	NZWN	x	x
		AUCKLAND/Auckland Intl	NZAA	x	x
		CHRISTCHURCH/Christchurch Intl	NZCH	x	x

***Note:** *UA bulletins are compiled by those aerodrome meteorological offices in Column 3, which are designated as MWOs according to FASID Table MET 1B.*

ASIA/PAC FASID **6-4B-1**

FASID TABLE MET 4B — OPMET DATA BANKS TO SUPPORT THE ROBEX SCHEME (ROBEX OPMET DATA BANKS – RODB)

EXPLANATION OF THE TABLE

Column

1. ROBEX Centres

2. ROBEX OPMET data bank responsible for collection and dissemination of METAR, SPECI, AIREP and TAF bulletins issued by ROBEX centres in column 1.

ASIA/PAC FASID **6-4B-2**

RODB RESPONSIBILITY FOR ROBEX BULLETINS

ROBEX centres	RODB responsible for collection and dissemination of bulletins (SA, SP, UA and FT)				
	Bangkok	**Brisbane**	**Singapore**	**Tokyo**	**Nadi**
1	2				
ASIA/PAC					
Bangkok	x				
Beijing				x	
Brisbane		x			
Colombo	x				
Delhi	x				
Hong Kong				x	
Incheon				x	
Jakarta			x		
Karachi	x				
Kolkata	x				
Kuala Lumpur			x		
Mumbai	x				
Nadi					x (FT)
Port Moresby		x			
Singapore			x (FT)		
Tokyo				x	
Wellington		x			
MID					
Baghdad	x				
Bahrain	x				
Beirut	x				

ASIA/PAC FASID **6-4B-3**

Jeddah	x				
Tehran	x				
OTHER REGIONS					
EUR Bulletins			x		
AMBEX TAF Bulletins	x				
SAM TAF Bulletins		x			
NAM TAF Bulletins				x	x

PART VI

METEOROLOGY (MET)

……

5. Exchange of operational meteorological information
(FASID Tables MET 2A, MET 2 B, MET 4A and MET 4B)

5.1 OPMET data banks

5.1.1 The OPMET data banks in Bangkok, Brisbane, Nadi, Singapore and Tokyo have been designated to serve States in the ASIA/PAC Regions to access OPMET information which is required but not received. FASID Tables MET 4B sets out the responsibilities of the ASIA/PAC OPMET data banks for collection and dissemination of OPMET bulletins to support the ROBEX Scheme.
[APANPIRG/7 Concl. 7/20]

*Note: A list of the OPMET information available at the OPMET data banks to serve the ASIA/PAC Regions, together with the procedures to be used in communicating with the data banks are contained in the **ASIA/PAC Interface Control Document (ICD) for interrogation with the OPMET data banks,** published by the ICAO Regional Office, Bangkok.*

5.2-*Exchange of METAR, SPECI and TAF*

5.2.1 FASID Table MET 4A sets out the Regional OPMET Bulletin Exchange (ROBEX) Scheme for the collection and dissemination of METAR, SPECI and TAF. This table contains information regarding the designated ROBEX centres and their respective areas of responsibility.
[ASIA/PAC/3 Rec. 9/6, Rec. 9/8]
[APANPIRG/7 Concl. 7/20]

*Note.— Details of the ROBEX procedures regarding the exchange of OPMET information required under the scheme are given in the **ROBEX Handbook** published by the ICAO ASIA/PAC Office, Bangkok, in coordination with the ICAO MID Office, Cairo.*

5.2.2 FASID Table MET 4A should be updated, as necessary, by the ICAO Regional Office on the basis of changes in the pattern of aircraft operations, the Statement of Basic Operational Requirements and Planning Criteria, and in consultation with those States and international organizations directly concerned.
[ASIA/PAC/3 Rec. 9/8]

5.2.3 METAR, SPECI and TAF from ASIA/PAC Regions should be transmitted to the ASIA/PAC OPMET data banks and to SADIS and ISCS uplink stations in accordance with FASID Table MET 2A. This table should be updated, as necessary, by the ICAO Regional Office on the basis of changes in the pattern of aircraft operations, the Statement of Basic Operational Requirements and Planning Criteria, and consultation with those States and international organizations directly concerned.
[ASIA/PAC/3 Rec. 9/1, Rec. 9/8]

5.2.4 The exchanges indicated in FASID Table MET 2A should be implemented as soon as possible

5.3 *Exchange of SIGMET information and air-reports*

5.3.1 SIGMET from ASIA/PAC regions should be transmitted to the ASIA/PAC OPMET data banks and to the SADIS and ISCS uplink stations in accordance with FASID Table MET 2 B. SIGMET should also be disseminated to other MWOs and ACCs as necessary to fulfill the requirements for availability set out in the Statement of Basic Operational Requirements and Planning Criteria. FASID Table MET 2B provides detail regarding the ASIA/PAC communication gateways to which SIGMET messages from all regions should be addressed. This table should be updated, as necessary, by the ICAO Regional Office.

Note: To avoid duplication in transmission, the inter-regional exchange of SIGMET should be via designated inter-regional gateways.

5.3.2 Each MWO should arrange for the transmission to all aerodrome meteorological offices within its associated FIR of its own SIGMET messages and relevant SIGMET messages for other FIR, as required for briefing and, where appropriate, for flight documentation.
[ASIA/PAC/3 Rec. 8/16]

5.3.3 Each MWO should arrange for the transmission to its associated ACC/FIC of SIGMET information and

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special air-reports received from other MWOs as necessary to fulfill the requirements for availability set out in the Statement of the Basic Operational Requirements and Planning Criteria.

5.3.4 Each MWO should arrange for the transmission of routine air-reports received by voice communication to all meteorological offices within its associated FIR. Special air-reports which do not warrant the issuance of a SIGMET should be disseminated by MWO in the same way as SIGMET messages.

ASIA/PAC FASID **6-0-3**

PART VI

METEOROLOGY (MET)

…….

3. EXCHANGE OF OPERATIONAL METEOROLOGICAL INFORMATION
(FASID Tables MET 2A, 2B, 4A and 4B)

3.1 The requirements for METAR, SPECI and TAF, which should be made available by the ASIA/PAC States, to meet the needs of the global international flight operations are shown in FASID Table MET 2A.

Note: Requirements for METAR, SPECI and TAF from other regions, needed for the operations conducted to/from ASIA/PAC region, are contained in the FASID Table MET 2A of the respective regional ANPs.

3.2 FASID Table MET 2B contains information for the communication gateways in the ASIA/PAC Region to which all SIGMET messages and volcanic ash and tropical cyclones advisories should be addressed.

3.3 FASID Table MET 4A sets out the Regional OPMET Bulletin Exchange (ROBEX) Scheme for the exchange of METAR, SPECI, air reports (AIREP) and TAF.

Note. — Details of the ROBEX procedures including the exchange of OPMET information required under the Scheme are given in the "ROBEX Handbook" *prepared by the ICAO Asia and Pacific Office, Bangkok in co-ordination with the ICAO MID Office, Cairo.*

3.4 FASID Table MET 4B reflects the requirements for the operation of the ASIA/PAC OPMET data banks to support the ROBEX Scheme. The responsibilities of the ROBEX OPMET data banks are as follows :

a) support the ROBEX Scheme to facilitate a regular exchange of OPMET information within the ASIA/PAC Regions;

b) operate as Inter-regional OPMET Gateways (IROG) with responsibility of exchanging the OPMET information between stations within the ASIA/PAC Regions and in other Regions; and

c) provide request/response facilities for users to obtain non-regular or occasional information.

Note. — The interrogation procedures applicable to the OPMET data banks and data banks catalogues are provided in the "ASIA/PAC Regional Interface Control Document (ICD) - OPMET Data Bank Access Procedures"*, published by the ICAO Asia and Pacific Office, Bangkok.*

ASIA/PACIFIC (ASIA/PAC) REGIONS

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	Not listed in the AOP Tables				
1	2	3	4	5	6
AMERICAN SAMOA (United States)					
Pago Pago/Pago Pago Intl		NSTU	X	X	SA/FTPA32
AUSTRALIA					
Adelaide/Adelaide Intl		YPAD	X	X	
Alice Springs/Alice Springs		YBAS	X		
	Amberley	YAMB	X		FC: issued 6 hourly on Sat. and Sun.; 12-hour validity
	Avalon	YMAV	M	X	
Brisbane/Brisbane Intl		YBBN	X	X	
Broome/Broome Intl		YBRM	X		FC: issued 6 hourly; 12-hour validity
Cairns/Cairns Intl		YBCS	M	X	
	Canberra	YSCB	M	X	
Christmas I./Christmas I.		YPXM	X		FC: issued as required; 12-hour validity
Cocos I/Cocos I.		YPCC	M		
	Coolangatta	YBCG	M	X	
	Curtin-Derby	YCIN	X		FC: issued 6-hourly; 12-hour validity
Darwin/Darwin Intl		YPDN	X	X	
Dubbo/Dubbo		YSDU	X		FC: issued 6-hourly; 12-hour validity
	Forrest	YFRT	X		FC: issued 6-hourly; 12-hour validity
	Gove	YPGV	X		FC: issued 6-hourly; 12-hour validity
	Hamilton I.	YBHM	X		FC: issued 6-hourly; 12-hour validity
Hobart/Hobart		YMHB	X		FC: issued 6 hourly; 12-hour validity
	Kalgoorlie	YPKG	X		FC: issued 6 hourly; 12-hour validity
	Kununurra	YPKU	X		FC: issued three times a day; 12- or 6-hour validity
Learmonth		YPLM	M		
Melbourne/Melbourne Intl		YMML	X	X	
	Mount Isa	YBMA	X		FC: issued 6 hourly;

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	**Not listed in the AOP Tables**				
1	**2**	**3**	**4**	**5**	**6**
					12-hour validity
Norfolk I./Norfolk I.		YSNF	X		FC: issued three times a day; 12-hour validity
	Pearce	YPEA	X		FC: issued 6 hourly; 12-hour validity
Perth/Perth Intl		YPPH	X	X	
Port Hedland/Port Hedland		YPPD	X		
	Richmond, NSW	YSRI	X		FC: issued 6 hourly; 12-hour validity
Rockhampton/Rockhampton		YBRK	M		
Sydney/Kingsford Smith Intl		YSSY	X	X	
Tindal/Catherine		YPTN	M		
Townsville/Townsville Intl		YBTL	X	X	
	Williamtown	YWLM	M	X	FT: issued three times a day
BANGLADESH					
Chittagong/ Chitagong		VGEG	M	X	
Dhaka/Zia Intl		VGZR	X	X	
BHUTAN					
Paro/Paro Intl		VQPR	M		
BRUNEI DARUSSALAM					
Bander Seri Beegawan/Brunei Intl		WBSB	X	X	
CAMBODIA					
Phnom-Penh/Pochentong		VDPP	M	X	
Siem-Reap/Angkor		VDSR	M		
CHILE					
	Isla de Pascua/Mataveri	SCIP	M		SA: available as required; FT: twice a day
CHINA					
Beijing/Capital		ZBAA	X	X	
	Changchun/Dafangshen	ZYCC	M	X	
Changsha/Huanghua		ZGHA	X	X	
Chengdu/Shuangliu		ZUUU	X	X	
Chongqing/Jiangbei		ZUCK	M	X	
Dalian/Zhoushuzi		ZYTL	X	X	
Fuzhou/Changle		ZSFZ	M		
Gaoxiong/Gaoxiong		RCKH	M	X	
Guangzhou/Baiyun		ZGGG	M	X	

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	Not listed in the AOP Tables				
1	2	3	4	5	6
Guilin/Liangjiang		ZGKL	M		
	Haikou/Meilan	ZJHK	M	X	
Hangzhou/Jianqiao		ZSHC	X	X	
Harbin/Yanjiagang		ZYHB	X	X	
Hefei/Luogang		ZSOF	M	X	
Hohhot/Baita		ZBHH	X	X	
Jinan/Yaoqiang		ZSJN	M		
Kashi/Kashi		ZWSH	M		
Kunming/Wujiaba		ZPPP	X	X	
Lanzhou/Zhongchuan		ZLLL	X	X	
Nanjing/Lukou		ZSNJ	M	X	
Nanning/Wuxu		ZGNN	X	X	
Qingdao/Liuting		ZSQD	M	X	
Sanya/Fenghuang		ZJSY	M	X	temporarily not available
Shanghai/Hongqiao		ZSSS	M	X	
Shanghai/Pudong		ZSPD	X	X	
	Shantou/Shantou	ZGOW	M	X	
Shenyang/Taoxian		ZYTX	X	X	
Shenzhen/Huangtian		ZGSZ	M	X	
Taibei/Sungshan		RCSS	M	X	
Taibei/Taibei Intl		RCTP	M	X	
Taiyuan/Wusu		ZBYN	X	X	
Tianjin/Binhai		ZBTJ	X	X	
Urumqi/Diwopu		ZWWW	X	X	
Wuhan/Tianhe		ZHHH	X	X	
Xiamen/Gaoqi		ZSAM	X	X	
Xi'an/Xianyang		ZLXY	X	X	
Xichang/Qingshan		ZUXC	M		
Hong Kong, China					
Hong Kong/Hong Kong Intl		VHHH	X	X	
Macau, China					
Macau/Macau Intl		VMMC	M	X	
COOK ISLANDS					
Avarua/Rarotonga Intl		NCRG	M	X	
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA					
Pyongyang/Sunan		ZKPY	M	X	
FIJI					
Nadi/Nadi Intl		NFFN	X	X	

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	Not listed in the AOP Tables				
1	2	3	4	5	6
	Naousori/Naousori Intl	NFNA	M		
FRENCH POLYNESIA (France)					
Rangiroa/Rangiroa		NTTG	M		
Tahiti/Faaa		NTAA	X	X	
GUAM (United States)					
Guam I./Agana NAS		PGUM	M	X	SA/FTPA31
Guam I./Andersen AFB		PGUA	M	X	SA/FTPA31
INDIA					
Ahmadabad/Ahmadabad		VAAH	X	X	
Amritsar/Amritsar		VIAR	M	X	
	Bangalore	VOBG	M	X	
	Bhubaneshwar	VEBS	M	X	
Calicut/Calicut		VOCL	X	X	
Chennai/Chennai		VOMM	M	X	
Delhi/Indira Gandhi Intl		VIDP	X	X	
	Hyderabad	VOHY	M	X	
	Jaipur	VIJP	M	X	
Kolkata/Netaji Subhash Chandra Bose Intl		VECC	X	X	
	Lucknow	VILK	M	X	
Mumbai/Jawaharial Nehru Intl		VABB	X	X	
Nagpur/Nagpur		VANP	M	X	
	Pathankot	VIPK	M	X	
Patna/Patna		VEPT	M	X	
Tiruchchirappalli/ Tiruchchirappalli		VOTR	M	X	
Trivandrum/Trivandrum Intl		VOTV	M	X	
Varanasi/Varanasi		VIBN	M	X	
INDONESIA					
Ambon/Pattimura		WAPP	M		
Bali/Ngurah Rai		WADD	X	X	
Balikpapan/Sepinggan		WALL	M		
Banjarmasin/Syamsuddin Noor		WAOO	M		
Batam/Hang Nadim		WIDD	M		
Biak/Frans Kaisiepo		WABB	M	X	
Jakarta/Halim Perdana Kusuma		WIHH	X	X	
Jakarta/Soekarmo (Hatta Intl)		WIII	X	X	
Jayapura/Sentani		WAJJ	M		

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	Not listed in the AOP Tables				
1	2	3	4	5	6
	Jogyakarta/Adisucipto	WARJ	M	X	
Kupang/Eltari		WATT	M		
Manado/Sam Ratulangi		WAMM	M		
	Mataram/Selaparang	WADA	M	X	
Medan/Polonia		WIMM	M	X	
Merauke/Mopah		WAKK	M		
Padang/Tabing		WIMG	M		
Palembang/Sultan M.B. II		WIPP	M		
Pekanbaru/Simpang Tiga		WIBB	M		
Pontianak/Supadio		WIOO	M		
	Solo/Adi Sumarmo	WARQ	M	X	
	Sorong/Jefman	WASS		X	
Surabaya/Juanda		WARR	M		
Tanjung Pinang/Kijang		WIDN	M		
Tarakan/Juwata		WALR	M		
Timika/Tembagapura		WABP	M		
Ujung Pandang/Hasanuddin		WAAA	M	X	
JAPAN					
Fukuoka/Fukuoka		RJFF	X	X	
Hakodate/Hakodate		RJCH	M	X	
Hiroshima/Hiroshima		RJOA	M	X	
Kagoshima/Kagoshima		RJFK	M	X	
Kumamoto/Kumamoto		RJFT	M	X	
Nagasaki/Nagasaki		RJFU	M	X	
Nagoya/Nagoya		RJNN	X	X	
Naha/Naha		ROAH	X	X	
Niigata/Niigata		RJSN	M	X	
Oita/Oita		RJFO	M	X	
Okayama/Okayama		RJOB	M	X	
Osaka/Kansai Intl		RJBB	M	X	
Osaka/Osaka Intl		RJOO	M	X	
Sapporo/New Chitose		RJCC	M	X	
Sendai/Sendai		RJSS	M	X	
Takamatsu/Takamatsu		RJOT	M	X	
Tokyo/New Tokyo Intl		RJAA	X	X	
Tokyo/Tokyo Intl		RJTT	X	X	
JOHNSTON I. (United States)					
Johnston I./Johnston Atoll		PJON	M	X	SA/FTPA31
KIRIBATI					
Kirimati/Christmas I.		PLCH	M	X	
Tarawa/Bonriki Intl		NGTA	M	X	FT: 12 to 15 hours
LAO PEOPLE'S DEMOCRATIC REPUBLIC					

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	**Not listed in the AOP Tables**				
1	**2**	**3**	**4**	**5**	**6**
Vientiane/Wattay		VLVT	M	X	
MALAYSIA					
	Alor Setar/Sultan Abdul Halim	WMKA	M	X	
	Bintulu	WBGB	X		
	Ipoh/Sultan Azlan Shaw	WMKI	M	X	
Johor Bharu/Sultan Ismail		WMKJ	M		
	Kota Bahru/Sultan Ismail Petra	WMKC	M		
Kota Kinabalu/Kota Kinabalu Intl		WBKK	X	X	
Kuala Lumpur/Sepang Intl		WMKK	M	X	
Kuala Lumpur/Subang Kuala Lumpur Intl		WMSA	X	X	
	Kuala Terengganu/Sultan Mahmud	WMKN	M	X	
Kuantan/Kuantan		WMKD	M		
Kuching/Kuching		WBGG	X	X	
	Kudat	WBKT	M		
	Labuan/Labuan	WBKL	X		FC: 12-hour validity
Malacca/Malacca		WMKM	M		
	Mersing	WMAU	M		
Miri/Miri		WBGR	M		FC: 12-hour validity
Penang/Bayan Lepas		WMKP	X	X	
Pulau Langkawi/Pulau Langkawi Intl		WMKL	M		
	Sandakan	WBKS	X		FC: 12-hour validity
Sibu/Sibu		WBGS	M		FC: 12-hour validity
	Simanggang	WBGY	M		
	Sitiawan	WMBA	M		
Tawau/Tawau		WBKW	M		FC: 12-hour validity
MALDIVES					
Gan/Gan		VRMG	M	X	
Male/Hulule		VRMM	M	X	
MARSHALL Is					
Majuro Atoll/Marshall I Intl		PKMJ	M	X	SA/FTPA31
	Kwajalein Atoll/Bucholz AAF, Kiribati	PKWA	M	X	
MICRONESIA, FEDERATED STATES OF					
	Kosrae I./Kosrae	PTSA	M	X	SA/FTPA31
Moen./Truk Intl		PTKK	M		SA/FTPA31
Ponape I./Ponape		PTPN	M	X	SA/FTPA31
Yap I./Yap Intl		PTYA	M		SA/FTPA31
MIDWAY Is (United States)					

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	Not listed in the AOP Tables				
1	2	3	4	5	6
	Sand I./Midway NAF.	PMDY	M	X	SA/FTPA31
MONGOLIA					
Ulaanbaator/Bryant-Ukhaa		ZMUB	M	X	
MYANMAR					
	Mondalay Intl	VYMD	M	X	
	Sittwe	VYSW	M	X	
Yangon/Mingaladon		VYYY	X	X	
NAURU					
Nauru I./Nauru		AUUU	M	X	
NEPAL					
Kathmandu/Tribhuran Intl		VNKT	M	X	
NEW CALEDONIA (France)					
Noumea/La Tontouta		NWWW	X	X	
NEW ZEALAND					
Auckland/Auckland Intl		NZAA	X	X	
Christchurch/Christchurch Intl		NZCH	X	X	
Wellington/Wellington Intl		NZWN	X	X	
NIUE I. (New Zealand)					
Alofi/Niue Intl		NIUE	M		FC: 9-hour validity
NORTHERN MARIANA Is (United States)					
Rota/Rota Intl		PGRO	M	X	
Saipan I. (Obyan)/Saipan I. (Obyan) Intl		PGSN	M	X	
PAKISTAN					
Gwadar/Gwadar		OPGD	M	X	
	Faisalabad	OPFA	M	X	
Islamabad/Chaklala		OPRN	X	X	
Karachi/Jinnah Intl		OPKC	X	X	
Lahore/Allama Iqbal Intl		OPLA	X	X	
	Multan	OPMT	M	X	
Nawabshah/Nawabshah		OPNH	M		
	Pasni	OPPI	M	X	
Peshawar/Peshawar		OPPS	M	X	
	Quetta/Samungli	OPQT	M	X	
	Sukkur	OPSK	M	X	
PALAU I. (United States)					
Koror/Koror (Babelthuap I.)		PTRO	M	X	SA/FTPA31

Updated
February 2005

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	Not listed in the AOP Tables				
1	2	3	4	5	6
PAPUA NEW GUINEA					
	Daru	AYDU	X		
	Goroka	AYGA	X		
Kieta/Kieta		AYKT	M		
	Madang	AYMD	X		
	Momote	AYMO	X		
	Mount Hagen	AYMH	X		
	Nadzab	AYNZ	X		
Port Moresby/Jacksons		AYPY	M	X	
Vanimo/Vanimo		AYVN	M		
	Wewak	AYWK	M		
PHILIPPINES					
	Clark AB/Pampanga	RPLC	M	X	
Davao/Francisco Bangoy Intl		RPMD	M		
Laoag/Laoag Intl		RPLI	M		
Lapu-Lapu/Mactan Cebu Intl		RPVM	X		
Manila/Ninoy Aquino Intl		RPLL	X	X	
Olongapo/Cubi Intl		RPMB	M		
	Puerto Princesa/Palawan	RPVP	M	X	
Subic Bay/Subic Bay Intl		RPLB	M	X	
Zamboanga/Zamboanga Intl		RPMZ	M		
REPUBLIC OF KOREA					
Busan/Gimhae Intl		RKPK	M	X	
Cheongju/Cheongju Intl		RKTU	M		
Daegu/Daegu Intl		RKTN	M	X	
	Gunsan	RKJK	M	X	
	Gwangju	RKJJ	M	X	
Jeju/Jeju Intl		RKPC	M	X	
	Osan	RKSO	M	X	
Seoul/Gimpo Intl		RKSS	M	X	
Seoul/Incheon Intl		RKSI	M	X	
	Seoul/Sinchonri	RKSM	M	X	
Yangyang/Yangyang Intl		RKNY	M	X	
SAMOA					
Apia/Faleolo Intl		NSFA	M	X	SA/FTPA32
SINGAPORE					
	Seletar	WSSL	M		
Singapore/Changi		WSSS	X		
Singapore/Paya Lebar		WSAP	M		

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	Not listed in the AOP Tables				
1	2	3	4	5	6
Singapore/Seletar		WSSL	M		
SOLOMON ISLANDS					
Honiara/Henderson		AGGH	M	X	
SRI LANKA					
Colombo/Katunayake		VCBI	X	X	
	Colombo/Ratmalana	VCCC	M	X	
	Kankesanturai/Jaffna	VCCJ	M	X	
Minnerya/Hingurakgoda		VCCH	M		
THAILAND					
Bangkok/Bangkok Intl		VTBD	X	X	
	Buri Ram	VTUO	M	X	
Chiang Mai/Chiang Mai Intl		VTCC	M	X	
Chiang Rai/Chiang Rai Intl		VTCT	M		
	Chumphon	VTSE	M	X	
Khon Kaen/Khon Kaen		VTUK	M		
	Krabi	VTSG	M	X	
	Lampang	VTCL	M	X	
	Loei	VTUL	M	X	
	Mae Hong Son	VTCH	M	X	
	Nakhon Phanom (West)	VTUW	M	X	
	Nakhon Ratchasima	VTUQ	M	X	
	Nakhonsi Thammarat	VTSF	M	X	
	Nakhon Si Thammarat/Chai-Ian	VTSN	M	X	
	Nan	VTCN	M	X	
	Narathiwat	VTSC	M	X	
	Pattani	VTSK	M	X	
Phitsanulok/Phitsanulok		VTPP	M		
	Phrae	VTCP	M	X	
	Phetchabun	VTPB	M	X	
Phuket/Phuket Intl		VTSP	M	X	.
	Prachuap Khiri Khan/Hua Hin	VTPH	M	X	
	Ranong	VTSR	M	X	
Rayong/Utaphao		VTBU	M		
	Roi Et	VTUV	M	X	
	Sakhon Nakhon/Ban Khai	VTUI	M	X	
Songkhla/Hat Yai Intl		VTSS	M	X	
Surat Thani/Surat Thani		VTSB	M		
	Surathani/Samui	VTSM	M	X	
	Tak/Mae Sot	VTPM	M	X	
	Trang	VTST	M	X	
Ubon Ratchathani/Ubon Ratchathani		VTUU	M		

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	**Not listed in the AOP Tables**				
1	**2**	**3**	**4**	**5**	**6**
	Udon Thani	VTUD	M	X	
TONGA					
Tongatapu/Fua'amotu Intl		NFTF	M	X	
Vava'u/Vava'u		NFTV	M	X	
TUVALU					
Funafuti/Funafuti Intl		NGFU	M	X	FT: 15-hour validity
VANUATU					
Port Vila/Bauerfield		NVVV	M	X	
Santo/Pekoa		NVSS	M	X	
VIET NAM					
	Cat Bi	VVCI	X		SA/FC issued during 2200-1100 UTC, as required
	Da Lat/Lien Khuong	VVDL	X		SA/FC issued during 2200-1100 UTC, as required
Danang/Danang		VVDN	M	X	
	Dien Bien Phu	VVDB	X		SA/FC issued during 2200-1100 UTC, as required
Hanoi/Noibai		VVNB	X	X	
Ho-Chi-Minh/Tan-Son-Nhat		VVTS	X	X	
	Hue/Phu Bai	VVPB	X		SA/FC issued during 2200-1100 UTC, as required
	Nha Trang	VVNT	X		SA/FC issued during 2200-1100 UTC, as required
WAKE Is ((United States					
Wake Island	*Wake Island*	PWAK	M	X	
WALLIS Is (France)					
Wallis/Hihifo		NLWW	M		

TERMS OF REFERENCE OF ASIA/PAC OPMET MANAGEMENT TASK FORCE (OPMET/M TF)

1. Terms of Reference

- Review the OPMET exchange schemes in the ASIA/PAC and MID Region and develop proposals for their optimization taking into account the requirements by the aviation users and the current trends for global OPMET exchange;

- Develop monitoring and management procedures related to ROBEX exchange and other exchanges of OPMET information;

- Regularly update the regional guidance material related to OPMET exchange;

- Liaise with other groups dealing with communication and/or management aspects of the OPMET exchange in ASIA/PAC and other ICAO Regions (ASIA/PAC ATN Transition TF, BMG EUR Region, CNS/MET SG MID Region, etc.).

2. Work Programme

The work to be addressed by the ASIA/PAC OPMET Management Task Force includes:

(a) to examine the existing and any new requirements for OPMET exchange in ASIA/PAC and MID regions and assess the feasibility of satisfying these requirements, taking into account the availability of the data;

(b) to keep under review the ROBEX scheme and other OPMET exchange schemes and prepare proposal for updating and optimizing of the schemes;

(c) to review and update the procedures for interregional OPMET exchange and ensure the availability of the required ASIA/PAC and MID OPMET data for the AFS satellite broadcasts (ISCS and SADIS);

(d) to keep under review and provide timely amendments of the regional guidance materials on the OPMET exchange; to ensure that guidance material covers procedures for the exchange of all required OPMET data types: SA, SP, FC, FT, WS, WC, WV, FK, FV, UA;

(e) to conduct trials and develop procedures for monitoring and management of the OPMET exchange; to foster implementation of quality management of OPMET data by the ROBEX centres and the RODBs;

(f) to prepare regional plan for the transition to BUFR coded OPMET information in coordination with the relevant APANPIRG contributing bodies.

3. Composition

(a) The Task Force is composed by experts from:

Australia (Rapporteur); China; Fiji; Japan; Hong Kong, China; Indonesia; Singapore; Thailand; United Kingdom; United States; and Viet Nam.

(b) Representatives of IATA, EUR BMG and MID OPMET Bulletin Board are invited to participate in the work of the Task Force

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List of issues related to the implementation of SIGMET provisions, identified by the CNS/MET SG/9 meeting, to be addressed by the appropriate ICAO body

1. Clarify the provisions for updating SIGMET.

Explanation: For VA and TC SIGMET it is specified that update should be made at least every 6 hours. However, for "normal" SIGMET there is no requirement for updating other than canceling the SIGMET. The case when a SIGMET issued for a "FCST" phenomenon should be eventually replaced by a SIGMET for "OBS" phenomenon, should be addressed.

2. Provision for exclusion of the forecast part of the SIGMET in relation to VOLMET (and D-VOLMET).

Explanation: It is logical that SIGMET should be reported by VOLMET only during its period of validity. Thus, SIGMETs issued in advance should not be included in VOLMET until the commencement of their period of validity. In this regarded it may be proposed to replace in Annex 3, App. 10, 4.2.1, the word "available" with "valid". Same applies for the OUTLOOK part of the VA and TC SIGMETs, which may need to be cut off when SIGMET is used for VOLMET.

3. Issuance of SIGMET when the FIR concerned is affected by part of a tropical cyclone (e.g., the FIR is affected by one of the tropical cyclone cloud spirals).

Explanation: The question here is whether the SIGMET should be issued as a SIGMET for tropical cyclone (WC SIGMET), or as SIGMET for thunderstorms (WS SIGMET). It should be noted in this regard, that the current format of WC SIGMET, as defined in Annex 3, App. 6, Table A6-1, assumes that the TC (as a weather phenomenon) should be described as a circle-shaped cloud system, e.g., "CB TOP FL500 WI 150 NM OF CENTRE". Difficulties arise when the centre of the TC is outside the FIR, but it is affected by part of the TC cloud system. It may be useful to impose some more detailed criteria in this regard, for instance:

- the MWO should issue a WC SIGMET when the TC centre is (or is expected to be) within the FIR concerned;

- otherwise, when the larger part of the TC lies outside, but the FIR is affected by one of the TC cloud spirals or other cloud formation which is part of the TC cloud system, so that the weather phenomenon actually affecting the flight safety is a TS formation, the MWO should issue a WS SIGMET for TS.

4. Adding more examples in Table A6-1 describing non-trivial cases

Explanation: Current examples in Table A6-1 do not cover some "difficult" cases that may be interpreted by the MWOs in different ways, e.g., SIGMET for a FIR affected by a part of a tropical cyclone (e.g., the FIR is affected by one of the tropical cyclone cloud spirals), or the use "geographical features well known internationally" in describing the location of the phenomenon. It is desirable to provide more examples to ensure harmonized implementation.

5. Consider the usefulness of "OBS AND FCST"

Explanation: Each SIGMET may contain some forecast part in indicating the movement and intensity change. Therefore, it would be clearer for the user to use either "OBS" or FCST" to indicate existence or expectation of the phenomenon concerned. The mixed type "OBS AND FCST", if necessary, should be explained by means of examples or in the related guidance material (e.g., Manual of the Aeronautical Meteorological Practice, Doc 8896).

ASIA/PAC FASID – MET **6-3-B-1**

FASID TABLE MET 3B — VOLCANIC ASH ADVISORY CENTRES

EXPLANATION OF THE TABLE

Column

1. Location of the volcanic ash advisory centre (VAAC).
2. ICAO location indicator of VAAC (for use in the WMO heading of advisory bulletin).
3. Area of responsibility for the preparation of advisory information on volcanic ash by the VAAC in Column 1.
4. MWOs to which the advisory information on volcanic ash should be sent.
5. ICAO location indicator of the MWOs in Column 4.
6. ACCs to which the advisory information on volcanic ash should be sent.
7. ICAO location indicator of the ACCs in Column 6.

Note: MWOs and ACCs in italics are situated outside the Asia/Pacific Region

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6-3B-2 **ASIA/PAC FASID - MET**

VOLCANIC ASH ADVISORY CENTRE	ICAO LOCATION INDICATOR	AREA OF RESPONSIBILITY	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT		ACC TO WHICH ADVISORY INFORMATION IS TO BE SENT	
			Name	ICAO LOCATION INDICATOR	Name	ICAO LOCATION INDICATOR
1	2	3	4	5	6	7
Anchorage (United States)	PAWU	Anchorage Oceanic Anchorage Continental Anchorage Arctic and west to E150, north of N60	Anchorage	PAWU	Anchorage	PAZA
Darwin (Australia)	YDRM (ADRM)	Southward from N10 and from E100 to E160 and the Perth FIR between E100 and E75, Colombo FIR and those parts of the Kuala Lumpur, Bangkok, Chennai, Yangon and Kolkata FIRs lying within N10 E100 to N20 E100 to N20 E82 to N10 E82 to N6 E78 to S2 E78 to E6 E75	Adelaide Bangkok Brisbane Chennai Darwin Gia Lam Guam Hobart Honiara Jakarta Kota Kinabalu Kuala Lumpur Manila Melbourne Perth Port Moresby Singapore Sydney Townsville Ujung Pandang Yangon	YPRM VTBD YBRF VOMM YDRM VVGL PGUM YMHF AGGH WIII WBKK WMKK RPLL YMRF YPRF AYPY WSSS YSRF YBTL WAAA VYYY	Adelaide Bangkok Brisbane Cairns Chennai Darwin Hanoi Ho-Chi-Minh Hobart Honiara Jakarta Kota Kinabalu Kuala Lumpur Manila Melbourne Perth Port Moresby Singapore Sydney Townsville Ujung Pandang Yangon	YPAD VTBB YBBN YBCS VOMF YPDN VVNB VVTS AGGH WIIF WBFC WMFC RPHI YMMM YPPH AYPM WSJC YSSY YBTL WAAF VYYY
Tokyo (Japan)	RJTD	N60 to N10 – and from E90 to Oakland	Bangkok *Blagoveschensk*	VTBD *UHBB*	Bangkok *Blagoveschensk*	VTBB *UHBB*

ASIA/PAC FASID – MET **6-3-B-3**

VOLCANIC ASH ADVISORY CENTRE	ICAO LOCATION INDICATOR	AREA OF RESPONSIBILITY	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT		ACC TO WHICH ADVISORY INFORMATION IS TO BE SENT	
			Name	ICAO LOCATION INDICATOR	Name	ICAO LOCATION INDICATOR
1	2	3	4	5	6	7
		Oceanic and Anchorage Oceanic and Continental FIR boundaries	Beijing	ZBAA	Beijing Huhhot Taiyuan	ZBPE ZBHH ZBYN
			Bratsk	*UIBB*	*Bratsk*	*UIBB*
			Chita	*UIAA*	*Chita*	*UIAA*
			Gia Lam	VGLL	Hanoi Ho-Chi-Minh	VVNB VVTS
			Guandzhou	ZGGG	Guandzhou Changsha Guilin Nanning Sanya	ZGZU ZGCS ZGKL ZGNN ZJSA
			Hong Kong	VHHH	Hong Kong	VHHH
			Incheon	RKSI		RKRR
			Irkutsk	*UIII*	*Irkutsk*	*UIII*
			Khabarovsk	*UHHH*	*Khabarovsk*	*UHHH*
			Kirensk	*UIKK*	*Kirensk*	*UIKK*
			Kunming	ZPPP	Kunming Chengdu Chongqing	ZPKM ZUDS ZUCK
			Lanzhou	ZLLL	Lanzhou Xi'an	ZLAN ZLSN
			Magadan	*UHMM*	*Magadan*	*UHMM*
			Magdagachi	*UHBI*	*Magdagachi*	*UHBI*
			Manila	RPLL	Manila	RPHI
			Nik.-na-Amure	*UHNN*	*Nik.-na-Amure*	*UHNN*
			Okha	*UHSH*	*Okha*	*UHSH*
			Okhotsk	*UHOO*	*Okhotsk*	*UHOO*
			Pet.-Kamchatsky	*UHPP*	*Pet.-Kamchatsky*	*UHPP*
			Phnom-Penh	VDPP	Phnom-Penh	VDPP
			Pyongyang	ZKPY	Pyongyang	ZKKK
			Shanghai	ZSSS	Shanghai Hefei Jinan Nanchang Nanjing Xiamen Qingdao	ZSHA ZSOF ZSTN ZSCN ZSNJ ZSAM ZSQD
			Shenyang	ZYTX	Shenyang Dalian Harbin	ZYSH ZYTL ZYHB

6-3B-4 **ASIA/PAC FASID - MET**

VOLCANIC ASH ADVISORY CENTRE	ICAO LOCATION INDICATOR	AREA OF RESPONSIBILITY	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT		ACC TO WHICH ADVISORY INFORMATION IS TO BE SENT	
			Name	ICAO LOCATION INDICATOR	Name	ICAO LOCATION INDICATOR
1	2	3	4	5	6	7
			Taibei	RCTP	Taibei	RCTP
			Tokyo	RJAA	Tokyo Naha Fukuoka Osaka	RJTI ROAH RJDG RJOO
			Ulan-Bator	ZMUB	Ulan-Bator	ZMUB
			Urumqi	ZWWW	Urumqi	ZWWW
			Vientiane	VLVT	Vientiane	VLVT
			Vladivostok	*UHWW*	*Vladivostok*	*UHWW*
			Wuhan	ZHHH	Wuhan	ZHWH
			Yuzhnosakhalinsk	*UHSS*	*Yuzhnosakhalinsk*	*UHSS*
Washington (United States)	KNES	Oakland Oceanic FIR				
			Guam	PGUM	Oakland	KZOA
			Honolulu	PHFO	Honolulu	PHZH
			Kansas City	KMKC	Kansas City	KZKC
Wellington (New Zealand)	NZKL	Southward from the Equator and from E160 to W140*				
			Brisbane	YBRF	Brisbane	YBBN
			Honolulu	PHFO	Honolulu	PHZH
			Honiara	AGGH	Honiara	AGGH
			Melbourne	YMRF	Melbourne	YMMM
			Nadi	NFFN	Nadi	NFFF
			Nauru	ANAU	Nauru	ANAU
			Sydney	YSRF	Sydney	YSSY
			Tahiti	NTAA	Tahiti	NTTT
			Wellington	NZKL	Auckland Christchurch	NZZO NZZC

*Note. – Coverage south of 60°S latitude is currently not feasible.

ASIA/PAC FASID **6-3C-1**

FASID TABLE MET 3C

SELECTED STATE VOLCANO OBSERVATORIES

EXPLANATION OF THE TABLE

Column	
1	Provider State of the volcano observatory.
2	Name of the volcano observatory.
3	Location of the VAAC to which the information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.
4	MWO to which the information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.
5	ICAO location indicator assigned to the MWO in Column 4.
6	ACC to which information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.
7	ICAO location indicator assigned to the ACC in Column 6.

ASIA/PAC FASID **6-3C-2**

Provider State of volcano observatory	Volcano observatory	VAAC to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent	MWO to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent		ACC to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent	
			Name	ICAO Loc. Ind.	Name	ICAO Loc. Ind.
1	2	3	4	5	6	7
Japan	Sapporo Volcano Observation and Information Centre Japan Meteorological Agency	Tokyo	Tokyo	RJAA	Tokyo Naha Fukuoka Osaka	RJTI ROAH RJDG RJOO
	Sendai Volcano Observation and Information Centre Japan Meteorological Agency	Tokyo	Tokyo	RJAA	Tokyo Naha Fukuoka Osaka	RJTI ROAH RJDG RJOO
	Tokyo Volcano Observation and Information Centre Japan Meteorological Agency	Tokyo	Tokyo	RJAA	Tokyo Naha Fukuoka Osaka	RJTI ROAH RJDG RJOO
	Fukuoka Volcano Observation and Information Centre Japan Meteorological Agency	Tokyo	Tokyo	RJAA	Tokyo Naha Fukuoka Osaka	RJTI ROAH RJDG RJOO
China	Heilongjiang Wudalianchi Volcano Observatory	Tokyo				
	Jilin Changbai Mountain Tianchi Volcano Observatory	Tokyo				
Philippines	Mayon Volcano Observatory	Tokyo Darwin	Manila	RPLL	Manila	RPHI
Papua New Guinea	Rabaul*	Darwin	Port Moresby	AYPY	Port Moresby	AYPM
Indonesia	Directorate of Volcanology and Geological Hazard Mitigation (DVGHM)	Darwin	Jakarta Ujung Pandang	WIII WAAA	Jakarta Ujung Pandang	WIIF WAAF
India	TBD	Darwin				
New Zealand	Wairakei Research Centre Institute of Geological and Nuclear Sciencies	Wellington				

ASIA/PAC FASID **6-3C-1**

Provider State of volcano observatory	Volcano observatory	VAAC to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent	MWO to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent		ACC to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent	
			Name	ICAO Loc. Ind.	Name	ICAO Loc. Ind.
1	2	3	4	5	6	7
Russian Federation	*KVERT***	*Tokyo Anchorage*				

* Required by the VAAC, but not confirmed by the Provider State

** To be coordinated with ICAO Office, Paris

ASIA/PAC FASID – MET **6-1B-1**

TABLE MET 1B – METEOROLOGICAL WATCH OFFICES

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
AUSTRALIA				MWOs have areas of responsibility (AOR) defined by specific forecast area boundaries. These boundaries are not aligned with FIR boundaries
ADELAIDE/Adelaide	YPRM	Melbourne FIR limited by the coordinates: 27S/128E;27S/135E;26S/138E; 2806S/14012E;29S/142E; 3414S/14205E;3345S/14045E; 40S/14045E;45S/14045E; 45S/129E;33S/129E;30S/129E; 2715S/12830E.	YMMM	
BRISBANE/Brisbane	YBRF	Brisbane FIR outside the AOR of YBTL MWO and limited by the coordinates: 0937S/14102E;0916S/14203E; 0913S/14206E;0911S/14214E; 0914S/14217E;0922S/14230E; 0922S/14230E;0923S/14236E; 0919S/14248E;0908S/14352E; 0924S/14414E;0957S/14405E; 1130S/14402E;1144S/14404E; 12S/144E;12S/155E;14S/155E; 14S/16115E;1740S/163E; 2830S/163E;2830S/155E; 2850S/15316E;29S/150E; 29S/14330E;26S/138E; 14S/138E;0937S/14102E.	YBBB	
		Melbourne FIR limited by the coordinates: 26S/138E;29S/143E;29S/142E; 2806S/14012E;26S/138E.	YMMM	
DARWIN/Darwin	YDRM	Brisbane FIR limited by the coordinates: 1055S/12447E;0920S/12650E; 07S/135E;0950S/13940E; 0950S/141E;14S/138E; 18S/138E;2215S/138E; 26S/138E;2218S/13638E; 2128S/13609E;2111S/13134E; 2151S/13058E;2313S/12828E; 2322S/12629E;2327S/12415E; 2250S/12330E;2030S/12330E; 20S/129E;16S/12915E; 1528S/12806E;1450S/12825E; 14S/12730E;1345S/12609E; 14S/124E;1055S/12447E.	YBBB	
		Melbourne FIR limited by the coordinates: 2250S/12330E;2327S/12415E; 2322S/12629E;2313S/12828E; 2151S/13058E;2111S/13134E; 2128S/13609E;2218S/13638E; 26S/138E;27S/135E;	YMMM	

6-1B-2 **ASIA/PAC FASID – MET**

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
		2715S/12830E;25S/12815E; 25S/12330E;2250S/12330E.		
HOBART/Hobart	YMHF	Melbourne FIR limited by the coordinates: 40S/14045E;40S/143E; 3953S/14353E;4006S/14759E; 40S/150E;45S/150E; 45S/14045E;40S/14045E.	YMMM	
MELBOURNE/Melbourne	YMRF	Brisbane FIR limited by the coordinates: 3730S/15033E;3730S/163E; 45S/163E;45S/150E; 4434S/150E;4351S/15040E; 43S/151E;3811S/15019E; 3730S/15033E.	YBBB	
		Melbourne FIR limited by the coordinates: 3345S/14045E;3414S/14205E; 3510S/14728E;3730S/150E; 3730S/15033E;3811S/15019E; 43S/151E;4351S/15040E; 4434S/150E;40S/150E; 4006S/14759E;3953S/14353E; 40S/143E;40S/14045E; 3811S/14045E;3345S/14045E.	YMMM	
PERTH/Perth	YPRF	Brisbane FIR limited by the coordinates: 12S/110E;12S/12320E; 1055S/12447E;14S/124E; 1345S/12609E;14S/12730E; 1450S/12825E;1528S/12806E; 16S/12915E;20S/129E; 2030S/12330E;2250S/12330E; 2153S/12226E; Thence along the major arc of a circle of 15 NM radius centred on 2143S 12213E; 2133S/12201E;2026S/12045E; Thence along the minor arc of a circle of 120NM radius centred on 2023S 11837E; 1823S/11825E;1753S/11822E; Thence along the minor arc of a circle of 150NM radius centred on 2023S 11837E; 1934S/11606E;1931S/11331E; 12S/110E.	YBBB	
		Melbourne FIR limited by the coordinates: 06S/75E;02S/78E;02S/92E;12S/107E;12S/110E;1931S/11331E;1934S/11606E; thence along the minor arc of a circle of 120NM radius centred on 2023S 11837E; 1753S/11822E;1823S/11825E; thence along the minor arc of a circle of 120NM radius centred on 2023S	YMMM	

ASIA/PAC FASID – MET **6-1B-3**

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
		11837E; 2026S/12045E;2133S/12201E; thence along major arc of a circle of 15.0NM radius centred on 2143S 12213E; 2153S/12225E;2250S/12330E; 25S/12330E;25S/12815E; 2715S/12830E;30S/129E; 30S/129E;33S/129E;45S/129E; 45S/75E;06S/75E.		
SYDNEY/Sydney	YSRF	Brisbane FIR limited by the coordinates: 29S/14632E;29S/150E; 2850S/15328E;2830S/155E; 2830S/163E;3730S/163E; 3730S/15033E 3657S/15045E; then east of the minor arc of a circle of 120NM radius centred on 3457S/15032E; 3519S/15256E;3421S/15140E; 3359S/15201E;3351S/15154E; 3328S/15148E;3315S/15126E; 3312S/15114E;3320S/15042E; 3327S/15033E;3206S	YBBB	
		Melbourne FIR limited by the coordinates: 29S/142E;29S/14330E; 29S/14632E;3206S/14850E; 3327S/15033E;3320S/15042E; 3312S/15114E;3315S/15126E; 3328S/15148E;3351S/15154E; 3359S/15201E;3421S/15140E; 3519S/15256E; then east of the minor arc of a circle of 120NM radius centred on 3457S 15032E; 3657S/15045E;3730S/15033E; 3730S/150;3510S/14728E; 3414S/14205E;29S/142E.	YMMM	
TOWNSVILLE	YBTL	Brisbane FIR limited by the coordinates: 14S/138E;10S/141E;09S/142E; 09S/144E;13S/145E;15S/147E; 1817S/148E;2309S/15252E; 2334S/14811E;1818S/14332E; 18S/138E;14S/138E.	YBBB	
BANGLADESH				
DHAKA/Zia Intl	VGZR	Dhaka FIR and SRR	VGFR	
CAMBODIA				
PHNOM-PENH/Pochentong	VDPP	Phnom-Penh FIR and SRR	VDPP	
CHINA				
BEIJING/Capital	ZBAA	Beijing FIR and SRR	ZBPE	

6-1B-4 **ASIA/PAC FASID – MET**

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
GUANGZHOU/Baiyun	ZGGG	Guangzhou FIR and SRR	ZGZU	
KUNMING/Wujiaba	ZPPP	Kunming FIR and SRR	ZPKM	
LANZHOU/Chongchuan	ZLLL	Lanzhou FIR and SRR	ZLHW	
SHANGHAI/Hongqiao	ZSSS	Shanghai FIR and SRR	ZSHA	
SHENYANG/Taoxian	ZYTX	Shenyang FIR and SRR	ZYSH	
TAIBEI/Taibei Intl	RCTP	Taibei FIR and SRR	RCTP	
URUMQI/Diwopu	ZWWW	Urumqi FIR and SRR	ZWUQ	
WUHAN/Tianhe	ZHHH	Wuhan FIR and SRR	ZHWH	
HONG KONG/Hong Kong Intl	VHHH	Hong Kong FIR and SRR	VHHK	
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA				
PYONGYANG/Sunan	ZKPY	Pyongyang FIR and SRR	ZKKK	
FIJI				
NADI/Nadi Intl	NFFN	Nadi FIR and SRR	NFFF	
FRENCH POLYNESIA				
TAHITI/Faaa	NTAA	Tahiti FIR and SRR	NTTT	
INDIA				
KOLKATA/Kolkata	VECC	Calcutta FIR and SRR	VECF	
CHENNAI/Chennai	VOMM	Chennai FIR and SRR	VOMF	
DELHI/Indira Ghandi Intl	VIDP	Delhi FIR and SRR	VIDF	
MUMBAI/Jawaharlal Nehru Intl	VABB	Mumbai FIR and SRR	VABF	
INDONESIA				
BIAK/Frans Kaisieppo	WABB	Biak FIR and SRR	WABZ	
DENPASAR/Ngurah Rai (Bali Intl)	WRRR	Bali FIR and SRR	WRRZ	
JAKARTA/Soekarno-Hatta Intl	WIII	Jakarta FIR/UIR and SRR	WIIZ WIIF	
UJUNG PANDANG/Hasanuddin	WAAA	Ujung Pandang FIR/UIR and SRR	WAAZ WAAF	
JAPAN				
NAHA/Naha	ROAH	Naha FIR	RORG	

ASIA/PAC FASID – MET **6-1B-5**

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
TOKYO/New Tokyo Intl	RJAA	Tokyo FIR/SRR	RJTG	
LAO PEOPLE'S DEMOCRATIC REPUBLIC				
VIENTIANE/Wattay	VLVT	Vientiane FIR and SRR	VLVT	
MALAYSIA				
KOTA KINABALU/Kota Kinabalu Intl	WBKK	Kota Kinabalu FIR and SRR	WBFC	
KUALA LUMPUR/Kuala Lumpur Intl	WMKK	Kuala Lumpur FIR and SRR	WMFC	
MALDIVES				
MALE/Hulule	VRMM	Male FIR and SRR	VRMM	
MONGOLIA				
ULAN BATOR/Ulan Bator	ZMUB	Ulan Bator FIR and SRR	ZMUB	
MYANMAR				
YANGON/Yangon Intl	VYYY	Yangon FIR and SRR	VYYY	
NAURU				
NAURU I./Nauru	ANAU	Nauru FIR and SRR	ANAU	
NEPAL				
KATHMANDU/Tribhuvan Intl	VNKT	Kathmandu FIR and SRR	VNSM	
NEW ZEALAND				
NEW ZEALAND/Wellington ~~Intl~~ Kelburn	NZKL	Auckland Oceanic FIR and SRR	NZZO	Operational monitoring coverage south of 60˚S is limited due to the lack of information
		New Zealand FIR AND SRR	NZZC	
NORTHERN MARIANA ISLANDS (United States)				
SAIPAN I. (OBYAN)/Saipan I.(Obyan) Intl	PGSN	Guam SRR		
PAKISTAN				

6-1B-6 **ASIA/PAC FASID – MET**

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
KARACHI/Quaid-E-Azam Intl	OPKC	Karachi FIR and SRR	OPKR	
LAHORE/Lahore	OPLA	Lahore FIR and SRR	OPLR	
PAPUA NEW GUINEA				
PORT MORESBY/Jacksons	AYPY	Port Moresby FIR and SRR	AYPY	
PHILIPPINES				
MANILA/Ninoy Aquino Intl	~~RPMM~~ RPLL	Manila FIR and SRR	~~RPMM~~ RPHI	
REPUBLIC OF KOREA				
INCHEON/Incheon Intl	RKSI	~~Daegu FIR and SRR~~ Incheon FIR and SRR	RKRR	
SINGAPORE				
SINGAPORE/Singapore Changi	WSSS	Singapore FIR and SRR	WSJC	
SOLOMON ISLANDS				
HONIARA/Henderson	AGGH	Honiara FIR and SRR	AGGG	
SRI LANKA				
COLOMBO/Katunayake	VCBI	Colombo FIR and SRR	VCBI	
THAILAND				
BANGKOK/Bangkok Intl	VTBD	Bangkok FIR and SRR	VTBB	
UNITED STATES				
ANCHORAGE/Anchorage Intl	PAWU	Anchorage ~~Oceanic~~ FIR; ~~portion of Anchorage Continental FIR South of a line between approximately 62N 141W and approximately 6230N 175W and West of a line between approximately 59N 13730W and approximately 5530N 145W; Juneau SRR.~~	PAZA	
~~FAIRBANKS/Fairbanks Intl~~	~~PAFA~~	~~Anchorage Arctic FIR; portion of Anchorage Continental FIR North of a line between approximately 62N 141W and approximately 6530N 175W; Honolulu SRR.~~	~~PZAN~~	
HONOLULU/Honolulu Intl	PHFO	Oakland Oceanic FIR South of 30N, East of 160E and West of 140W; Honolulu SRR.	KZOA	
~~(JUNEAU, Alaska)~~	~~PAJN~~	~~Portion of Anchorage Continental FIR East of a line between approximately 59N 13730W and approximately 5530N~~	~~PZAN~~	

ASIA/PAC FASID – MET **6-1B-7**

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
		~~145W.~~		
(KANSAS CITY/Missouri) (National Aviation Weather Advisory Unit)	KMKC	Oakland Oceanic FIR North of 30N.	KZOA	
VIET NAM Gialam MWO	VVGL	Hanoi FIR and SRR Ho-Chi-Minh FIR and SRR	VVNB VVTS	

Proposed Changes to
Table A 6-2. Template for aerodrome warnings

Proposed changes are highlighted in bold

……

Element	*Detailed content*	*Template*	*Example*
Phenomenon (M)[2]	Description of phenomenon causing the issuance of the aerodrome warning	TC[3] nnnnnnnnn or [HVY] TS or GR or [HVY] SN [nnCM][3] or [HVY] FZRA or [HVY] FZDZ or RIME[4] or [HVY] SS or [HVY] DS or SA or DU or SFC **WIND n[n]** [7] nn[n]KMH MAX nn[n] (SFC **WIND n[n]** [7] nn[n]KT MAX nn[n]) or SQ or FROST or VA or *Free text up to 32 characters*[5]	TC ANDREW HVY SN 25CM SFC **WIND NE** 80KMH MAX 120 VA

…….

Notes.—

1. Fictitious location.
2. One phenomenon or a combination thereof, in accordance with 5.1.2.
3. In accordance with 5.1.2.
4. Hoar frost or rime in accordance with 5.1.2.
5. In accordance with 5.1.3.
6. End of the message (as the aerodrome warning is being cancelled).
7. **Prevailing wind direction in eight-point compass.**

Regional Seminar on MET/ATM Coordination
February, 2006, ICAO Regional Office, Bangkok

Provisional Agenda

Agenda Item 1: Organisation of Air Traffic Management and Meteorological services by the States:

1) Authorities and Providers
2) Current and proposed organisational frameworks and consultative mechanisms

Agenda Item 2: ICAO Annexes and guidance materials relating to MET and ATM coordination arrangements

1) Annex 3 SARPs relating to ATM
2) Annex 11 SARPs and PANS-ATM (Doc 4444) relating to MET
3) Doc 9377 (Manual on Coordination between ATS, AIS and Aeronautical MET services)

Agenda Item 3: Meteorological Impacts on ATM:

1) En-route – Large-scale Weather Deviations, Volcanic Ash etc
2) Terminal Area
   MET information for Air Traffic Flow Management

Agenda Item 4: Use of MET by ATM:

1) Current practices
2) Limitations of MET information (uncertainty) and the resources required to provide a particular level of service

Agenda Item 5: Future requirements – MET component of the CNS/ATM systems:

1) ATM developments requiring additional MET information
2) Tailored products
3) Products under development

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. 1-29 HAVE BEEN COMPLETED AND REMOVED FROM THE LIST

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
30	RAN/3 C.11/10 (TOR 1)	Subject: Ensure effective transition to satellite communications. Task: Planning for the implementation of satellite communications.	B	In planning for the implementation of CNS/ATM take into account: 1) Requirements for an effective transition, 2) Time frame for implementing changes, 3) HF requirements after implementation of satellite communications, 4) Human factors (staffing, retraining).	CNS/MET SG	On-going
					~~SG~~	Note: Superseded by Task No. 43
32	RAN/3 C.8/14 APANPIRG/ 14 (TOR 3)	Subject: Inadequate implementation of procedures for advising aircraft on volcanic ash and tropical cyclones Task: Monitoring of the implementation of international airways volcano watch (IAVW) and tropical cyclone advisories and SIGMETs	A	Monitor and provide assistance in the implementation of volcanic ash and tropical cyclone advisories and SIGMETs procedures to ensure provision of timely information on volcanic ash and tropical cyclones to aircraft.	CNS/MET SG Task Force on the implementation of Volcanic Ash and Tropical Cyclone advisories and SIGMETs (VA/TC/I TF)	On going

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
						Note: Routine task for CNS/MET SG
35	(TOR 3)	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 the evaluation and training of new CNS/ATM systems c) progress the adoption of WGS-84 co-ordinate system and introduction of high integrity systems for the management of the co-ordinate data	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 3) Co-ordinate with States and monitor progress 4) Collect information and suggest methods of resolving problems commonly faced by States	 CNS/MET SG CNS/ATM IC SG	On-going On-going On-going On-going

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
36	APANPIRG D. 4/46 RAN/3 C.12/3 APANPIRG 5/3 (TOR 3)	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
37	C 12/24	Subject : Transition to the GRIB and BUFR coded WAFS products Task : Implementation of the transition to the GRIB and BUFR coded WAFS products	A	1) Development of guidelines for the use of BUFR and GRIB codes for the production of WAFS products. 2) Planning and coordinating the transfer of SIGWX and WIND/TEMP charts from the current T4 facsimile format to BUFR and GRIB format. 3) Development of a regional training programme for the operational use of BUFR and GRIB. 4) Participate in the development and implementation of an adequate WAFS back-up system for dissemination of WAFS products in the ASIA/PAC Region.	CNS/MET SG WAFS Implementation Task Force (WAFS/I TF)	Completed GRIB: Completed 1 July 2005 BUFR: Nov 2006
38	C12/36 APANPIRG C14/45	Subject : Lack of ATM requirements for MET components of the ASIA/PAC CNS/ATM Plan. Task : Developing the MET Chapter for the ASIA/PAC CNS/ATM Plan.	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	CNS/MET SG with assistance of MET WG on CNS/ATM Plan CNS/MET SG METATM TF	Completed Completed 2006

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
39	APANPIRG /13 D 13/28	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)	Completed Completed on-going on-going on-going
40	APANPIRG /13 C 13/32	Subject: Quality Management of the meteorological service for the international air navigation Task: Foster the development and implementation of quality management systems by the States' MET authorities/providers in the ASIA/PAC Region	B	1) Review the status of implementation of the quality management system in the region 2) Assist in the organization of regional seminars/workshops to foster exchange of information between the States on the matters of quality management systems Note: ASIA/PAC Seminar on QMS for MET services to be held in November 2005.	CNS/MET SG	On-going Nov 2005
41		Subject: Regional Strategy for air-ground data communication Task: Develop regional strategy for the implementation of air-ground communication data link	B	Development of AMS data link	CNS/MET SG	~~2005~~ Completed

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
42		Subject: Radio Spectrum Tasks: Facilitate State preparation for WRC-2007	A	Update the list of focal point of contact person Prepare for presentation of ICAO position at third APT meeting Inform State aviation contact persons of APT and ITU meeting schedule to assist in representatives participating in State delegation.	CNS/MET SG	2006
43		Subject: Implementation of data link Task: Encourage implementation	A	Encourage States to implement CPDLC, D-ATIS, D-VOLMET, PDC and DPC	CNS/MET SG	2008
44		Subject: FASID Task: Updating of Table CNS-2	A	Seek State revisions of Table CNS-2 prior to May 2006. Review and update Table CNS-2 with the assistance of the Secretariat	CNS/MET SG	2006
45	APANPIRG List of deficiencies	Subject: Implementation of SIGMET Task: Improve regional procedures and availability of SIGMET from ASIA/PAC States	A	1) Assist States in implementing SIGMET requirements 2) Conduct regular SIGMET tests 3) Produce training and guidance material 4) Regular monitoring on the availability and quality of SIGMET and advisories	CNS/MET SG VA/TC/I TF	2007

AGENDA ITEM 2.3: ATS CO-ORDINATION GROUPS' ACTIVITIES

2.3 ATS Coordination Groups' Activities

Review ATS Coordination Groups Activities

2.3.1 The meeting was updated on the activities since APANPIRG/15 (August 2004) of the ICAO and State ATS Coordination Groups that contribute to the work of APANPIRG. The following Sub-Regional ATS Coordination Groups were currently active in the Asia/Pacific Region:

ICAO ATS Coordination Groups

- Bay of Bengal ATS Coordination Group (BBACG)
- FANS Implementation Team for the Bay of Bengal (FIT-BOB)
- South-East Asia ATS Coordination Group (SEACG)
- FANS Implementation Team for South-East Asia (FIT-SEA)
- China, Mongolia, Russian Federation, and IATA ATS Coordination Group (CMRI)

State ATS Coordination Groups

- Informal South Pacific ATS Coordinating Group (ISPACG)
- Informal Pacific ATS Coordinating Group (IPACG)
- Informal Indian Ocean ATS Coordination Group (IIOACG)
- Russian-American Coordinating Group for Air Traffic Control (RACGAT)

2.3.2 Meetings of CMRI and RACGAT were not convened during the period under discussion.

ICAO ATS Coordination Groups

Fourth Meeting of the FANS Implementation Team – Bay of Bengal (FIT-BOB/4)

2.3.3 The FIT-BOB/4 meeting was held in September 2004. The meeting noted that BBACG/14 (February 2004) had recognized that the establishment of a Central Reporting Agency (CRA) was critical to enabling States to implement operational ADS and CPDLC systems. FIT-BOB/4 noted that Boeing had indicated to BBACG/13 (September 2003) that they would be willing to provide the CRA services for FIT-BOB to support the ADS/CPDLC operational trial. Boeing indicated that the CRA should be able to commence work related to the Bay of Bengal operational trial from October 2004, subject to suitable financial and contractual arrangements.

2.3.4 FIT-BOB/4 noted that in considering implementation of data link systems, APANPIRG/15 (August 2004) agreed under Conclusion 15/7 that States should take all relevant ICAO provisions on data link into account when establishing their operating requirements and procedures and that the *FANS 1/A Operations Manual* (FOM) provided the necessary procedures for ATS providers and should be used as a basis to operate ADS and CPDLC with aircraft equipped with the FANS-1/A systems.

2.3.5 India updated FIT-BOB/4 with regard to problems experienced in the Chennai and Kolkata FIRs during the ADS/CPDLC operational trial, which commenced on 19 February 2004. FIT-BOB/4 encouraged States to commence planning towards the implementation of ADS/CPDLC operations throughout the entire Indian Ocean. This would necessarily involve coordination with Australia, island States in the Indian Ocean and East African States, in addition to the member States of the BBACG.

2.3.6 FIT-BOB/4 was invited to consider a proposal under which an annual meeting of a "Whole of Indian Ocean ATS Coordination Group" would be conducted subsequent to meetings of three main subsidiary groups – an Arabian Sea Group, a Bay of Bengal Group and a southern Indian Ocean Group. The FIT-BOB/4 would provide feedback to the next BBACG meeting in this regard.

2.3.7 FIT-BOB/4 noted that RASMAG was developing draft *Guidance Material for End-to-End Safety and Performance Monitoring of ATS Data Link Systems in the Asia/Pacific Region*. It was intended that this guidance material would help promote a standardized approach for monitoring the performance of ATS data link systems within the Region.

Fifteenth Meeting of the Bay of Bengal ATS Coordination Group (BBACG/15)

2.3.8 The BBACG/15 meeting was held in September 2004 following the FIT-BOB/4 meeting. The primary objectives of the BBACG/15 meeting were to progress implementation of data link services and development of a cohesive air traffic flow management plan for the Bay of Bengal area.

2.3.9 BBACG/15 considered the benefits of using automated flow management systems that would allow airlines to collaborate and manage the slots over Afghanistan, particularly during the westbound night time traffic peak. BBACG/15 agreed that there were two distinct problems to be dealt with – a regional ATFM Plan and the ATC coordination arrangements.

2.3.10 BBACG/15 was also updated in regard to Myanmar's long standing air-ground communications difficulties. Myanmar had recognized that further action should be taken on a complete systems basis to correct the communications difficulties and was taking actions to replace and update ground equipment installations, including VHF, HF, and VSAT links to RCAG sites.

Special Coordination Meeting – Bay of Bengal Air Traffic Flow Management (SCM BOB ATFM)

2.3.11 SCM BOB ATFM was convened in conjunction with BBACG/16 (February 2005) in follow-up to the recommendation of RVSM/TF/24 (Bay of Bengal one-year review, November 2004) to progress the establishment of an ATFM plan and implementation of ATFM automated systems for the Bay of Bengal traffic flows. This matter was considered a high priority by users and ATS providers, and was to be progressed in a timely manner.

2.3.12 SCM BOB ATFM, on reviewing the issues, agreed that a dedicated Task Force should be established under the BBACG to progress the matter. Accordingly, the SCM BOB ATFM prepared the following Terms of Reference of the "ATFM Task Force for the Bay of Bengal and South Asia" (ATFM/TF):

Objectives:

The objectives of the Task Force are to:

1. To enhance and facilitate the orderly and efficient flow of Air Traffic across the Bay of Bengal and South Asia;

2. To minimize ground and en route delays;

3. To maximize capacity and optimize the flow of air traffic within the area;

4. To plan for and manage future ATS workload in the light of forecast increased traffic flow within the area; and

5. To assess the economic and environmental impact of the implementation of the ATFM system.

Implementation Programme

To meet these objectives the ATFM/TF shall adopt a phased implementation programme as per the following:

Phase One: Flights planning to transit the Kabul FIR

Phase Two: Other international flights crossing the Bay of Bengal and/or South and South East Asia areas

Phase Three: Future planning for increased traffic within the Bay of Bengal and South and South East Asia areas

(Note: For the purposes of the ATFM/TF, South Asia includes India, Nepal, Pakistan and Sri Lanka).

The Air Traffic Flow Management Task Force (ATFM/TF)

2.3.13 Since the SCM BOB ATFM established the ATFM/TF in February 2005, the ATFM/TF had conducted an informal 'mini' meeting in Singapore (March 2005) and two formal meetings, ATFM/TF/1 (Bangkok, April 2005) and ATFM/TF/2 (Delhi, June/July 2005), whilst ATFM/TF/3 has been scheduled for 6-9 September, 2005.

2.3.14 ATFM/TF/2 had considered available options for the conduct of an ATFM Operational Trial across the Bay of Bengal and South Asia. In this regard, the meeting noted Thailand's readiness to proceed to an operational trial and accordingly, ATFM/TF/2 requested Thailand to continue to develop the Bay of Bengal Cooperative Air Traffic Flow Management Advisory System (BOBCAT) to the stage of an operational trial in close cooperation with concerned States and IATA.

2.3.15 Also under consideration by ATFM/TF was the FAA Dynamic Ocean Track System Plus (DOTS+) automated system which had been in operational use in the United States for 10 years. The system was also being operated by Australia under a technical assistance agreement with the FAA in a primary role to generate flex tracks, however it was also capable of serving as an automated ATFM system tool, using the "Track Advisory" functionality that currently resides within the DOTS+ core system.

2.3.16 The meeting was informed that a special coordination meeting of ATFM/TF was held in Singapore on 10 – 11 August 2005 in order to progress the work towards the implementation of an operational trial of automated flow management systems in the Bay of Bengal. The meeting authorized the issue of an AIC notifying the commencement of an operational ATFM trial on 22 December 2005, which would utilize the Bay of Bengal Cooperative Air Traffic Flow Management Advisory System (BOBCAT) under development by Thailand.

Sixteenth Meeting of the Bay of Bengal ATS Coordination Group (BBACG/16)

2.3.17 The BBACG/16 meeting was held from 31 January - 4 February 2005, in conjunction with the SCM BOB ATFM. BBACG/16 reviewed its Work Plan and agreed that as the items related to ATS routes were being dealt with by the ARNR/TF, these would be removed from the Work Plan.

2.3.18 In light of the outcome of RASMAG/2 (October 2004), BBACG/16 considered the establishment of a Safety Monitoring Agency (SMA). BBACG/16 requested that the States concerned indicate to the Regional Office prior to the RASMAG/3 meeting (scheduled June 2005) their position on the establishment of the SMA. The interest expressed by both Thailand and CSSI (of the United States) in providing SMA services for the BBACG was timely and welcomed by the meeting.

2.3.19 States were requested to raise the matter of the funding of safety monitoring services within their administrations, stressing the safety issues involved and urgency to provide the safety management services for the airspaces concerned. The matter would be referred to the RASMAG/3 and States were requested to be prepared to resolve this issue at that meeting.

2.3.20 BBACG/16 also considered, among others, the following matters: Survey of State contingency plans, ICAO language proficiency requirements, the Informal Indian Ocean ATS Coordination Group, Civil and military coordination, Electronic Locator Transmitters (ELT); implementation of 30/30 NM lateral and longitudinal separation standards.

Combined Fifth Meeting of the FANS Implementation Team for the Bay of Bengal (FIT-BOB/5) and Second Meeting of the FANS Implementation Team for South-East Asia (FIT-SEA/2)

2.3.21 The FIT-BOB/5 and FIT-SEA/2 meetings (April 2005) were updated on the status of further development of the FANS 1/A Operations Manual (FOM) and the ICAO regional *Guidance Material on CNS/ATM Operations in the Asia/Pacific Region* and harmonizing these documents with ICAO provisions to provide global guidance material.

2.3.22 The two principal ATS providers for the non-radar airspace over the South China Sea area where ADS was needed were the Philippines and Viet Nam. IATA expressed concern that continued delay in upgrading air traffic services to introduce ADS and CPDLC in the South China Sea area had a major negative impact on flight operations. The States concerned were urged to review their implementations plans and do their utmost to accelerate implementation of data link services in accordance with the ICAO's regional CNS/ATM plan.

2.3.23 Japan informed FIT-SEA/2 that in follow-up to FIT-SEA/1 (May 2004), and the offer made by CRA Japan to undertake the role of CRA activity for the South China Sea area, CRA Japan confirmed that it would be willing to provide the CRA service and the States present gratefully accepted this offer. The provision of CRA services would be an extension of Japan's existing activities in the Tokyo FIR as aircraft were operating from the Tokyo FIR to the South-East Asia area.

2.3.24 FIT-BOB/5 was presented with a review of the background and work undertaken to date to put viable CRA funding arrangements in place to support an operational trial for implementation and operation of ADS and CPDLC in the Bay of Bengal area. The meeting was encouraged by the progress being made between IATA and Boeing to establish the BOB CRA on behalf of the States concerned.

2.3.25 FIT-SEA/2 was presented with a draft copy of *the Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region* for review and endorsement.

ADS/CPDLC Seminar

2.3.26 The ADS/CPDLC Seminar was arranged to coincide with the FIT-BOB/5 and FIT-SEA/2 meetings in response to discussions at the FIT-BOB/4 meeting in September 2004. FIT-BOB/4 in considering comments made by Boeing CRA concerning the complex technical nature of ADS/CPDLC, and operational problems so far identified by the ADS/CPDLC trial in the Bay of Bengal, considered that an ADS/CPDLC seminar would be an effective way to educate ATS providers and operators in the region about ADS/CPDLC operations. The seminar was designed to provide information from experienced operators and pilots, ATS providers and controllers, network system providers and technical background to the work undertaken by the CRA.

Special Coordination Meeting for the Funding of the Bay of Bengal Central Reporting Agency (SCM BOB CRA)

2.3.27 The SCM BOB CRA was convened in June 2005 to address a very specific task, that of the funding of the CRA for the Bay of Bengal. The SCM noted the background in progressing arrangements to establish the CRA for the Bay of Bengal, using IATA as a joint collections agency. These arrangements had been reviewed by previous meetings involved and updated at FIT-BOB/4 and BBACG/15. Subsequently, the status of the CRA was again reviewed during the Combined Meetings of the FIT-BOB/5 and FIT-SEA/2.

2.3.28 Although the initial contract between IATA and Boeing to establish the CRA would be for 18 months, SCM BOB CRA was advised that it would be possible to extend the arrangement on an annual or triennial basis thereafter, should this interim approach to funding the CRA prove successful for the parties concerned. IATA reported that to bring the CRA into operation, it would be necessary for IATA to also enter into formal arrangements with the States concerned to ensure provision of the necessary data and to enable IATA to collect charges from the users of the data link services.

2.3.29 SCM BOB CRA considered a draft legal agreement between IATA and relevant States, which comprised the legal arrangements necessary to enable and facilitate the collection by IATA of a specific “CRA Charge” from operators for the purposes of funding CRA services in the Bay of Bengal area. The draft legal agreement was thoroughly reviewed and updated by SCM BOB CRA, addressing many of the concerns raised at this and previous meetings. The meeting anticipated that the legal agreements would be finalized imminently, enabling Boeing to commence CRA services.

Twelfth Meeting of the South-East Asia ATS Coordination Group (SEACG/12)

2.3.30 The SEACG/12 meeting (May 2005) reviewed the post-implementation safety assessment for RVSM in the Western Pacific/South China Sea (WPAC/SCS) Area. It was noted that although the TLS had not been infringed, the RVSM/TF/18 meeting (July 2004) agreed that the States concerned in the Asia Region should review current ATC operations and put measures in place to reduce operational errors, including a review of FLOS arrangements.

2.3.31 SEACG/12 was updated on the progress made by the RVSM Task Force to address the application of the RVSM FLOS in the WPAC/SCS area. Delays in provision of data by some States led to the postponement of the proposed FLOS review meeting until February 2006. SEACG/12, noting the background to the present situation in regard to the lack of a post

implementation safety assessment for the South China Sea route structure, agreed that setting up of the SMA services was essential and this would be given priority. As RASMAG was the body with appropriate expertise, SEACG/12 requested RASMAG's assistance.

2.3.32 SEACG/12 also considered, among others, the following matters: Guidelines for the implementation of RNP operations; Special Implementation Project on ATS safety management; the First Air Traffic Flow Management Task Force Meeting; use of No-prior departure coordination (No-PDC) procedures; Amendment 4 to the PANS-ATM; Amendment 43 to Annex 11 which introduced a Standard that required States to establish a monitoring programme for aircraft height keeping performance in RVSM airspace; civil military coordination; and ICAO language proficiency requirements; Electronic Locator Transmitters (ELT).

State ATS Coordination Groups

Fourth Meeting of the Informal Indian Ocean ATS Coordination Group (IIOACG/4)

2.3.33 Australia updated the BBACG/16 meeting regarding the outcomes of the Fourth Meeting of the Informal Indian Ocean ATS Coordination Group (IIOACG/4), which was held at the Department of Civil Aviation ACC, Plaine Magnien, Mauritius on 8 - 10 December 2004.

2.3.34 In response to an informal request from the ICAO Asia/Pacific Regional Office, Airservices Australia had agreed to present the members of the IIOACG with a summary of the advantages that could be achieved if all Indian Ocean planning and implementation activities were combined under the one umbrella forum. The meeting agreed that the IIOACG could form the nucleus for a broader Indian Ocean ATS Coordination Group.

2.3.35 IIOACG/4 reviewed the current ATM management structures, systems status and future plans and noted the following:

a) Mauritius – establishment of the Thales Eurocat 2000X system; reclassification of Class G to Class A airspace between FL245 and FL460; implementation of RNP; and readiness for RVSM operations.

b) Australia – planning and implementation of Flex Tracks between Asia and Australasia; and the roll-out of the ADS-B program.

c) India - airspace and ATM structure; ADS/CPDLC systems implementation and operations; HF system upgrades (Mumbai) RVSM interface plans with Mauritius (subject to AFI regional implementation plans); associated changes to airspace classifications (extension of Class A in Mumbai FIR).

d) Maldives – implementation of new MSSR; new Control Tower and ADS/CPDLC capabilities for 2005 and beyond. Class A airspace now established in Male FIR between FL285 and FL460.

e) South Africa – Transitioned to new Thales Eurocat 2000X system in November 2004 - includes integrated ADS/CPDLC. AIDC messaging trials between South Africa and Australia to commence in early 2005.

f) ASECNA Comores – implementation of 10 Minute longitudinal separation standard and RVSM training and preparations to continue through 2005.

g) ASECNA Madagascar – installation of Eurocat system and ADS/CPDLC

system in operation. Introduction of 10 Minutes longitudinal standard and currently testing GNSS procedures. RVSM training completed and awaiting implementation.

h) Reunion – airspace classification – Improved ATS Coordination links between Reunion and Mauritius; Air Traffic Flow Management between Reunion and Mauritius; ADS-B initiatives.

Nineteenth Meeting of ISPACG (ISPACG/19)

2.3.36 The ISPACG/19 meeting (March 2005) was hosted by Airservices Australia in Brisbane Australia. The meeting was preceded by the twelfth meeting of the FANS Interoperability Team meeting (FIT/12). The outcomes and accomplishments of the meeting included the following:

a) review of the successful implementation of the 30 NM lateral and 30 NM longitudinal separation based on RNP 4 across the Brisbane Eastern Oceanic airspace, Auckland Oceanic, Nadi, and Nauru FIRs on 20 January 2005;

b) updating the table of CNS/ATM technologies and enhancements;

c) noted the finalization of a contingency plan between Port Moresby and Brisbane Centre;

d) agreement was reached on the regional implementation of lateral offset procedures. The Federal Aviation Administration (FAA) had implemented the procedures on 20 January 2005, and Australia, Fiji and New Zealand will implement on 17 March 2005; *[Note: Australia, Fiji and New Zealand subsequently implemented the lateral offset procedures on 17 March 2005].*

e) the issue of CRA funding was reopened and the ISPACG co-chairs agreed to jointly develop a plan for funding arrangements to take effect after 30 September 2005;

f) the co-chairs gave an undertaking to obtain and review the materials from the ICAO Flight Plan Study Group and develop a position to forward to ICAO;

g) regional draft guidance material for end-to-end performance monitoring of ATS datalink systems in the Asia/Pacific region was presented to the meeting for review and comment;

h) a draft Letter of Agreement was developed for the continuation of the ISPACG through 2008;

i) an ad-hoc working group reviewed total loss of communications, individual loss of communications, weather deviations and turn back procedures which resulted in an undertaking by the FAA to conduct a data analysis and provide a recommendation for revised turn back procedures; and

j) ISPACG endorsed NASA’s development of the ADS-B in-trail procedure.

Twenty Third Meeting of the Informal Pacific ATC Coordinating Group (IPACG/23)

2.3.37 The IPACG/23 meeting (July 2005) was hosted by the Japan Civil Aviation Bureau (JCAB) in Tokyo, Japan. The IPACG/23 was preceded by the 10th Meeting of the FANS Interoperability Team (FIT/10). The main issues addressed were as follows:

a) concluded that the hotline tests between the FAA Air Traffic Control System Command Center (ATCSCC) and JCAB Air Traffic Flow Management Center (ATFMC) had been successful and appropriate procedures were in place;

b) established procedures between Anchorage Air Route Traffic Control Center (ARTCC) and Tokyo ACC permitting the use of non-standard altitude for direction of flight on routes to enhance efficiency;

c) finalized dates and exchanged technical information for the transfer of the communications circuit between Tokyo and Naha ACCs, Anchorage and Oakland ARTCCs in preparation for JCAB Air Traffic Management Center (ATMC) to take over oceanic ATC responsibilities from Tokyo and Naha ACCs;

d) agreed with the conclusions of the North Pacific Airspace Cost Effective (NPACE) Study that a full migration of the aircraft population to meet RNP 4 approval requirements would have to occur by 2010 in order to mitigate increases in flight demand in the North Pacific;

e) agreed to continue inter-agency discussions in hopes of reaching a mutually acceptable agreement on the exchange of traffic data for air traffic flow management;

f) agreed to develop a plan to conduct a study to evaluate the effectiveness of the current airspace and route structures;

g) agreed to establish a task force to review the proposed course of action to adopt version 2 of the ATS Inter-facility Data Communications (AIDC) Interface Control Document; and

h) agreed to initiate steps to reduce dependence on high frequency (HF) communications.

IFATCA Eight and Ninth North East Air Traffic (NEAT) Meetings

2.3.38 IFATCA had initiated the NEAT meetings to consider operational air traffic matters in the Northeast Asia area. NEAT 8 (September 2004) and NEAT 9 (June 2005) were attended by the following ATC associations: HKATCA, ROCATCA, JFATC and PATCO. The NEAT 8 discussed the RVSM FLOS to be adopted by Japan and the Republic of Korea coincident with implementation of RVSM on 29 September 2005, and the impact of this on the modified single alternate FLOS currently used in the South China Sea RVSM airspace. There was further discussion at NEAT 9 regarding the implementation of the single alternate FLOS in Japan and the Republic of Korea RVSM airspace and the status of the modified single alternate FLOS used in the South China Sea area.

AGENDA ITEM 2.4: OTHER AIR NAVIGATION MATTERS

Agenda Item 2.4 Other Air Navigation Matters

Developments in the modernization of air navigation systems

2.4.1 The meeting was presented with an overview of the global and regional developments in the modernization of air navigation systems. The meeting noted that through the panels of the Air Navigation Commission and the Secretariat, assisted by Study Groups, ICAO has made substantial progress in the development of SARPs, PANS and guidance material. The meeting among other things noted the following:

a) Development status of Standards and Recommended Practices (SARPs) and guidance material detailed in **Appendix A** to the Report on Agenda Item 2.4;

b) Work programmes of various Panels and Study Groups engaged in CNS/ATM related activities detailed in **Appendix B** to the Report on Agenda Item 2.4; and

c) Comparative analysis of regional developments in air navigation systems detailed in **Appendix C** to the Report on Agenda Item 2.4.

2.4.2 Also, the meeting noted that, while Regional Monitoring Agencies (RMAs) had been established, work was underway to address associated institutional and economic issues on a global scale. With reference to the use of certain aviation systems that are not standardized by ICAO or not fully compliant with SARPs for CNS/ATM systems, the meeting noted the concerns of the ANC. While such systems often yield operational and/or economical benefits to providers and users of air navigation services in the interim period, the meeting was informed of the advice of the Commission that their impact on the implementation of end-state SARPs-compliant systems should be taken into account, particularly in relation to equipment life cycle and retrofit considerations. The meeting agreed to take into account these air navigation developments in the work programme of APANPIRG.

Revised Statement of BORPC

2.4.3 The meeting recalled that the Commission had last approved the Statement of BORPC on 17 June 1999 for use at the third Caribbean/South American Regional Air Navigation (CAR/SAM/3) Meeting held in Buenos Aires, Argentina (October 1999).

2.4.4 In view of a number of advancements in many of the fields of air navigation systems that have taken place since the last update of the Statement in 1999, it has been revised by Secretariat on advice by ANC. The revised Statement took into account the ATM operational concept, ATS and aerodrome safety management, updated strategy for the introduction of non-visual aids for approach and landing, closure of regional area forecast centres, new provisions related to the exchange of operational meteorological information and the withdrawal of supersonic aircraft operations.

2.4.5 Whereas the Statement of BORPC is considered a vision statement and should apply equally to every region, it has until now been applicable in all regions except for the European region. Recognizing a common Statement would be another tool for ensuring interregional harmonization and, eventually, a global ATM system, the meeting noted that the Commission decided, henceforth, to extend the applicability of the Statement of BORPC to all the regions.

2.4.6 Taking into account the changes proposed by States, the meeting noted that the Air Navigation Commission, on 22 February 2005, approved the revised Statement of BORPC for use by all ICAO Regions. Consequently, the meeting agreed to incorporate the revised Statement of BORPC, through the following decision, into the Asia/Pacific Basic air navigation plan (ANP).

Decision 16/55 – Revised Statement of BORPC for regional air navigation planning and implementation

That, the revised Statement of BORPC for the regional air navigation planning and implementation be incorporated into the Asia/Pacific Basic ANP (Doc 9673).

Furthermore, the meeting while reviewing the revised Statement of BORPC proposed modification to para 7.2 and reflected in the following Conclusion. The meeting requested ICAO to take into account the amendment during its next cycle of BORPC update.

Conclusion 16/56- Amendment to Surveillance Part of revised BORPC

That, the paragraph 7.2 of the revised BORPC be amended in the next cycle of update as follows:

7.2 Surveillance should be provided as an integral part of air traffic control where practicable and desirable or necessary in the interest of safety, efficiency and economy of operations, in particular for those areas where traffic density and/or the multiplicity or complexity of ATS routes creates constraints. ~~Primary and/or secondary surveillance radar systems may be used to fulfill this requirement. Subject to availability and cost effectiveness and provided that the required level of safety is maintained, ADS and ADS-B may be used in airspace where surveillance by radar is impracticable or cannot be justified.~~

Follow-up to the 35th Session of the ICAO Assembly concerning air navigation matters

2.4.7 The meeting was presented with a report on the outcome of, and actions taken by, the Council, the Air Navigation Commission and the Secretary General of ICAO on the 35th Session of ICAO Assembly (A35), which was held at ICAO Headquarters in Montreal from 28 September to 8 October 2004. A35 developed number of Resolutions and Decisions enveloping a wide range of issues concerning air navigation matters and call for further follow-up by States and PIRGs.

2.4.8 The proposed actions on the Resolutions and Decisions, which are analyzed in the **Appendix E** to the Report on Agenda Item 2.4, were discussed and the meeting decided to include the relevant follow-up actions in the work programme of States and APANPIRG.

Implementation of ICAO Universal Safety Oversight Audit Programme under Comprehensive Systems Approach

2.4.9 The meeting was provided with a report on the implementation of the comprehensive systems approach for the conduct of safety oversight audits launched as of January 2005 under the ICAO Universal Safety Oversight Audit Programme (USOAP). The meeting was reminded that ICAO USOAP was established in 1999, pursuant to Assembly Resolution A32-11, with the objective of promoting global aviation safety through the conduct of regular and mandatory safety oversight audits of all Contracting States. Safety oversight audits performed thus far had been planned and conducted on an Annex-by-Annex basis, starting with Annex 1 — *Personnel licensing*, Annex 6 — *Operation of aircraft* and Annex 8 —*Airworthiness* and with a view to progressively introducing other Annexes. While this approach served its purpose and proved effective for the establishment of the Programme and the initial audits, it was time for USOAP to evolve from an Annex-by-Annex to a comprehensive systems approach, which would focus on the States' overall safety oversight capabilities. The comprehensive systems approach would cover all safety-related Annexes and would provide an improved and cost-effective approach to auditing.

2.4.10 Activities related to planning and implementation of the comprehensive systems approach started immediately following the endorsement of Assembly Resolution A35-6 in October 2004. The audit schedule for States to be audited in 2005 and 2006 was published in December 2004, providing States adequate time to prepare for an ICAO safety oversight audit and to discourage States from requesting the postponement of the audit. Nevertheless, requests for postponement have been received both from States scheduled to be audited in 2005 as well as in 2006. It should be recognized that all States cannot be audited in the last year of the audit cycle and that each request for postponement generates a negative impact on the Programme both in its effectiveness and efficiency. Noting this concern, the meeting requested the ICAO Asia/Pacific Regional office to urge States, through a letter, to accept the safety oversight audit schedule as determined by ICAO, with reference to Operative Clause 11 of Assembly Resolution A35-6.

2.4.11 In preparation for the launching of safety oversight audits under the comprehensive systems approach the meeting was apprized that ICAO has conducted seven workshops, one in each of the ICAO Regional Offices, directed at the National Safety Oversight Coordinators, ICAO regional office experts and other participants from Contracting States and regional and international organizations. A series of audit tools was developed to assist both Contracting States and ICAO in the preparation for, and conduct of, safety oversight audits. These tools include the State Aviation Activity Questionnaire (SAAQ), Compliance Checklists for each Annex concerned and Audit Protocols for each area of audit. The SAAQ is available to all Contracting States through the ICAO-Net website in English, French, Russian and Spanish. Also, the meeting noted that ICAO has completed recruitment and training of all the required staff.

2.4.12 The meeting noted that ICAO USOAP tentative work programme included proposed dates for audits of States of the Asia/Pacific Region during 2006 as described below. However, it was explained that these were tentative dates only and were therefore subject to change. Enquiries in relation to audit dates should be made directly to ICAO's Safety Oversight Audit Section via email to soa@icao.int.

- January 2006 Fiji, Vanuatu (including PASO)
- March 2006 New Zealand, Solomon Islands
- October 2006 Bhutan, India

ICAO 5 Letter Name Code System

2.4.13 The meeting noted that the current ICAO 5-letter name-code (5LNC) system for the naming of significant points on ATS routes was a paper based methodology and as such the coordination of 5LNC among Member States and ICAO Regional Offices had been very complex and time-consuming. With advent of the Internet, it has been made possible to address the 5LNC management process from one central, global database. The main goal of the ICAO 5LNC system is to assist States and Regional Offices in allocating unique 5LN codes worldwide.

2.4.14 Using web-based tools, the Aeronautical Information and Charts Section of ICAO has developed an on line 5LNC system that has two major components: Graphical User Interface (GUI) and Geographic Information System (GIS). The first component, the web-based GUI, allows end-users to view, search, reserve, allocate, modify and receive a confirmation of the assigned code. The GUI supports the role-based security that gives privileges on the system depending on who the user is. The web-based GIS system allows users to visualize geographically all 5LNC in the world. Also, the system permits users to see 5LNC data in relation with other aeronautical entities such as aerodromes, runways, flight information regions, approach area, landing area and States. The 5LNC database contains en-route and terminal data.

2.4.15 The meeting appreciated that this web based ICAO 5LNC system offers tutorials thus facilitating users to self-train about the use of the system at their own convenience. One of the important aspects of the 5LNC system is the resolution of the existing duplicate 5LNC for en-route. Upon acceptance by the ICAO Regional Offices, Member States will be progressively invited to register in the ICAO 5LNC system and to begin using it. Noting this information, the meeting requested the states to implement ICAO 5LNC system when made available in November 2005.

The Fuel Crisis and the Urgent Need to Implement Fuel Saving Measures

2.4.16 The meeting noted with concern that in spite of international passenger and cargo traffic growth exceeding expectations, the extraordinarily high level of oil prices threatened the airline industry with yet another year of losses. Consequently, the meeting discussed the areas where ATS Providers and State ATS Authorities could assist in developing more efficient systems that would contribute to airlines internal fuel efficiency strategies.

2.4.17 The cost of fuel, as a percentage of overall operating costs, as presented by IATA, has risen from around 10-12% in 2002, to around 25-30%. Consequently, it has been reported by one major airline that every 1 cent increase in jet fuel equals an annual increase of 17 million USD. The airlines are undertaking a number of fuel mitigation activities – both to reduce the amount of fuel burned – and to mitigate the cost of fuel as a "bottom line" item. Also, many airlines have implemented fuel surcharges. However, market forces make such surcharges unpopular, and can actually dissuade passengers from flying. The key to mitigating the effect of fuel price is to increase operating efficiency across the entire system.

2.4.18 The meeting was aware that many areas, such as route structure, arrival/departure procedures, air traffic control and airport capacity and layout directly impact the fuel consumption. In 2004, IATA had launched a Fuel Action Campaign, aimed at reviewing every aspect of air transport operations.

2.4.19 The meeting recognized that the steady growth in the global demand for oil has resulted in new records high's in the cost of fuel. This new era of high fuel costs should not be viewed as a single crisis situation but should be treated from a long-term strategic perspective to gain efficiencies on a continuous basis. The meeting also called on states and industries to be forthcoming in supporting this task in terms of aviation expertise and any other assistance that may be required. The meeting therefore called upon aviation and airspace planners to work together proactively rather than reactively so as to maximize the efficiencies of aircraft movement. Furthermore, the meeting called upon ICAO to arrange a workshop that focuses on best practices for achieving fuel efficiencies and accordingly developed the following conclusion.

Conclusion 16/57- Workshop on Fuel Savings Measures

That, ICAO consider arranging a workshop for Asia/Pacific States in 2006 that focuses on best practices for achieving fuel efficiencies in airport, TMA and en-route environment.

DEVELOPMENT STATUS OF SARPS AND GUIDANCE MATERIAL RELATED TO CNS/ATM SYSTEMS

Main field		Elements	SARPs/PANS		Guidance material	
			Target completion date	Status	Target completion date	Status
ATM	ATM	Global air traffic management requirements	2005	• Annexes 2 and 11 SARPs and PANS-ATM procedures under development.	Completed	• The ATM operational concept was endorsed by the Eleventh Air Navigation Conference in October 2003 and approved by the Air Navigation Commission (ANC) in January 2004 under delegated authority.
		Interoperability and functional integration of flight operations, ATS, ATFM and tactical ASM	2005 and beyond	• Annexes 2 and 11 SARPs and PANS-ATM procedures under development.	Completed	• The ATM operational concept was endorsed by the Eleventh Air Navigation Conference in October 2003 and approved by the ANC in January 2004 under delegated authority.
		Required total system performance (RTSP)	2005	• Draft policy statement under development.	2005	• Definition developed. • Role and functionality of RTSP being explored as part of work on the global ATM operational concept.
		ATM requirements for communications, navigation and surveillance	2005	• Annexes 2, 6 and 11 SARPs and PANS-ATM procedures under development.	2005	• Additional guidance material for the *Manual of Air Traffic Services Data Link Applications* (Doc 9694) under development.
	ASM	Airspace infrastructure planning	—	—	2005	• *Manual on Airspace Planning Methodology for the Determination of Separation Minima* (Doc 9689) published. • Further guidance material under development by SASP and ATMCP.

Main field		Elements	SARPs/PANS		Guidance material	
			Target completion date	Status	Target completion date	Status
		RNP and RNAV for en-route operations	Completed	• Annex 11 SARPs and PANS-ATM procedures adopted by Council in 1998.	Completed	• Update of the *Manual on Required Navigation Performance (RNP)* (Doc 9613) completed. • Second edition published.
ATM	**ATS**	Separation between aircraft	2005	• PANS-ATM procedures approved by Council in 1998 • Further amendment to Annexes 2, 6, 11 and PANS-ATM under development.	Completed	• Amendment to the *Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum between FL 290 and FL 410* (Doc 9574) completed. • Additional guidance is under development for the *Manual on Airspace Planning Methodology* (APM) (Doc 9689).
		ATS (uplink of MET data)	Completed	• SARPs and procedures concerning D-VOLMET have been included in Annex3 and PANS-ATM respectively.	2005	• *Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services* (Doc 9377) to be amended to include guidance material.
		ATS (uplink of SIGMET information in graphical format)	Completed	• Initial SARPs for graphical SIGMETs have been included in Annex 3.	2005	• *Manual of Aeronautical Meteorological Practice* (Doc 8896) to be amended to include guidance material.
		WAFS planning and implementation (final phase)	On-going	• SARPs for global WAFS SIGWX forecasts in binary format (BUFR code) for direct transmission to airline and ATM computers have been included in Amendment 73 to Annex 3.	2005	• *Manual of Aeronautical Meteorological Practice* (Doc 8896) to be amended to include guidance material.

Main field		Elements	SARPs/PANS		Guidance material	
			Target completion date	Status	Target completion date	Status
		ATS applications for air-ground data links	2005	• Annex 11 SARPs and PANS-ATM procedures are being developed.	Completed	• The *Manual of Air Traffic Services Data Link Applications* (Doc 9694) published and dispatched in second quarter 1999. • Additional guidance is under development.
		Data interchange between automated ATS systems	2005	• Annex 11 SARPs and PANS-ATM procedures under development.	—	—
	ATFM	ATFM systems and procedures	2005	• Annexes 2 and 11 SARPs and PANS-ATM procedures to be developed.	2005	• ATFM part of the ATM operational concept under development.
CNS/ATM		Human Factors	Completed	• HF-related SARPs were developed and incorporated in Annexes 10 and 11. • Further, HF-related requirements for inclusion in the PANS-OPS were developed during 2000, with an applicability date of 1 November 2001.	Completed	• *Human Factors Guidelines for Air Traffic Management (ATM) Systems* (Doc 9758) was completed and published in 2000.
		Human Resource Planning and Training	—	—	2005	• The human resource planning guidance material is under development. • A potential approach and format for regional training planning was developed.
COM		VHF digital link (Modes 3 and 4)	Completed	—	Completed	—
		UAT	2005	• Draft SARPs are near completion.	2005	• Manual on UAT near completion.
		ATN	Completed	• Completed in 2001.	2005	• Updates to detailed technical specifications and guidance material near completion.

Main field	Elements	SARPs/PANS		Guidance material	
		Target completion date	Status	Target completion date	Status
NAV	RNP (en-route)	Completed	• Adopted/approved by Council in 1994 (Annexes 2, 4, 6, 11, 15 and PANS-ATM).	2005	• Second edition of Doc 9613, *Manual on Required Navigation Performance (RNP)* was published in 1999. • Additional guidance material on approval of aircraft and operations for RNP 10 was published in 2001. • Similar guidance material for RNP 4 is under development.
	WGS-84 (common reference systems)	Completed	• Adopted by Council in 1994, 1995, 1997 and 1998 of WGS-84 • Annexes 4, 11, 14 (both volumes) and 15 updated, provisions applicable from 1 January 1998.	Completed	• *WGS-84 Manual* (Doc 9674) Second edition, which was published in 2002, included provisions relating to taxiway and apron surveying points. • ICAO WGS-84 Web site is operational.
		Completed	• Updating of WGS-84 (as the horizontal reference system) to include temporal changes in the tectonic plate motion required for precise geodetic and some air navigation applications. • Introduction into Annex 15 of the vertical reference system for international civil aviation and consequential amendments to Annexes 4, 11 and 14 (both volumes).	2005	• Amendment to the *World Geodetic System — 1984 (WGS-84) Manual* (Doc 9674) to reflect the changes resulting from the Amendment 33 to Annex 15, specifically on the common reference systems for air navigation.
			• Introduction into Annex 15 of the temporal reference system for international civil aviation.		

Main field	Elements	SARPs/PANS		Guidance material	
		Target completion date	Status	Target completion date	Status
NAV (cont'd)	Aeronautical terrain and obstacle databases	2006	• The Secretariat with the assistance of The East Tennessee State University (ETSU) developed an aeronautical communication transfer protocol for the exchange of aeronautical information/data and a new concept for computerized AIS systems. Further development continues in accordance with Rec 1/8 of the 11th AN/Conf.	2006	• To be developed by the Secretariat in the form of new manual (guidance material) on all aspects of electronic aeronautical data.
		2006	• Initial SARPs for electronic aeronautical charts for cockpit display were incorporated by Amendment 52 to Annex 4 in 2002. • Further SARPs for Annex 4 under development.	2006	• Under development by the Secretariat.
		Completed	• SARPs for the electronic terrain and obstacle data format and interchange developed by the Secretariat and incorporated into Annex 15 by Amendment 33, and as a consequence, Annexes 4, 11 and 14 amended. Annex 15 provisions applicable from 20 November 2008 and 18 November 2010.	2005	• New guidance material concerning the electronic terrain obstacle and aerodrome mapping data and their interchange under the development by the Secretariat.
	GNSS performance criteria to support operational requirements	•Completed.		•Completed.	
	GNSS performance criteria to support advance operations (CAT II/III, A-SMGCS and curved approaches)	2005/2007	• Under development.	2005/2007	• To be developed in parallel with SARPs.

Main field	Elements	SARPs/PANS		Guidance material	
		Target completion date	Status	Target completion date	Status
	SARPs for the use of existing satellite navigation systems with augmentation sub-systems	•Completed.		•Completed.	• To be published in the form of a manual.
	SARPs for new GNSS elements and signals	2007	• Work on the develoment of SARPs for new elements of GNSS (GPS second civil frequency, GALILEO, GLONASS-M) is under way.	2007	• Under development
NAV (cont'd)	GBAS CAT I flight procedure criteria	Completed		—	—
	RNP < 0.3 flight procedure criteria	2007	Under development by the OCP	—	—
	Quality assurance in-flight procedure design	2007	Under development by the OCP	—	—
SUR	Surveillance system specifications for emerging surveillance systems and architectures	2004	• Surveillance enhancements (ANC Task No. CNS-9601) being developed by SCRSP.	2005	• A circular on ASAS was completed and is under publication..
	SSR procedures	Completed	• Update of Annex 11 and PANS-ATM.	Completed	
	ADS -C procedures	2005	• Annex 11 SARPs and PANS-ATM procedures developed by the OPLINKP and SASP.	Completed	• *Manual of ATS Data Link Applications* (Doc 9694) published and dispatched in second quarter 1999. The first amendment is being developed.
	ADS-B and equivalent	2005	• Being developed by OPLINKP.	2005	• Amendment to the *Manual of ATS Data Link Applications* (Doc 9694) to be developed.
	ADS: inclusion of turbulence reporting	Completed	• Annex 3 SARPs and PANS-ATM turbulence reporting procedures based on the eddy dissipation rate have been developed with the assistance of METLINKSG.	—	—

LEGEND

ATM	—	Air traffic management	GNSS	—	Global navigation satellite system
ADS	—	Automatic dependent surveillance	NAV	—	Navigation
ADS-B	—	ADS broadcast	RNAV	—	Area navigation
AIS	—	Aeronautical information services	RNP	—	Required navigation performance
ASM	—	Airspace management	SSR	—	Secondary surveillance radar
ATFM	—	Air traffic flow management	SUR	—	Surveillance
ATN	—	Aeronautical telecommunication network	UAT	—	Universal access transceiver
ATS	—	Air traffic services	WAFS	—	World area forecast system
CNS	—	Communications, navigation, and surveillance	WGS	—	World geodetic system
COM	—	Communications			

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PANELS AND STUDY GROUPS INVOLVED IN CNS/ATM-RELATED ACTIVITIES

PANEL/STUDY GROUP	WORK PROGRAMME			
	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS
OPLINKP	ATM-9102	ATS applications for air-ground data links	2005 and beyond	Work continued on draft SARPs, procedures and guidance material relating to the use of ADS, CPDLC and other data link applications.
	ATM-9502	ATM requirements for communication	On-going	The development of the concept of required communication performance (RCP) was completed and distributed to States and international organizations for comments.
	ATM-9506	Automatic dependent surveillance (ADS) systems and procedures	2005	
	ATM-9103	Data interchange between automated ATS systems	2005	Provisions applicable to air traffic services interfacility data communications (AIDC) are being developed.
	ATM-0002	ADS-B, Traffic situational awareness and airborne separation assurance	On-going	Development of an operational concept has been completed and amendments to PANS-ATM to use ADS-B for ground surveillance should be completed in 2005. Operational requirements for the use of a system to increase aircraft situational awareness and airborne separation assurance are being developed.
ACP (formerly AMCP)	CNS-7002 CNS-0401 CNS-0001	Aeronautical electromagnetic spectrum	On-going task	Work on development and support of ICAO position for WRC-2007 and other interference-related issues is on-going.
	CNS-8702	Aeronautical mobile satellite air-ground data link (AMSS subnetwork)	2005	Restructuring of the AMSS SARPs (separation of core from detailed technical specifications) near completion..
	CNS-9902	Next-generation AMSS systems	2005	Draft NGSS SARPs to be consolidated with restructured AMSS SARPs.
	CNS-9102	VHF air-ground digital link (VDL subnetwork)	Completed	Completed
	CNS-9603	Air-ground data link to support navigation and surveillance applications	2005	Validation of the VDL Modes 3 and 4 SARPs completed. Development of draft UAT SARPs near completion.
	CNS-9602	High frequency data link (HFDL)	Completed	Completed.

PANEL/STUDY GROUP	WORK PROGRAMME			
	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS
ATMRRP (Formerly ATMCP)	ATM-9501	Required total system performance	2005 and beyond	The ATM Operational concept was endorsed by the Eleventh Air Navigation Conference in October 2003 and approved by the Air Navigation Commission in January 2004 under delegated authority. Further work on RTSP is being undertaken by the panel in parallel with and based on its work on ATM system requirements.
	ATM-9202	Global air traffic management	2005 and beyond	
	ATM-9510	Interoperability and functional integration of flight operations, ATS, ATFM and tactical ASM	2005 and beyond	
ATNP (Disbanded in 2003. Outstanding work is being conducted by the ACP)	CNS-7001	AFS systems planning studies	Completed	SARPs completed. Guidance material being processed for publication.
	CNS-9403	Aeronautical telecommunication network (ATN)	2005 - 2007	Current work involves the development of provisions to incorporate Internet Protocol (IP) networks in the ATN and the development of optional message encryption provisions.
	CNS-9901	AFS procedures	Completed	Completed. Further work may become necessary as implementation of new AFS systems progress.
NSP (formerly GNSSP)	CNS-9401	Global navigation satellite system (GNSS)	Completed	First set of SARPs was adopted and included in Annex 10, Volume I as part of Amendment 76 in 2001. Further enhancements to SARPs were incorporated in Annex 10 as parts of Amendments 77 and 79 (the latter is under development). SARPs and guidance material for new GNSS elements are currently being developed.
	CNS-7002	Aeronautical electromagnetic spectrum	Ongoing task (in coordination with AMCP)	

PANEL/STUDY GROUP	WORK PROGRAMME			
	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS
OCP	OPS-8502	Development of procedures, areas and obstacle clearance criteria for the approach, holding and departure phases of flight for inclusion in PANS-OPS, Volumes I and II	2005-2007	Several issues related to GNSS-based procedures are being investigated. Development of procedures for APV, RNP performance levels less than 0.3 and enhanced DME/DME criteria is being progressed.
	OPS-9802	Development of material for inclusion in PANS-OPS on instrument procedure data base integrity requirements	2005	A quality assurance working group has been established and will study a quality assurance requirements in the development of flight procedures to ensure data integrity.
	OPS-9803	Development of obstacle clearance criteria for vertical navigation in all phases of approach procedures	2005	Initial proposals under development
	OPS-0201	Development of instrument procedures for helicopter operations at heliports	2005 and beyond	Point in space procedures (using basic GNSS) have been completed and other instrument procedures are being developed. Relevant provisions of Annex 14 (relating to surfaces) are being reviewed.
OPSP	OPS-008	Procedures for all-weather operations	2006	Operational requirements for performance-based navigation systems and operational priorities for development of material to support instrument approach and landing operations using new technology are being developed. To assist prevention of controlled flight into terrain accidents, procedures concerning the use of the continuous descent final approach technique and the use of minimum descent altitude as a decision altitude are also under development. Operational standards, procedures and guidance material concerning the use of head-up guidance systems, head-up displays and enhanced flight vision systems are also being developed

PANEL/STUDY GROUP	WORK PROGRAMME			
	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS
SASP	ATM-8505	Required navigation performance and area navigation for en-route operations	2005	SARPs completed. Second edition of Doc 9613, Manual on Required Navigation Performance (RNP) published in 1999. Additional guidance material on approval of aircraft and operators for RNP 10 published in 2001. Similar guidance material for RNP 4 under development.
	ATM-6301	Separation between aircraft	2005 and beyond	Developments of proposals were advanced for the amendment of SARPs and PANS concerning reduced separation minima including: lateral distance-based intersecting track separation; 30 NM oceanic lateral and longitudinal minima based on RNP 4 submitted for publication. Procedures for RNP 4 under development. The implementation of RVSM is continuing to be under review and the revision to the *Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive* (Doc 9574) is completed.
	ATM-9505	Airspace infrastructure planning	Completed	
SCRSP	CNS-7901	Conflict resolution and collision avoidance systems	2005	Work is concentrating on surveillance enhancements and ADS-B while monitoring ACAS and Mode S implementation in the States. Activities on ASAS are progressing with the preparation of technical requirements for ASAS to be presented at SCRSP/1.
	CNS-9601	Surveillance enhancements (emerging surveillance systems)	Completed	ASAS circular has been developed and is under publication.
	CNS-9701	Airborne separation assurance system (ASAS)	2005	

PANEL/STUDY GROUP	WORK PROGRAMME			
	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS
ADMSG	AIS-9401	Aeronautical data bases	2006	The Secretariat with the assistance of the East Tennessee State University (ETSU) developed an aeronautical communication transfer protocol for the exchange of aeronautical information/data and a prototype of the Computerized Aeronautical Information Services (CAIS) system. Progress on the subject by EURCONTROL/FAA is being taken into account in accordance with the Rec 1/8 of the Eleventh Air Navigation Conference.
	AIS-9806	Transfer and access of aeronautical information from ground-based automated systems.	2006	
AISMAPSG	AIS-9801	Electronic aeronautical charts for cockpit display	2006	Amendment 52 to Annex 4 contained an interim amendment, applicable in 2002, concerning electronic charts for cockpit display. Further work is being progressed in consultation with the SAE G-10 Aerospace Behavioural Engineering Technology Committee, Aeronautical Charting Subcommittee.
AUPISG	CNS-0301	Aviation use of the public Internet	Completed	Guidelines on the use of the public Internet were developed.
AVSSSG (Disbanded in 2003. Work is being conducted by the ACP)	CNS-7001	AFS systems planning studies	Completed	The Manual on ATS ground-ground voice communications was published in 2003.
HFSG	PEL-9001	Flight safety and human factors	Completed	Review of SARPs on CNS/ATM, to ensure that Human Factors are properly taken into consideration. SARPs submitted to the Council during the periodic cycles of revision of the relevant Annexes.
HRPTSG	PEL-9601	Regional human resource planning and training needs	Completed	A draft of the Human Resource Development Manual is complete. A Human Resource Planning Seminar was developed and conducted for the first time in the CAR/SAM Regions.
METLINKSG	MET-9101	Amendment to Annex 3 concerning automated air-reporting	On-going	The quality assurance of MET information included in ADS reports being studied. The need for the inclusion of additional MET parameters (e.g. icing) in the MET information data block of the ADS report format is being addressed in coordination with the OPLINKP.
	MET-9301	Uplink of OPMET information to aircraft in flight	Completed	Amendment 73 to Annex 3 includes meteorological specifications (templates) for D-VOLMET, and other data link applications.

PANEL/STUDY GROUP	WORK PROGRAMME			
	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS
	MET-9601	Development of SIGMET information	Completed	Amendment 73 to Annex 3 includes specifications for the dissemination and uplink of graphical SIGMETs.
NOSSSG	PEL-9001	Flight safety and human factors	2005	The study group was established in March 2004 and held its first meeting in July 2004. The main task of the study group is the development of an ICAO NOSS manual.
TRNSG	CNS-9402	Testing of radio navigation aids	Completed	The study group produced a new version of Doc 8071, Volume I, *Manual on testing of ground-based radio navigation systems* (replacing former Volumes I and II). TRNSG/3, 4 and 5 produced Volume II (GNSS) containing guidance material on testing of GNSS-based non-precision approaches, SBAS and GBAS.
	CNS-9401	Global navigation satellite system (GNSS)	Completed	
WAFSOPSG	MET-8802	WAFS planning and implementation	On-going	Amendment 73 to Annex 3 includes global WAFS SIGWX forecasts in binary format (BUFR) code for direct transmission to airline and ATM computers.

LEGEND

ACP — Aeronautical Communications Panel
****ATMCP — Air Traffic Management Operational Concept Panel
ATMRPP — Air Traffic Management Requirements and Performance Panel
*ATNP — Aeronautical Telecommunication Network Panel
**GNSSP — Global Navigation Satellite System Panel
NSP — Navigation Systems Panel
OCP — Obstacle Clearance Panel
OPLINKP — Operational Data Link Panel
SASP — Separation and Airspace Safety Panel
SCRSP — Surveillance and Conflict Resolution Systems Panel (Former SICASP)

ADMSG — Aeronautical Data Modelling Study Group
AISMAPSG — Aeronautical Information and Charts Study Group
AUPISG — Aviation Use of the Public Internet Study Group
*AVSSSG — ATS Voice Switching and Signalling Study Group
HFSG — Flight Safety and Human Factors Study Group
HRPTSG — Human Resource Planning and Training Study Group
METLINKSG — Meteorological Information Data Link Study Group
NOSSSG — Normal Operations Safety Survey Study Group
***TRNSG — Testing of Radio Navaids Study Group
WAFSOPSG — World Area Forecast System Operations Group

*Disbanded in 2003 — outstanding work to be carried out by the ACP
**Renamed NSP in 2003
***Disbanded in 2003 — outstanding work to be carried out by the NSP
**** Renamed ATMRPP in 2004

COMPARATIVE ANALYSIS OF REGIONAL DEVELOPMENTS IN AIR NAVIGATION SYSTEMS

AIR TRAFFIC MANAGEMENT								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
1	Revision of ATS route structure	Review of ATS routes – Ongoing. APANPIRG/14 established the ATS Route Network Review Task Force (ARNR/TF). Asia to Europe through Middle East via South of Himalayas (EMARSSH) – Implemented 28 Nov. 2002.	Established new ATS routes.	Revision of route structure in eastern and western part of Europe – Ongoing Aegean Sea – major restructure to cater for Athens Olympics and beyond – Implemented Dec 2003. Asia to Europe through Middle East via south of Himalayas (EMARSSH) – Implemented 28 Nov. 2002.	Phase II implementation of ATS RNAV route network in CAR/SAM Regions planned – Effective 31 Mar. 2005.	New Middle East ATS route network is planned – Implemented 22 Dec. 2003 Asia to Europe through Middle East via south of Himalayas (EMARSSH) – Implemented 28 Nov. 2002.	The ATS route structure of NAM Region – Under review. To be included in updated version of the NAM ANP.	—
2	RVSM	Pacific airspace – Implemented 24 Feb. 2000. Western Pacific and South China Sea airspace – Implemented 21 Feb. 2002 (Phase 1) and 31 Oct. 2002 (Phase II). Bay of Bengal and beyond – Implemented 27 Nov. 2003. Japanese domestic airspace and Incheon, FIR planned, effective 9 June 2005.	Implementation strategy and action plan being considered by States - target date to be established. Parts of Region falling in SAM and EUR corridor – Implemented 24 Jan. 2002. Parts of AFI Region falling in MID region implemented RVSM – Effective 27 Nov. 2003.	Western part of European Region – Implemented 24 Jan. 2002. Planning for expansion in Eastern part of the Region commenced. EUR/SAM Corridor – Implemented 24 Jan. 2002. EUR/MID corridor (Black Sea) 2005 South Caucasus States - Nov. 2004	EUR/SAM corridor – Implemented 24 Jan. 2002. CAR/SAM Regions – Implementation scheduled for 20 January 2005 in coordination with NAM and PAC Regions.	Middle East Region – Implemented 27 Nov.2003.	Canada implemented RVSM between FL 290 to FL 410, inclusive, in northern domestic airspace (north of 57N) and transition airspace (between 52N and 57N) on 18 Apr. 2002. RVSM – Implementation in entire domestic airspace scheduled for 20 Jan. 2005, in coordination with CAR, SAM and PAC Regions.	Horizontal RVSM expansion in entire NAT Region from FL 310 to FL 390 – Completed 1 Nov. 2001. Vertical expansion of RVSM throughout NAT Region from FL 290 to FL 410 – Implemented on 24 Jan. 2002.

AIR TRAFFIC MANAGEMENT								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
3	Establishment of Regional airspace safety system performance monitoring structure	Regional Airspace Monitoring Advisory Group established by APANPIRG/14 (Aug. 2003).	Under consideration.	Implemented. Financial mechanism being developed.	CARSAMMA (CAR/SAM Monitoring Agency) was designated as the monitoring agency for CAR/SAM Regions for RVSM and RNP implementation.	UAE support to MECMA (Middle East Central Monitoring Agency) discontinued from 1 June 2004. New regional mechanism to be established.	NAARMO was designated to monitor RVSM implementation.	Implemented.
4	ACAS II	*Mandated from 23 March 2000.*	*Mandated from 1 Jan. 2000.*	*Mandated from 1 Jan. 2000.*	*Mandated from 1 Jan,. 2003.*	*Mandated from 1 Jan. 2000.*	Implemented in Canada and United States airspace.	*Mandated from 31 March 200*1
5	RNAV/RNP	RNP 10: 1) North Pacific and Tasman – 23 April 1998; 2) South China Sea – 1 Nov. 2001; 3) Australia and Indonesia – 1 Nov. 2001; 4) Bay of Bengal – Nov. 2002. Other routes – Under consideration.	RNP 5 – Implemented in continental Johannesburg FIR 1998.	RNAV/RNP 5 – implemented in ECAC area Jan. 1998.	EUR/SAM corridor RNP 10 – Implemented 4 Oct. 2001. RNP 10 for routes UL 302 and UL 780 – Implemented 22 Jan. 2004.	RNP 5 Phase I – Implemented 14 June 2001.	United States implemented RNP in domestic and oceanic airspace since 1998.	MNPS – Implemented 1981.
		RNP 4: Under development in the South Pacific area.	RNP 10 – Implemented in Mauritius 5 Mar. 2003.	Implementation of precision RNAV (nearly equivalent to RNP 1) in terminal areas planned for 2004/2005.	Action plan developed to implement RNP 5 in Brasilia, Curitiba and Montevideo FIRs, with a target date of July 2007.	RNP 5/RNAV Phase 2 – Implementation started effective 28 Nov. 2002 as ongoing process.	Canada planning to implement RNP in domestic airspace 2006.	
		30/30 between Australia and New Zealand implemented on 20 January 2005.	.		Studies for implementation being carried out by other States of the CAR/SAM Regions.	P-RNAV to be implemented within some busy TMAs and to be superseded by RNP 1 at a later stage.	Implementation of RNAV route structure in NAM Region – Under review in coordination with the CAR/SAM Regions.	

COMMUNICATION								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
1	ATN (subnetworks, end-systems and intermediate systems and applications such as AMHS and AIDC).	ATN transition plan developed with a target date of 2005 for ground-ground application, namely ATN router and AMHS. AFTN-based AIDC procedure implemented by some States. Interface Control Document (ICD) for AIDC Version 2 adopted by APANPIRG/14. AMHS tests progressing. First ATN Link established between Bangkok and Hong Kong on 15 June 2004. Several interface control documents (ICDs) developed to ensure harmonization and to facilitate the implementation.	ATN implementation – Under study. Focus is more on improving current circuits with long-term plans for migrating to AMHS and AIDC.	ATN transition planning deferred until operational requirements established. Preoperational trials – In progress. Link 2000 programme will gradually introduce operational applications over A-G ATN on VDL2 from 2003 to 2010. A comprehensive CIDIN network operates within the AFTN infrastructure.	ATN transition plan – Under review. With upgrade of CAR digital networks and REDDIG implementation (SAM Digital Network) in 2003, implementation of AMHS and AIDC would be facilitated.	Current AFTN circuits being improved for transition to ATN. Guiding principles being prepared for ground-ground applications, namely AMHS and AIDC. Pending availability of ATN infrastructure, some States are considering implementing AFTN-based AIDC procedure. Document on ICD for AIDC – Under development.	ATN transition plan developed with focus on ground-ground applications. Test, development and validation phases completed. Operational implementation – Under review.	Investigation of operational ATN data link scenarios in Region, with focus on air-ground applications – In progress.

COMMUNICATION								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
2	Air-ground communication infrastructure	Further improvements made in VHF voice in continental and terminal areas. VHF data link used for D-ATIS, D-VOLMET and CPDLC. AMSS data (for ADS and CPDLC using FANS-1/A) used in oceanic and remote areas; AMSS voice used for non-routine & emergency communications. SSR Mode S data link for high-density airspace being planned.	VHF voice provided in terminal areas. Extension of VHF coverage to en-route areas – In progress in several FIRs. HF voice provided in most of FIRs. CPDLC based on FANS-1/A being used.	Implementation of air-ground data link services planned for 2002-2007. Horizontal expansion of 8.33 kHz channel spacing from 7 to 29 States – Implemented 31 Oct. 2002. Vertical expansion of 8.33 kHz channel spacing from FL 245 to FL 195 planned for 2006.	VHF voice provided in continental and terminal areas. HF voice provided in oceanic areas. VHF/AMS have been improved. Several States are implementing VDL Mode 2 to support CPDLC and D-ATIS. Trials on HFDL are being conducted.	VHF voice provided in continental and terminal areas. VDL being studied. AMSS for data and voice in oceanic and remote areas used. SSR Mode S data link for high-density airspace being considered.	VDL Mode 2, HFDL and AMSS implementation planned to support CPDLC applications – Ongoing.	HF is main communication, and already saturated with difficulty of obtaining additional frequencies. Use of SATCOM voice for routine ATS being evaluated. Trials to use CPDLC based on FANS-1/A for routine communications being carried out.
3	Ground-ground digital communication infrastructure	Some States have implemented digital networks. Other States also considering upgrading their networks.	3 major satellite networks provided in States of the Region, namely AFISNET, SADC and CAFSAT. Another satellite network (NAFISAT) being developed for AFI northeast Region. Consolidation of these networks being implemented.	Many States upgraded to digital networks.	Number of digital networks implemented in the Regions. Additional interconnectivity points for regional and interregional digital networks being implemented with aim of achieving harmonized digital platform.	Establishment of regional satellite-based digital network – Under consideration. The Feasibility study of the MID VSAT being updated and final document will be ready Dec.2004.	CAN/MEX/USA States have-implemented digital ground-ground networks.	Well developed. Many States upgraded to digital networks.

NAVIGATION								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
1	GNSS	Transition to WGS-84 – Nearing completion .	Transition to WGS-84 – In progress.	Transition to WGS-84 – Ongoing.	Considerable progress achieved for WGS-84 implementation.	Transition to WGS-84 – In progress.	Transition to WGS-84 completed in Canada and United States; Mexico – In progress.	Transition to WGS-84 completed.
		Strategy for GNSS implementation updated and adopted. Checklist to assist GNSS implementation, developed by APANPIRG, used by States for implementation.	GNSS strategy adopted.	Launching "Galileo", a new constellation of navigation satellites, decided by the European Council 26 Mar. 2002 with full operation capability 2008.	Strategy for implementation of GNSS adopted. .	Strategy for implementation of GNSS adopted.	GNSS/GPS strategy adopted for NPA and APV.	.
		Satellite-based augmentation system (MSAS) being developed with a target date of commissioning with 1 satellite in 2004 and 2 satellites in 2006. Technology Demonstration System (TDS) of GANGAN in India will be completed by mid-2006, and target date for FOC is 2008.	SBAS test bed in cooperation with EGNOS implemented.	Satellite-based augmentation system (EGNOS) being developed with a target date of commissioning 2005.	SBAS test bed in cooperation with EGNOS and WAAS are being developed. Preoperational model of SBAS – Under study as a basis for the future operational system. Ionospheric model – Under study in order to apply the NPA Operation with SBAS test bed.	SBAS test bed, in cooperation with EGNOS, carried out. SBAS test bed based on WAAS planned.	SBAS based on United States-wide area augmentation system (WAAS) commissioned 10 July 2003 for initial operating capability.	
			Development of harmonized GNSS/NPA procedures for SADC States – Completed Dec. 2001, and for ASECNA States 2002. Plans for other FIRs – Under consideration.		Several CAR States/ Territories have implemented GNSS/GPS NPA.	.	GNSS approach implementation programme initiated by all 3 States; GNSS augmentation system agreements completed for future expansion of GNSS concept.	
		GNSS is used for oceanic and remote continental areas for en-route operations and NPA as supplemental means.	GNSS being used for oceanic and continental en-route operations.	GNSS is being used for continental en-route operations.	GNSS being used for oceanic and continental en-route operations.	GNSS being used for continental en-route and NPA operations.	GNSS being used for oceanic and continental en-route operations.	GNSS being used for oceanic operations

SURVEILLANCE								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
1	SSR Modes A/C and SSR Mode S	Currently, SSR Modes A/C employed.	Surveillance in most FIRs is through pilot voice position reporting.	Currently, SSR Modes A/C employed.	Currently, SSR Modes A/C employed. ORCAM system is implemented.	Region well covered by radars (PSR/SSR Mode A/C).	Substantial improvements achieved in en-route area with upgrading of radar systems. In areas of Gulf of Mexico & Northern Canada, surveillance restricted to position reports sent by pilots via air-ground communications.	Surveillance in most of NAT Region is via position reports using HF voice approx. every 10 degrees of longitude.
			En-route aeronautical surveillance plan with SSR requirements included in AFI FASID.	ORCAM code management extended to entire Region.	Established use of ASTERIX protocol for SSR data sharing.			
		SSR Mode S – Implemented in some terminal areas and high-density en-route.	PSR and SSR Mode A/C employed in some busy terminals and for en-route operations.	SSR Mode S in some terminal areas and high-density en-route planned for implementation: · basic Mode S in 2003 to 2005; · enhanced Mode S in 2005 to 2007.	Implementation of SSR Mode S in some terminal areas and high-density en-route areas – Ongoing.	SSR Mode S planned for some terminal and high-density en-route areas in 2006.	Agreement reached between Canada, Mexico and United States to implement SSR Mode S.	

SURVEILLANCE								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
2	ADS	ADS/CPDLC services (using FANS-1/A) operational in PAC Region. Operational trials being established for Southeast &West Asian Region. APANPIRG/15 agreed the use of FANS 1/A Operations Manual (FOM) by States as the basis for ADS and CPDLC operations in conjunction with Annex 10 Vol. II, PANS/ATM and regional guidance material.	ADS will be used for low-density, remote and oceanic airspace as well as outside SSR coverage. ADS trials – In progress in SAT Region.	ADS will be used in some parts of the Region.	ADS will be used initially for oceanic airspace and, later, in remote areas.	ADS will be used initially for oceanic airspace and, later, in remote areas and possibly, in 2006, as backup to SSR in high-density traffic areas.	ADS will be used in oceanic or remote areas; however, further review needed for continental domestic airspace areas.	To improve surveillance, the regional plan specifies ADS over the ATN. Meanwhile, provisions have been made to utilize FANS-1/A-equipped aircraft. ADS and other data link technologies being used for waypoint position reporting.
3	ADS-B	ADS-B deployment in Australia initiated. Trial in Hong Kong China Japan and Mongolia – In progress. 1090 MHz ES adopted for ADS-B link for near term air-ground surveillance service.	To be determined.	To be determined.	ADS-B implementation in Mexico in progress. Implementation plan of ADS-B in CAR/SAM Regions –Under study.	To be determined.	Agreement reached between Canada, Mexico and United States to implement ADS-B from Jan. 2007.	To be determined.
		ADS-B air-ground surveillance expected to be implemented on subregional basis Jan. 2006.		Mode S squitter related applications from 2007.	Mode S extended squitter as the data link for near-term ADS-B implementation was selected by States.			

RELATED ISSUES								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
1	Transition from current single volume ANP to two volumes Basic ANP and FASID documents	Material finalized and published on website. Document in final preparation stage for official publication. Amendments continue to be processed for both ANP and FASID.	Material finalized and published.	Material finalized and published. Documents being kept up-to-date.	Material finalized and published. Documents being kept up-to-date.	Material finalized and awaiting publication.	Revision programme proposed to update FASID document.	Trial NAT Basic ANP and FASID being reviewed, and scheduled to be completed in 2005.
2	Development and update of Regional Plan for CNS/ATM Systems	Reviewed and updated. New chapter on meteorology included.	Reviewed and updated.	Reviewed and updated.	Reviewed and updated. GREPECAS/12 approved ATM Evolution Tables for en-route and terminal areas operations.	Reviewed and updated.	Reviewed and updated.	New Plan being developed.

RELATED ISSUES								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
3	Interregional groups which coordinate and ensure seamlessness in implementation of AN systems between Regions	South-West Asia ATS Coordination Group (SWACG).		South-West Asia ATS Coordination Group (SWACG). Joint EUR and NAT Regions data link steering group establish to ensure harmonized data link requirements.	Eastern Caribbean and North East SAM Implementation and Coordination Group (E-CAR/NESAM ICG).	South-West Asia ATS Coordination Group (SWACG).	CANADA/MEXICO/ USA CNS/ATM Working Group.	Joint EUR and NAT Regions data link steering group established to ensure harmonized data link requirements.
		Indian Ocean ATS Co-ordinating Group (IOACG).	Indian Ocean ATS Co-ordinating Group (IOACG).		Central American Air Navigation Experts Working Group (CA/ANE/WG).			
		Europe/Asia Air Routes Meeting (EAAR).		Europe/Asia Air Routes Meeting (EAAR).	Central Caribbean Working Group (C/CAR WG).			
			Informal interface meetings between EUR/MID and EUR/AFI convened from time to time.	Informal interface meetings between EUR/MID and EUR/AFI convened from time to time.	Eastern Caribbean Working Group (E/CAR WG).	Informal interface meetings between EUR/MID and AFI/MID convened from time to time.		
			South Atlantic Coordination Group (SAT).	South Atlantic Coordination Group (SAT).	South Atlantic Coordination Group (SAT).			
		Informal Trans-Asia, Trans-Siberia and Cross-Polar Routes Steering Group (ITAPS).		Informal Trans-Asia, Trans-Siberia and Cross-Polar Routes Steering Group (ITAPS).			Informal Trans-Asia, Trans-Siberia and Cross-Polar Routes Steering Group (ITAPS).	

RELATED ISSUES								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
4	Meteorological component of CNS/ATM systems	Migration from T4 charts to WAFS forecasts in digital code forms (i.e. WMO BUFR and GRIB code forms) to be fully implemented by 1 July 2005.						Not an applicable issue as it is being addressed by States as part of EANPG.
		A second workshop on use of GRIB- & BUFR-coded WAFS data to be organized by WAFC Provider States, in coordination with ICAO and WMO in 2005.	Two workshops on use of GRIB- & BUFR-coded WAFS data were organized by WAFC Provider States, in coordination with ICAO and WMO in 2002 and 2003.	Two workshops on use of GRIB- & BUFR-coded WAFS data were organized by WAFC Provider States, in coordination with ICAO and WMO in 2003.	A workshops on use of GRIB- & BUFR-coded WAFS data for Spanish speaking States was organized by WAFC Provider States, in coordination with ICAO and WMO in 2004. Similar workshop will be organized for English-speaking States in 2005.	A workshop on use of GRIB- & BUFR-coded WAFS data was organized by WAFC Provider States, in coordination with ICAO and WMO in 2003.	A workshops on use of GRIB- & BUFR-coded WAFS data was organized by WAFC Provider States, in coordination with ICAO and WMO in 2004.	Not applicable.
		Two world area forecast centres (WAFC London and Washington), nine volcanic ash advisory centres (VAAC Anchorage, Buenos Aires, Darwin, London, Montreal, Tokyo, Toulouse, Washington and Wellington) and seven tropical cyclone advisory centres (TCAC Darwin, Honolulu, Miami, La Réunion, Nadi, New Delhi and Tokyo) to serve all ICAO Regions – Fully implemented.						
		D-VOLMET being implemented by some States. Trials on meteorological data downlink through ADS being conducted. New ATM requirements for MET services being studied (MET/ATM Task Force); MET/ATM seminar planned for 2005						

RELATED ISSUES								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
5	Review of deficiencies	Addressed as part of APANPIRG work programme.	Addressed as part of APIRG work programme. List of deficiencies grouped on basis of States, in addition to facility-wise. Various COSCAPs also addressing this issue.	Addressed as part of EANPG work programme.	Addressed as a part of GREPECAS work programme.	Addressed as part of MIDANPIRG work programme.	—	Addressed as part of NAT SPG work programme.
		Dedicated task force established to develop appropriate management tools.	Establishment of Aviation Safety Board – Under consideration.		Aviation Safety Board established.	Dedicated Air Navigation Safety Working Group established.		
		APANPIRG/15 (Aug. 2004) developed regional procedures for identification, assessment, reporting and monitoring status of air navigation deficiencies as a supplement to uniform methodology.	Air navigation infrastructure enhancement team for eastern and south Africa established.		Adopted a regional procedure including last resort action to resolve all types of deficiencies in air navigation field.			

RELATED ISSUES								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
6	Specific to Region	Guidance material to enhance AIS activities within Region developed. AIS quality assurance manual developed.	New larger aeroplane task force developed strategy for future work, including evaluation of impact on aerodromes in AFI Region. Establishment of appropriate body to address regional human resource and training issues – Under consideration.	Focus on increasing efficiency and capacity at international aerodromes through implementation of safety and capacity enhancing procedures.	Human resources and training issues being addressed. Development of AIS Quality Assurance Programme and its associated activities – Being carried out. ATS Quality Management System Guidance Documents harmonized with ISO 9001:000 developed/approved by GREPECAS/12. SAR Quality Management System Guidance Documents in harmony with ISO 9001:2000 – Under development. Steps to implement an automated AIS system – In progress.	Formulation of plan for developing regional training capabilities in specific training centres will be addressed through dedicated task force.	ICD established for radar interoperability between Canada, Mexico and United States.	Work initiated to develop operational and economic performance indicators for use throughout NAT Region.

ORGANIZATIONAL ISSUES								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
1	Establishment of subregional entities/groups to provide air navigation services	Advice provided to States about benefits of cooperative arrangements and mechanism.	Southern Africa Development Community (SADC). Agency for the Safety of Air Navigation in Africa and Madagascar (ASECNA). Common Market for Eastern and Southern Africa (COMESA). Roberts FIR Organization (Guinea, Liberia and Sierra Leone). Harmonization of standards, procedures and regulations being implemented. Establishment of subregional safety oversight facility being implemented.	European Organization for the Safety of Air Navigation (EUROCONTROL). Regional Air Navigation Services Development Association (RADA). International Organization Information Coordinating Council on Air Navigation Charges (IKSANO). Central European Air Traffic Services (CEATS). Central Flow Management Unit (CFMU). Maastricht ACC	Central American Corporation for Air Navigation Services (COCESNA). SAM Subregional Group for Digital Network (REDDIG). Eastern Caribbean subregional group for digital network (E-CAR). Central Caribbean subregional group for digital network (MEVA). Trinidad and Tobago provides ATS within Piarco FIR that embraces all the States and Territories of Eastern Caribbean.	Europe-Middle East Regional Coordination Mechanism on Air Traffic Management (EMAC).	Subregional group comprised of CAN/MEX/USA.	—

ECONOMIC ISSUES								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
1	Cost-benefit study, business case analysis and cost-recovery system	Advice was provided to national meteorological service providers about application of ICAO's guidance and policies on cost recovery. Development of revenue-sharing model for Nadi FIR (2003).	Business case and cost-benefit analysis carried out for SADC States for UACC project. Similar exercise under consideration for areas of routing AR4 (Europe to southern Africa).	Business case and cost-benefit analysis being carried out by EUROCONTROL. No ICAO Secretariat involvement. Advice provided at two different occasions (workshops) on cost recovery of MET (Nov. 2003) and air navigation services (June-July 2004) for States in Central and Eastern parts of Europe.	ICAO-assisted in economic aspects of the study of the transitional plan (Project RLA/98/003) to CNS/ATM systems through development and integration of financial module. ICAO also participated in organization of ~~a~~ two seminars on the economics and institutional aspects of CNS/ATM systems in Honduras (Oct. 2002) and Brazil (May 2004). GREPECAS Task Force on Institutional Aspects for CNS/ATM implementation reactivated; held its first meeting in Brazil, May 2004.	Business case illustrative application developed for the Region. SIP workshop on the development of business case for the implementation of CNS/ATM systems was held in Cairo in Sept. 2004.	Business case and cost-benefit analysis being carried out by CAN/MEX/USA. No ICAO Secretariat involvement.	Feasibility of creating common cost-recovery system for provision of AN services in northern part of Region was considered. No changes to current system envisaged. Cost-effectiveness of implementing new systems studied as ongoing exercise through NAT cost-effectiveness programme.

TRAFFIC FORECASTS								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
1	Traffic Forecasting Groups (TFGs)	TFG is in existence since 1991. 12th meeting of TFG, Bangkok 23-30 July 2004. Next meeting: tentatively in 2006.	TFG formed in 1998. 3rd meeting of TFG, Dakar 24–26 March 2003. Next meeting: tentatively in 2005.	Data developed by EUROCONTROL being used.	TFG established in 1996. Next meeting: tentatively in 2005.	TFG created in 1998. The Middle East Regional Traffic Forecasting Group (MER TFG) integrated into MIDANPIRG as Sub-Group (TF SG). First meeting of the TF SG was held in Cairo on 11-13 Sept. 2004.	No ICAO Secretariat involvement.	NAT Forecasting Group established 1965.
2	Traffic forecasts	Passenger and aircraft movement forecasts for transpacific and intra-Asia/Pacific developed up to 2020. Passenger forecasts for major city-pairs developed up to 2007.	Passenger and aircraft movement forecasts developed for major route groups up to 2018.	Forecasting done by EUROCONTROL and IATA. No ICAO Secretariat involvement.	Forecasts prepared for 6 major air routes identified by the TFG up to 2012 and the 18 major traffic flows included in the CAR/SAM ANP.	Forecasts of major traffic flows to/from/within MID Region as well as aircraft movement forecasts for city-pairs within each major traffic flow up to 2015 has been updated. Conducted peak period analysis for some airports in Region.		Medium- and long-term traffic (passenger and aircraft movements) forecasts developed biannually. Forecasts up to 2010, 2015 and 2020 developed in April 2004.

LEGAL ISSUES								
No.	**System**	**ASIA/PAC**	**AFI**	**EUR**	**CAR/SAM**	**MID**	**NAM**	**NAT**
1	Addressing legal issues such as universal accessibility, continuity, certification and liability	Legal issues raised, but these are beyond scope of regional bodies. HQ should continue to provide guidance, and address and resolve these issues at global level.	Subject not yet examined by APIRG. HQ should address this issue adequately for benefit of PIRGs.	Legal issues discussed in context of Galileo programme.	Legal issues are beyond resolution at regional level. HQ must provide leadership in this domain.	Issue too large and complex. MIDANPIRG did not look into the matter in depth.	—	—
2	Development of interim legal framework	An interim legal framework, the "Charter on the Rights and Obligations of States relating to GNSS Services", adopted in 1998 by the 32nd Session of the Assembly in the form of Resolution A32-19, embodies certain fundamental principles applicable to GNSS. The 35th Session of the Assembly adopted Resolution A35-3, which, *inter alia*, invites Contracting States to consider using regional organizations to develop mechanisms necessary to address any legal or institutional issues that could inhibit the implementation of CNS/ATM in the region, while ensuring that such mechanisms will be consistent with the Chicago Convention, and public international law. It directs the Secretary General to monitor the situation and further directs the Council to register regional initiatives, to consider the value and to make them public as soon as possible.						

— END —

AGENDA ITEM 3: CNS/ATM IMPLEMENTATION AND RELATED ACTIVITIES

Agenda Item 3: CNS/ATM Implementation and Related Activities

Key Priorities for CNS/ATM Implementation in the Asia/Pacific Region

3.1 The meeting recalled that APANPIRG/15 in its Decision 15/52 had tasked the ATM/AIS/SAR and CNS/MET Sub-groups to compile and evaluate the List of Key Priorities in their respective fields and present an updated list to APANPIRG. It was also stated that the list should be highly focused, fit the purpose intended and be time bound. In light of the above directive, the Sub-groups carried out a thorough review and developed an updated list. The updated list consolidated items to be acted on by both the Sub-groups in their respective fields. The meeting reviewed the consolidated list and agreed to retain SBAS, as MSAS and GAGAN would provide the satellite based augmentation systems covering the Asia/Pacific Region. In view of the foregoing and considering the updated strategy for implementation of GNSS the meeting adopted the List of Key Priorities for the CNS/ATM Implementation in the Asia/Pacific Region as shown in **Appendix A** to the Report on Agenda Item 3.

CNS/ATM Implementation Planning Matrix

3.2 The meeting noted the CNS/ATM Implementation Planning Matrix updated by the CNS/MET Sub group. The matrix provided a good overview of the planning and implementation status of CNS elements such as ATN, AIDC, CPDLC, GNSS, ADS-C and ADS-B. The Matrix is also used for monitoring the progress of implementation. The updated matrix is provided in **Appendix B** to the Report on Agenda Item 3.

The Global Air Navigation Plan for CNS/ATM Systems

3.3 The meeting noted that in response to Recommendation 1/9 (that ICAO develop a formal review and agreement process for the *Global Air Navigation Plan for CNS/ATM System)* of the Eleventh Air Navigation Conference (AN-Conf/11, Montreal, 22 September to 3 October 2003), the Council reviewed the status of Global Plan. Taking into consideration the legal constraints associated with changing the status of the Global Plan and being aware that the Global Plan was created as a living, dynamic document, to be easily updated within a short period of time, the Council decided that the present procedure for acceptance and updating of the Global Plan should be retained, with the addition that the Secretary General may, upon recommendation by the Commission, circulate specific proposals, or parts thereof, to States and selected international organizations for comment.

3.4 Furthermore, as a follow-up to AN-Conf/11, the meeting noted that the sixth meeting of the ANC Consultation with industry was held in Montreal in May 2004 and agreed that the Industry would develop a common roadmap/global action plan, aimed at attaining operational benefits in the near- to medium-term and made available to ICAO in November 2004. The meeting was informed that in January 2005, the Commission reviewed the Roadmap and requested the Secretariat to develop a proposal, as a part of second amendment to the Global Plan, so as to incorporate relevant material from the Roadmap. The Industry Roadmap addresses short- and medium-term implementation activities associated with CNS/ATM systems, while the longer-term objectives are addressed in the operational concept.

3.5 It is proposed that the revised Global Plan will be divided into three volumes. As the much of the material in the present version of the Global Plan is valid, it will be retained with relevant updates that will provide generic guidance material on areas largely outside the air navigation domain. Volume I would contain this material. Volume II is proposed to contain comprehensive guidance material and detailed operational requirements and planning criteria for air navigation planning (i.e. air traffic management, communications, navigation, surveillance, aeronautical information service and meteorology, etc.) that would lead to an integrated Global ATM system. The Volume II would serve as a guidance document for executives, policy-makers and planners and will contain global

timelines for implementation of the operational initiatives, which are subject to regional agreement. Volume III is proposed to be comprised of an interactive planning and reporting tool aimed at facilitating planning and implementation of the envisaged global ATM system. It would include the operational initiatives related to the near- and medium- term planning periods and would track progress achieved by the PIRGs toward its implementation. The intent is that as States in each region consider implementation of an operational initiative, they would use the common programme templates and reporting formats as the basis for establishing performance objectives and implementation time lines and also to define the work to be accomplished. It is envisaged that some parts of the programme templates would be the subject of regional air navigation agreement, which will be managed by PIRGs and reviewed by the Secretariat on a regular basis. Summary reports may also be developed using the programme templates for presentation to the Commission and Council.

3.6 The Secretariat would finalize and present this second amendment to the Global Plan to the Commission for its initial review during its session of October-December 2005. Subsequently, the Secretariat would be consulting States though established process as well as presenting the same proposed amendment to ALLPIRG/5 (5-7 December 2005) so as to seek their views and obtain full support for the revised Global Plan. Consequent to this coordination process and taking into account comments received from States and ALLPIRG, the second amendment will be presented to the Commission for its final review during its Jan-March 2006 session followed by final acceptance by the Council in May-June 2006. The meeting noted that that the Global Plan will continue to be the primary element of the regional planning framework for a coordinated implementation of a harmonized and seamless global ATM system.

Contribution by IBAC to the Industry roadmap

3.7 In developing the Industry Roadmap, the meeting noted that the business aviation community formed its own Joint Committee (JC), which was organized by the International Business Aviation Council (IBAC) and the General Aviation Manufacturers Association (GAMA). A number of coordination meetings were held by the JC and a series of presentations made by Air Navigation Service Providers (ANSP), airframe manufacturers and avionics integrators. The JC evaluation included a review of business aviation operational requirements and user expectations. Given the vast differences in types of business aviation operations and aircraft, the JC addressed all sub-sectors and reviewed requirements for both domestic and international operations. The business aviation Joint Committee finished its work in April 2005 and a report titled CNS/ATM Strategy for Business Aviation was published. The meeting noted that the IBAC input will be taken into account by the Secretariat as part of its effort to include relevant material from the Industry Roadmap in the revised Global Plan.

Amendment to Regional Plan for the New CNS/ATM System to include ADS-B

3.8 The meeting adopted an amendment proposal proposed by the ADS-B Study and Implementation Task Force to the ASIA/PAC Regional Plan for New CNS/ATM System to include ADS-B. It was recognized that the plan needs revision to include ADS-B related planning and description. The proposed changes are contained in the Chapter 3, 5, 6 and Chapter 9. The bar chart timelines information of national trials and implementation of surveillance systems in the table 9-1 of the Plan was also updated. The meeting agreed to replace the term of ADS used in the document with ADS-C especially in the two chapters and in the bar chart timelines table. Accordingly the meeting formulated the following Decision:

Decision 16/58 - Amendment to the Regional Plan for the CNS/ATM System to include ADS-B

That the ASIA/PAC Regional Plan for the New CNS/ATM System be amended to include ADS-B element for the surveillance systems as indicated in the **Appendix C** to the Report on Agenda Item 3.

Restructure of the Regional Plan for the New CSN/ATM Systems

3.9 It was noted that CNS/MET SG/9 in conducting the review of the bar chart timelines table for surveillance system in the Asia/Pacific Regional Plan for the New CNS/ATM had noted that the plan was in need of significant revision. Considering the need to achieve alignment with the Global Plan and that the information provided in the plan is being transferred into the FASID, the extensive revision to the ASIA/PAC Regional Plan for the new CNS/ATM system was considered necessary. The most appropriate action considered was to eliminate the Regional Plan and to capture any specific regional information in a Supplement to the Global Plan for the CNS/ATM Systems. Implementation status and plans will be reflected in the relevant FASID Tables using the nomenclature available in the tables. Recognizing that the new edition of Global Plan is still to be finalized and would be available only after June 2006, the meeting formulated the following Decision.

Decision 16/59 - Review of the Regional Plan for the New CNS/ATM System

That, the CNS/MET, ATM/AIS /SAR Sub-groups and RASMAG be tasked to review the Global Air Navigation Plan for the CNS/ATM System and the ASIA/PAC Regional Plan for the New CNS/ATM system with a view to avoiding any duplication with the updated Global Plan. The work should commence immediately after issuance of new edition of the Global Plan.

Correlation of aircraft identification

3.10 Thailand presented a paper that highlighted the constraints on the automation system from the lack of unambiguous correlation between the filed flight plan and SSR Mode A returns and proposed the use of Aircraft Identification (Flight ID) as an additional unique ‘key’ for correlation.

3.10.1 It was stated that the correlation between the surveillance information of aircraft and flight plan data is currently achieved through the use of re-useable discrete Mode A codes. However, there is a risk that one code could be assigned to two or more aircraft simultaneously. This leads to incorrect correlation between the surveillance information down linked from the aircraft and its flight plan data resulting in loss of situation awareness. It was informed that in the ‘Core Area’ of Europe, currently replacing existing classical SSR interrogators with Mode S interrogators, a large number of aircraft is currently being equipped with Mode S airborne equipment that support Mode S functionality. This incorporates Aircraft Identification (Flight ID) for Level 2 transponder or above as one of the aircraft down link parameters, as stipulated in Annex 10, Volume IV, Chapter 2, Paragraph 2.1.5.2 and corresponds to the aircraft identification specified in Item 7 of the ICAO Flight Plan. The use of aircraft identification as an additional unique ‘key’ to correlate between the flight plan data and surveillance information is considered to be a possible solution to alleviate the problem.

3.10.2 The meeting noted the importance of the additional unique ‘key’ as proposed in correlating between flight plan data and surveillance information and its role in the development of a seamless automated Air Traffic Flow Management Systems in the future. It was recognized that the implementation of the proposed procedure would require deployment of SSR Mode S interrogators in the Asia/Pacific Region and equipage of SSR Mode S transponder Level 2 or above. There may also

need to change relevant ATC procedures. Therefore the meeting agreed to task CNS/MET and ATM/AIS/SAR Sub-groups to further study this issue and formulated the following decision;

Decision 16/60 - Correlation of Aircraft Identification

That, ATM/AIS/SAR and CNS/MET Sub-groups study the use of "aircraft identification" as an unique 'key' for correlation between flight plan data and surveillance information considering operational and technical aspects for implementation. The result of study be presented for consideration by APANPIRG/17.

UAV Operations

3.11 India informed meeting that in the recent past there have been extensive research and development activities in a number of States by various civil and military agencies on UAVs (Unmanned Aerial Vehicles) for various strategic applications. These agencies become potential airspace users and consequently the airspace requirements for UAV operations results in serious ATC constraints and safety concern. In the absence of appropriate SARPs and guidance material for UAV operations, these requests are considered as special missions and accommodated in the segregated airspace in the oceanic area at heights not interfering with regular civil flight operations. These UAVs sharing the common airspace of regular flights will become inevitable and hence will lead to a situation where these UAVs will be required to be handled dynamically as controlled flights along with other regular flights. The meeting agreed that in such a mixed and complex traffic environment where pilot operated aircraft and UAVs are operating in the same airspace, appropriate separation standards and procedures to ensure safety shall be required to be defined.

3.12 The meeting recognizing that it is obligatory on the part of ATS providers to ensure all the legitimate requirements of all airspace users are adequately met, agreed for an urgent need for the development of appropriate provisions and procedures and relevant guidance material for the operations of UAV. The meeting, noting that the Secretariat has already considered this matter, while reviewing the report of EANPG /46 meeting, developed the following conclusion for action by the Commission.

Conclusion 16/61 - UAV Operation

That, ICAO develop, as a priority, appropriate provisions and guidance material for the operation of UAV.

KEY PRIORITIES FOR CNS/ATM IMPLEMENTATION IN THE ASIA/PACIFIC REGION

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
1.	RNP/RNAV Implementation	Implement performance based navigation, operation and procedures to improve the efficiency and flexible use of airspace.	Report to APANPIRG	ATM/AIS/SAR	On-going Phased implementation.	reflect performance based navigation, not just RNP.
2.	ADS-C	The implementation of ADS in oceanic or remote areas in accordance with the Regional CNS/ATM Plan is required for the enhancement of safety and ATM.	Report to APANPIRG FIT-BOB reconvened September 2003. Bay of Bengal operational trial of ADS/CPDLC commenced February 2004, trial on going. FIT-SEA inaugural meeting May 2004. South China Sea operational trial of ADS/CPDLC expected 2006/2007.	ATM/AIS/SAR	Phased implementation. Implementation focus and timetable need to be developed. States are gaining experience in the use of ADS.	

KEY PRIORITIES FOR CNS/ATM IMPLEMENTATION IN THE ASIA/PACIFIC REGION

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
3.	Co-operation in Regional CNS/ATM Planning , Implementation & Training.	The continuation and enhancement of ICAO's co-ordinating role of technical co-operation in CNS/ATM planning and implementation, in close co-operation with all partners and taking into account the regional approach, is required.	Report to APANPIRG	All	Sub-Groups to identify requirements.	Emphasis needs to be on sharing information and training. Title 'Technical Co-operation" is confusing with assistance programs. Need to inform States of opportunities for training well in advance of scheduled date. Training opportunities should include ICAO programs as well as associated organizations programs.
4.	Preparation for WRC-2007	The co-operative participation of States is required with their respective telecommunications regulatory authorities, regional groups, at the APT forums and at the WRC regional preparatory meetings for WRC-2007 to ensure that aviation spectrum requirements are fulfilled and protected.	WRC-2007 APT Feb 06	All	States are designating contact points responsible for preparation for WRC 2007 and are providing contact details for posting on the website to facilitate coordination.	High importance task. Spectrum must be available to enable CNS/ATM implementation.

KEY PRIORITIES FOR CNS/ATM IMPLEMENTATION IN THE ASIA/PACIFIC REGION

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
5.	GNSS Implementation • GBAS • SBAS	To implement GNSS in accordance with the Asia Pacific Regional Strategy. Facilitate market available GBAS ground system certified to Annex 10 SARPs.	On-going 2008	CNS/MET	SBAS receivers - (TSO C145/6) now available Lead aircraft with certified GBAS avionics now in service.	Strategy for Approach, Landing and Departure identified GBAS as a preferred CAT I option. No ground equipment is available that is certified to Annex 10 SARPs.
6.	MET support for the new CNS/ATM System.	To identify the ATM requirements for new MET products supporting CNS/ATM systems and update the plan accordingly. Implementation of the transition to GRIB and BUFR coded WAFS products	2006 2006	CNS/MET	METATM TF has surveyed the new requirements and is preparing an update for the MET chapter of the ASIA/PAC Regional Plan for the New CNS/ATM Systems. MET/ATM coordination seminar planned for early 2006. GRIB coded products have been implemented. BUFR coded SIGWX charts are being implemented with the deadline for implementation 30 Nov 2006	MET/ATM coordination seminar is expected to provide information for updating the Regional Plan

KEY PRIORITIES FOR CNS/ATM IMPLEMENTATION IN THE ASIA/PACIFIC REGION

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
7.	ADS-B	Operational Standards to support proposed separation standards. Airline aircraft certificated to participate in ADS-B operations. Avionic packages available to meet GA and low capacity operations.	2006 2006 2006	ADS-B Task Force ADS-B Task Force ADS-B Task Force		Focus on activities to enable successful ADS-B implementation. Roll-out of ADS-B considered an on-going activity.
8.	Implementation of APV and RNAV (GNSS) Approaches.	Review applicability of APV and RNAV (GNSS) Approach Design Standards, aircraft certification and augmentation system availability for Asia Pacific. Develop implementation strategy.	2006 2007	ATM/AIS/SAR CNS/MET	APV and RNAV (GNSS) Design standards now in PANS OPS. Aircraft certified for RNAV (GNSS) and APV approaches.	Navigation function. ATM/AIS/SAR/SG to consider operational issues including charting.

KEY PRIORITIES FOR CNS/ATM IMPLEMENTATION IN THE ASIA/PACIFIC REGION

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
9.	Data Link Flight Information Services (DFIS) applications	To implement the following applications via request/response mode of data link in the Asia and Pacific Regions: a) Data link –automatic terminal information services (D-ATIS); b) VOLMET data link service (D-VOLMET); c) Pre-Departure Clearance (PDC) delivery via data-link; d) DCL	2008	ATM/AIS/SAR CNS/MET	Trials and demonstrations are conducted and some operational services are provided by States.	
10.	Safety Management Systems.	States to establish national safety management systems and effective application of safety programmes which are required for the provision of air traffic services. Required monitoring services available to support operational		ATM/AIS/SAR RASMAG RASMAG	Annex 11 provisions effective 27 November 2003. On-going RASMAG activities. Operational enhancements suspended where effective monitoring is not available.	

KEY PRIORITIES FOR CNS/ATM IMPLEMENTATION IN THE ASIA/PACIFIC REGION

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
		enhancements.				
11.	Air Traffic Flow Management.	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; and e) application of tactical ATFM planning	2006	ATM/ ATIS/ SAR	On going	

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
AUSTRALIA	ATN tests were conducted. BIS Router and Backbone BIS Router and AMHS will be implemented by 2006.	AFTN based AIDC Implemented between Brisbane and Auckland.	Implemented and integrated with ATM systems to support FANS1/A equipped aircraft.	Implemented.	Implemented.	ADS-B trial being conducted. 27 ground stations are expected to be operational during first half of 2006 for upper airspace which is not covered by radar.	FANS 1/A ADS-C implemented.	
BANGLADESH	BIS Router and AMHS planned for 2007.							
BHUTAN	ATN BIS Router and UA service 2008.			Procedures developed for NPA.				
BRUNEI DARUSSALAM	ATN BIS Router and AMSH planned 2007.							
CAMBODIA	BIS Router and AMHS planned for 2007							

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
CHINA	ATN BIS Router AMHS will be implemented from 2006. - Tripartite BBIS trial completed with Bangkok and Hong Kong, China in Jan. 2003. - ATN trial with Hong Kong, China conducted 2003/2004. - AMHS trial with Hong Kong, China planned for 2005. - AMHS trial with Macau is under planning.	AIDC between ACCs within China are being implemented.	Implemented to support ATS Route L888 and polar routes. Trial on HF data link conducted for use in western China.		Implemented in certain airspace.	ADS-B trial will be conducted in 2006.	FANS 1/A ADS-C implemented to support L888 and polar routes.	

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
HONG KONG, CHINA	- Tripartite BBIS trial with Beijing and Bangkok completed in Jan 2003; -64 Kbps ATN Link with Bangkok put into operational use in June 2004. -ATN trials with China and Japan conducted in 2003/04; -AMHS trials with Thailand, China and Japan planned in 2005. Implementation of AMHS with Japan in 2005/2006. - ATN/AMHS trials with Viet Nam, Philippines, Macao China planned in late 2005/2006.	Trial on the AFTN based AIDC with Guangzhou and Sanya, China commenced. Implementation planned for 2005.	FANS 1/A based CPDLC conducted. D-ATIS D-VOLMET and PDC implemented. VDL Mode-2 technical trial completed in Dec. 2002 and planning on further trials was in progress.	Pilot Programme on RNAV (GNSS) departure procedures implemented in July 2005.	Implemented in certain airspace.	ADS-B trial using "ASMGCS" trial system in 2004/2005.	FANS 1/A Trials for ADS-C conducted.	
MACAO, CHINA	ATN BIS router and AMHS planned for late 2005. AMHS trial with China and Hong Kong, China in planning stage.							ATZ within Hong Kong and Guangzhou FIRs. In ATZ full VHF coverage exist. Radar coverage for monitoring purposes.

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
COOK ISLANDS								
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA								
FIJI	AMHS in-house trials planned for 2003. AMHS trials with USA in 2004. ATN BIS Router and AMHS will be implemented in 2005.	Implementation of AFTN based AIDC with Brisbane and Auckland in 2003.	FANS-1. Implemented since 1997.	NPA procedures for (S) completed in Dec. 2002.	Implemented as (S).	ADS-B trials planned for 2004. Implementation in 2005/2006.	ADS-C implemented in oceanic airspace using EUROCAT 2000 X.	
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 planned for implementation at Mumbai in 2007.		FANS-1 implemented at Kolkata and Chennai. Trial in progress in Mumbai and Delhi.		SBAS - Technical developments in 2007. - Implementation planed for 2009.	Trial planned for 2006.	FANS 1/A ADS-C implemented at Kolkata and Chennai. Trial in progress in Delhi and Mumbai.	

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
INDONESIA	ATN BIS Router and AMHS planned for trial in 2006.	AFTN based AIDC planned for implementation between Brisbane and Jakarta in 2006.	FANS-1/A. CPDLC in Jakarta, Ujung Pandang FIRs trial planned for 2005.	Procedure to be completed in 2006 for NPA.		Planning ADS-B ground stations at 5 locations in the eastern part of Indonesia as first stage of phase I.	FANS 1/A ADS-C trial planned at Jakarta and Ujung Pandang ACC in 2005.	
JAPAN	ATN BBIS already implemented. AMHS implemented between Japan and USA in 2005 and between Japan and Hong Kong, China planned for 2005/2006	AIDC based. AFTN procedure implemented with Oakland USA.	FANS1/A system Implemented in Tokyo FIR.	NPA implemented at 4 aerodromes in 2005.	SBAS operational in 2006.		FANS 1/A. ADS-C implemented in Tokyo FIR.	
KIRIBATI								
LAO PDR	ATN BIS Router and AMHS planned for implementation with Bangkok in 2006.	AIDC with Bangkok planned for 2007.	FANS-1/A Planned for Bay of Bengal and South China Sea areas. Equipment is under test operation.		Implemented.		FANS-1/A. ADS-C planned for Bay of Bengal and South China Sea areas. Equipment under test operation.	
MALAYSIA	ATN BIS Router and AMHS planned for 2006.		Planned for Bay of Bengal and South China Sea areas in 2006.	NPA at KLIA planned.			FANS 1/A ADS-C planned for Bay of Bengal and South China Sea areas in 2006.	
MALDIVES	BIS Router/AMHS planned for implementation in 2006.	Planned for 2006.	FANS1/A planned for 2006.		Trials planned for 2005-2008. Implementation in 2008.	Trials planned for 2005-2006. Implementation in 2006.		

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
MARSHALL ISLANDS				NPA implemented at Majuro Atoll.				
MICRONESIA FEDERATED 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.	Implemented.	ADS-B trial in progress implementation planned for 2006.	FANS 1/A ADS-C implemented since August 1998.	
MYANMAR	Trial for ATN BIS Router with Thailand planned for 2006. Test with China planned for 2006.		Implemented since August 1998				Implemented since August 1998	
NAURU								
NEPAL	BIS Router and AMHS planned for 2007.			Development of arrival procedure and NPA completed. Departure procedure is being developed.	Implemented.			

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
NEW ZEALAND	BIS Router and AMHS implementation planned for 2008.	AFTN based AIDC implemented between New Zealand, Australia and USA. - Tests with Fiji planned. - Test with Tahiti started in 2005.	FANS/1A. Implemented	Implemented.	will be implemented as required.	Trials planned for 2005 will be operational in 2006. National coverage starts in 2008 to be completed by 2020.	FANS 1/A Implemented.	
PAKISTAN	Implementation of ATN considered for Phase II (2005-2010).	Implemented between Karachi and Lahore ACCs	Implementation planned from 2005-2010.	Arrival and departure NPA procedure are being developed.	Planned for 2005-2010.	Planned for 2005 – 2010.	Planned for 2005-2010	RADAR coverage provided in Karachi and Lahore FIRs.
PAPUA NEW GUINEA				Implemented at certain aerodromes.	Implemented.			
PHILIPPINES	ATN BIS Router planned for 2005. Implementation for AMHS in April 2007.		CPDLC Planned for 2008.				FANS 1/A ADS-C planned for 2008.	
REPUBLIC OF KOREA	ATN BIS Router/AMHS planned for 2005-2010.	AFTN based AIDC implemented between Incheon ACC and Seoul APP.	PDC & D-ATIS implemented 2003.			ADS-B trials planned for 2008.	Trial for FANS 1/A ADS-C implemented since 2003.	

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
SINGAPORE	ATN BBIS Router trial with Hong Kong conducted between April and June 2003. Planned for ATN and AMHS implementation in 2006.		Implemented since 1997. Integrated in the ATC system in 1999.	NPA procedure developed. RNAV (SID/STAR) in 2005	Implemented.	Trial planned for 2006.	FANS 1/A ADS-C implemented since 1997. Integrated with ATC system in 1999.	
SRI LANKA	ATN BIS Router Planned for 2006. AMHS planned along with BIS in 2006.		CPDLC in trial operation since November 2000.			2010	FANS 1 /A ADS-C trial since November 2000.	GPS based domestic route structure being developed.
THAILAND	ATN G/G system implemented for domestic services. BBIS/BIS Routers already implemented. Target date for AMHS in 2006.	ATN based AIDC Implemented in Domestic Sector. Trials with adjacent centres planned for 2006.	FANS-1/A Implemented.		Implemented.	Trial planned for 2005.	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								
Anchorage			FANS1/A based CPDLC implemented.	Implemented.	Implemented.	ADS-B trials continuing.	FANS/1-ADS-C 2006.	
Fairbanks				Implemented.		Trials continuing		

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
Oakland		AFTN based AIDC implemented. ATN AIDC planned for 2007.	FANS-1/A based CPDLC implemented.	Implemented.	Implemented.		FANS-1/A ADS-C planned for Oct. 2005.	
Salt Lake City (Network Centre)	AMHS implemented between Japan and USA scheduled in 2005. USA/Fiji AMHS testing to be determined.							
VANUATU								
VIET NAM	ATN trials conducted with Bangkok in March/April 2005 for implementation of ATN BIS Router. AMHS in 2006.	Trial for ATN based AIDC planned in 2005 with Bangkok and implementation in 2006.	Planned for 2006.				FANS 1/A ADS-C planned for 2006.	Most of air space in Hanoi and Ho-Chi-Minh FIRs covered by RADAR.

Agreed draft for amendment Chapters 5, 6 and 9 of Regional Plan for CNS/ATM Systems

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3.3 Asia/Pacific Regional CNS/ATM Planning and Implementation Structure

3.3.1 Within the Asia/Pacific Region APANPIRG is tasked with the planning and implementation for the new CNS/ATM systems and is supported by three sub-groups:

1) The ATM/AIS/SAR Sub-Group;
2) The COM/MET/NAV/SUR Sub-Group; and
~~3) The CNS/ATM/IC Sub-Group.~~

3.3.2 ~~While all these groups are responsible for CNS/ATM planning, it is the CNS/ATM/IC sub-group which has the responsibility within APANPIRG for the on-going co-ordination, development and maintenance for the regional CNS/ATM plan. Its current terms of reference are as follows: (*……to be deleted)*~~

3.4 The Regional Process Description

3.4.1 The regional process for planning and implementation is described at Section 2.1.3, Chapter 2, Volume II of the global Plan and is at Appendix B to this chapter. This documentation provides the template for regional planning and is essential reading for those wishing to understand or participate in the regional planning process.

3.5 States' Plans

3.5.1 States have the responsibility for implementation of the new CNS/ATM systems within their areas of responsibility. It will however be necessary for each State within the Asia/Pacific Region to develop and publish its own CNS/ATM implementation plan after co-ordination with intra-regional plans.

3.6 Airlines' Plans

3.6.1 Airlines agree to incorporate the new CNS/ATM systems on an evolutionary basis. The path which airlines are taking in global planning follows the objective of achieving short and medium term goals, which provide improved airspace capacity and economy of operations. This path leads next to the operational use of existing CNS technology in aircraft and then to the evolution of new aircraft systems compatible with CNS/ATM global standards. During the transition phase to CNS systems, airlines plan to utilize developed datalink systems (ACARS) as the transitional means to enhance the development of operational ATN datalink systems in concert with the earliest implementation plans of ATC providers. This evolutionary approach to planning is accepted as providing the airlines and ATC providers with a financially viable programme for introducing the new CNS/ATM systems. The requirement to take advantage of new technologies and procedures as they become available to provide benefits to airspace users as soon as possible, is therefore a cornerstone of airline planning. IATA publishes User Driven CNS/ATM Implementation Plans, which are intended to complement the ICAO Regional Planning Process.

CHAPTER 5. CURRENT STATUS AND REGIONAL STRATEGY – CNS/ATM SYSTEMS

5.5 Surveillance

5.5.1 The Asia Pacific Region is characterised by the use of:

a) SSR Mode A/C and, in the near further, Mode S in some terminal and high-density continental airspace;

b) ADS in some parts of the Region; and

c) The diminishing use of primary radar; and

d) Early deployment of ADS-B for delivery of radar like services

5.5.1.1 Automatic Dependent Surveillance-Contract (ADS-C) is becoming available over the oceanic and continental airspace of the Asia and Pacific Regions. SSR (augmented as necessary with Mode S) will continue to be used in terminal areas and in some high density airspace. The use of primary radar will diminish.

5.5.1.2 The introduction of air-ground data links, together with sufficiently accurate and reliable aircraft navigation systems, present the opportunity to provide surveillance services in areas which lack such services in the present infrastructure, in particular oceanic areas and other areas where the current systems prove difficult, uneconomic, or even impossible, to implement. ADS is a function for use by ATS in which aircraft automatically transmit, via a data link, data derived from on-board navigation systems. As a minimum, the data should include the four-dimensional position. Additional data may be provided as appropriate. The ADS data would be used by the automated ATC system to present information to the controller. In addition to areas which are at present devoid of traffic position information other than pilot provided position reports, ADS will find beneficial application in other areas, including high-density areas, where ADS may serve as an adjunct and/or back-up for secondary surveillance radar and thereby reduce the need for primary radar. Also, in some circumstances, it may even substitute for secondary radar in the future. As with current surveillance systems, the full benefit of ADS requires supporting complementary two-way pilot-controller data and/or voice communication (voice for at least emergency and non-routine communication).

5.5.1.3 Automatic Dependent Surveillance Broadcast (ADS B) is becoming available over the continental airspace of the Asia and Pacific Regions. SSR (augmented as necessary with Mode S) will continue to be used in terminal areas and in some high density airspace. ADS-B offers the potential to provide ATC surveillance where none is available today. Furthermore, some states are considering the future decommissioning of existing enroute SSR only radar systems to be replaced by ADS-B.

5.6 CNS System Evolution

5.6.1 The new CNS concept is very flexible in that each State has the choice of implementing specific system elements to meet its individual requirement for forming a complete, operable CNS/ATM system. Thus, the communication elements can be implemented using any or all or any combination of satellite, VHF or SSR Mode S. States with high traffic

density airspace would probably use all of these, but small States with continental airspace could implement the CNS/ATM concept by communications and ADS on VHF alone.

Chapter 6 ..

Airspace organization and management

.....

Air traffic services

- The implementation and application of automation and other advanced technologies, while necessary to increase efficiency and regularity, should maintain and where possible, improve the controller's work environment.

- The implementation of an improved air navigation system should be supported by improvements in the communication, navigation and surveillance systems and by advanced automation functions.

- Airspace capacity increases should not cause a concurrent increase in controller workload.

- Automation aids such as conflict prediction and resolution advisory functions should be introduced to assist the controller where practicable. The accuracy of these systems must be assured.

- As the use of automation increases, full advantage should be taken of the ensuing safety benefits.

- Automation aids which improve planning data accuracy and reduce the necessity for controller interventions to resolve conflicting situations, must contain provisions which allow for required controller awareness in relation to the traffic situation.

- The ATM system will allow for a transfer of responsibility of some separation functions from ground to airborne systems under specific circumstances. The trend may continue based on advancements in cockpit situational awareness, however, the ground system should remain as the overriding authority in all cases where arbitration is required.

- Data link application should take place in an early stage of the transition phase based on the availability of any of the foreseen data link systems.

- Application of data link should aim for a reduction of voice communication load and also for an improvement in the provision of flight data (short-term intent and four-dimensional profile data for the entire flight route) by providing flight management system (FMS) data to the ground ATC system.

- Communications networks between ATM facilities within a State and ATM facilities in adjacent States should be established if they do not already exist.

- States and/or regions should co-ordinate to ensure that where ATC applications supported by aeronautical mobile-satellite service (AMSS) such as automatic dependent surveillance (ADS-C) are to be introduced, they should be introduced approximately simultaneously in adjacent fight information regions (FIRs) through which there are major traffic flows.

- States should develop operational procedures, in collaboration with neighbouring FIRs for the implementation of new systems such as ADS-C and ADS-B within airspace under their control, where such application would be advantageous.

- Rules and procedures should facilitate the operation of aircraft with different equipment in the same ATM environment.

- States and/or regions may consider segregating traffic according to CNS capability, and granting preferred routes/flight levels to aircraft with improved capabilities.

- States and/or regions should co-ordinate to ensure that separation standards and procedures for appropriately equipped aircraft are introduced approximately simultaneously in each FIR through which major traffic passes.

- Systems or other provisions must allow the controller to ensure safe separation in the event of system failures.

- Implementation of new functions should be maintained or improve existing or basic functions rather than just replace them and should relieve rather than worsen controller functions.

- Rules and procedures should be developed to facilitate the transfer of aircraft between adjacent systems which provide different levels of services.

- Rules and procedures for the sharing of responsibility between the ground ATC system and the flight management system for calculating and maintaining flight profiles should be clearly defined prior to implementation.

- All the future automation specifications for ATC systems should provide for functional coherence between air traffic flow management and air traffic control systems.

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CHAPTER 9. SURVEILLANCE

9.1 General

9.1.1 The surveillance systems presently in use can be divided into two main types: dependent surveillance and independent surveillance. In dependent surveillance systems, aircraft position is determined on board and then transmitted to ATC. The current voice position reporting is a dependent surveillance system in which the position of the aircraft is determined from on-board navigation equipment and then conveyed by the pilot to ATC by radiotelephony. Independent surveillance is a system which measures aircraft position from the ground. Current surveillance is either based on voice position reporting or based on radar (primary surveillance radar (PSR) or secondary surveillance radar (SSR)) which measures range and azimuth of aircraft from the ground station.

9.1.2 The surveillance systems of the new CNS/ATM systems include not only those above but also Automated Dependant Surveillance (ADS), its derivative ADS-broadcast (ADS-B) and the Airborne Collision Avoidance System (ACAS).

9.1.3 Detailed information regarding the surveillance elements of CNS/ATM systems is provided at Chapter 7 of the Global Plan.

9.2 Transition Guidelines

9.2.1 Guidelines for transition to the future systems encourage equipage by users for the earliest possible accrual of systems benefits. Although a transition period of dual equipage, both airborne and ground, is often necessary to ensure the reliability and availability of a new system, the guidelines are aimed at minimizing this period to the extent practicable. The Global Plan, Vol. I, Chapter 7, Appendix B lists the guidelines that States, regions, users, service providers and manufacturers should consider when developing CNS/ATM systems or planning for implementation of such systems. These guidelines are reproduced below for ease of reference and is support of regional planning:

GUIDELINES FOR TRANSITION TO SURVEILLANCE SYSTEMS

- States should, as necessary, develop operational procedures, in accordance with ICAO SARPs, procedures and guidelines, for the implementation of ADS within airspace under their control.

- Transition to ADS-C should initially begin in oceanic airspace and in continental en-route airspace with low-density traffic.

- Transition to ADS-B should initially begin in en-route airspace with low-density traffic.

- Development of ADS-B plans should attempt to optimise coverage using the minimum number of necessary ground stations. States should attempt to share the data from ADS-B ground stations and perhaps share the costs of establishing and maintaining these ground stations in cases where that is appropriate. States should consider the deployment of ADS-B to provide surveillance coverage at FIR boundaries to maximise FIR crossing coordination and safety for both FIRs

- States and/or regions should ensure that ADS is introduced in a co-ordinated fashion in adjacent FIRs traversed by major traffic flows.

- Where different surveillance methods are employed in adjacent FIRs, commonality or compatibility of systems should be ensured to enable a service which is transparent to the user.

- During the transition period in which ADS position reporting is introduced, the current levels of integrity, reliability and availability of existing position reporting systems must be maintained.

- States and/or regions should take action within the ICAO framework to ensure that implementation of changes due to ADS-C and ADS-B and other systems result in more efficient use of airspace.

- During the transition to ADS, suitably-equipped aircraft should be able to derive benefits from the use of preferred routes without penalizing non-ADS-equipped aircraft.

- ADS should be introduced in incremental phases.

- ADS equipment should be implemented in accordance with standards and procedures in such a way as to permit the use of ADS as a backup for other surveillance methods.

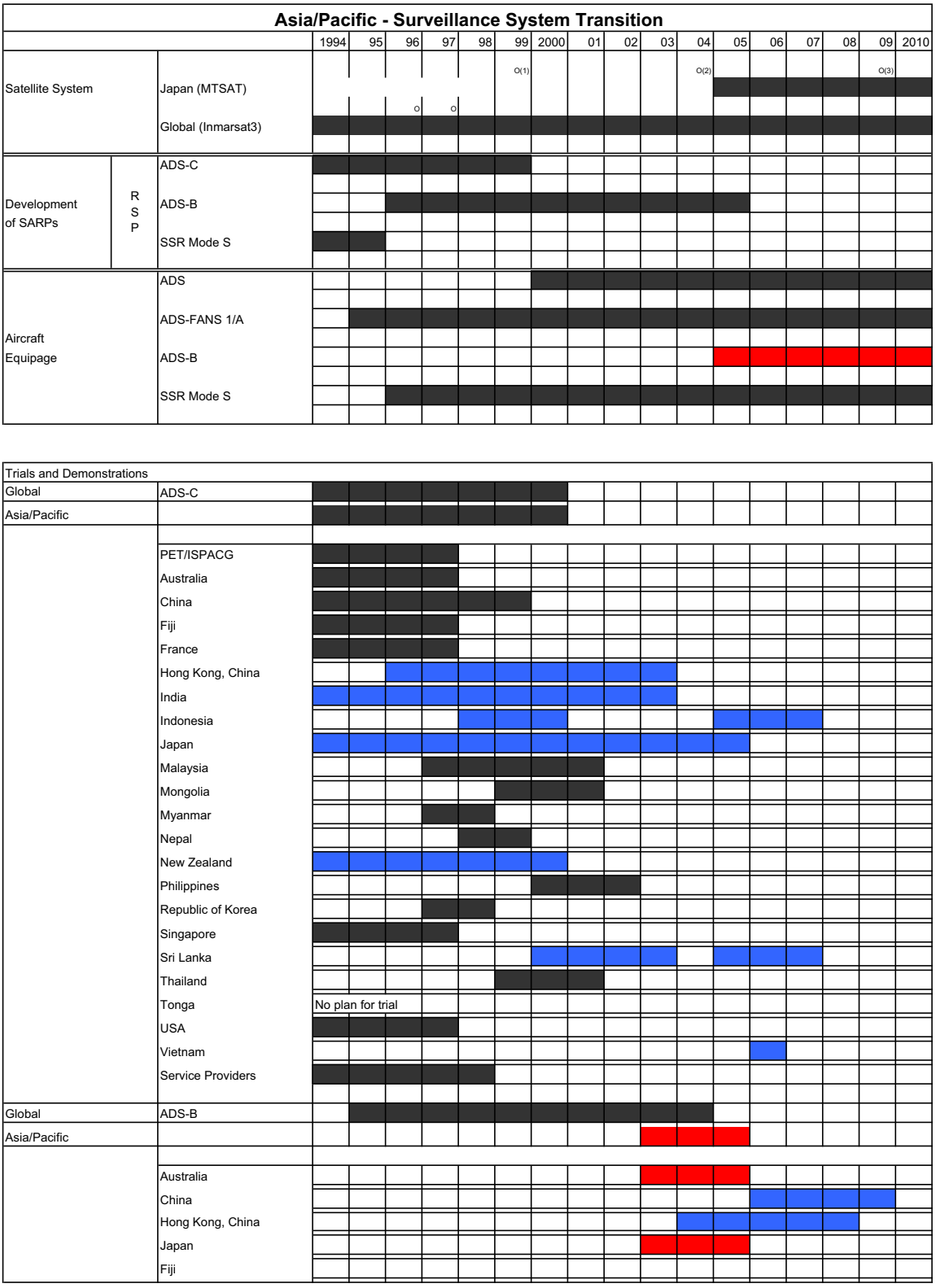
9.3 Asia/Pacific Transition Timescale

9.3.1 The key Global and Asia/Pacific events in the transition to the new surveillance systems are shown in Table 9-1. The timescales for the occurrence of the key events are based on currently available information from States and international organisations and will be revised as updated information becomes available.

9.3.2 The table is formatted in the same style as the Global Plan, Volume II, Chapter 8, for ease of reference, standardization and amendment action as is required from time to time. It is essentially divided into three sections. The first section provides detail regarding the **Satellite System**, the **Development of SARPs** and **Aircraft Equipage**. The last two sections detail, respectively, generic global and specific regional information on **Trials and Demonstrations** and **Implementation and Operational Use**.

9.3.3 The single minor variation from the Global Plan is the inclusion of satellite system information relevant to the Asia/Pacific in the first section.

(Refers to Excel file for the timelines)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Development of SARPs
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SSR Mode S
Aircraft Equipage
ADS
ADS-FANS 1/A
ADS-B
SSR Mode S
Trials and Demonstrations
Global
ADS-C
Asia/Pacific
PET/ISPACG
Australia
China
Fiji
France
Hong Kong, China
India
Indonesia
Japan
Malaysia
Mongolia
Myanmar
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Philippines
Republic of Korea
Singapore
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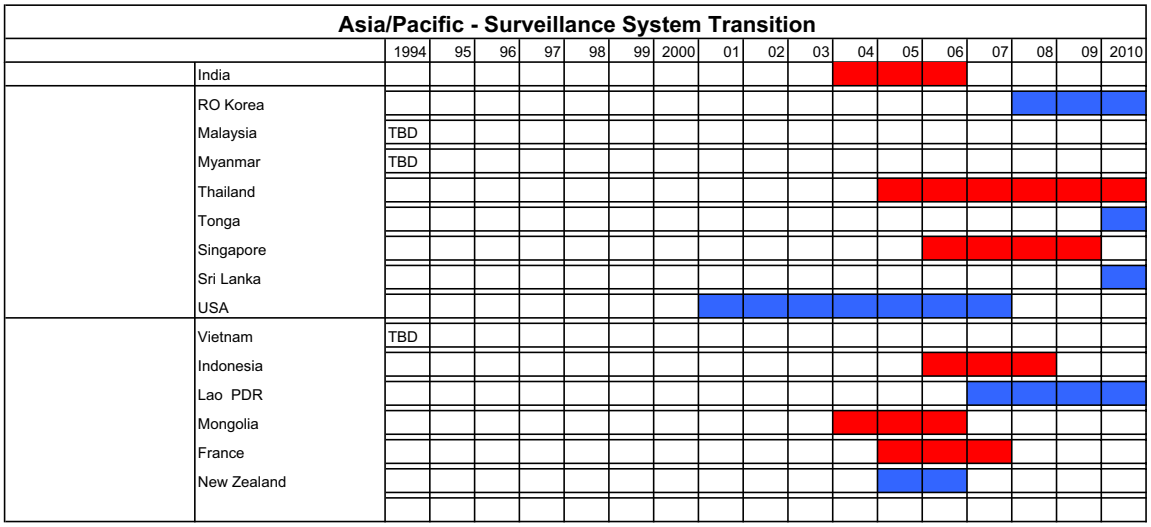
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Mongolia
France
New Zealand

Asia/Pacific - Surveillance System Transition

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Global	SSR Mode S																	
Asia/Pacific																		
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	China																	
	Hong Kong, China																	
	Indonesia																	
	Japan																	
	Lao PDR																	
	Korea, republic of	TBD																
	Sri Lanka																	

Note: The following states indicate no trial is planned for Mode S: Malaysia, Singapore, Thailand, Tonga, USA, Vietnam

Implementation and Operational Use																		
Global	ADS-C																	
Asia/Pacific																		
	Australia																	
	China																	
	Hong Kong, China	No implementation plan																
	Japan																	
	RO Korea																	
	Fiji	TBD																
	India																	
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	Tonga	No implementation plan																
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		TBD																
Global	ADS-B																	
Asia/Pacific																		
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	India	TBD																
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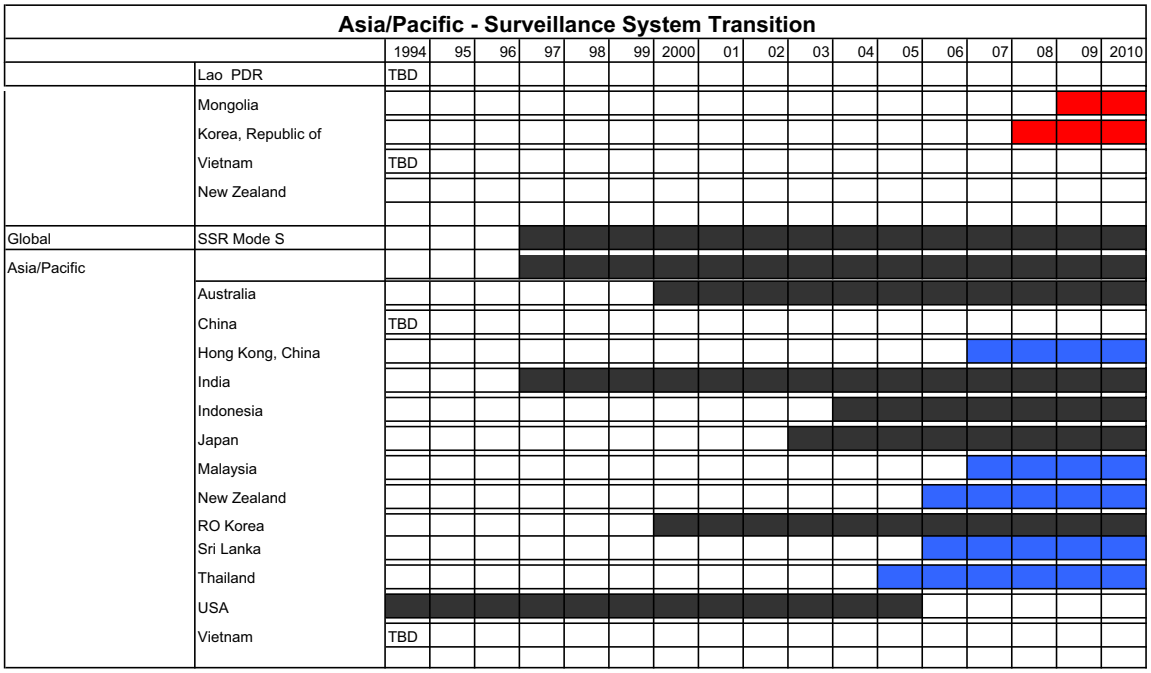
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AGENDA ITEM 4: DEFICIENCIES IN THE AIR NAVIGATION FIELDS

Agenda Item 4: Deficiencies in the Air Navigation Field

Unified strategy to resolve safety-related deficiencies

4.1 The meeting noted that the findings of the USOAP revealed many difficulties in implementing SARPs or correcting identified safety-related deficiencies by States, thus creating potential safety gaps and sources of risk to aviation safety. Reasons include the lack of adequate staff and financial resources, and lack of political commitment. Keeping the strategic objectives of the Organization in mind, the unified strategy to resolve safety-related deficiencies comprises two main elements. It aims, firstly, to provide assistance to States, or groups of States, in resolving safety-related deficiencies. Secondly, it aims to ensure increased transparency and sharing of safety information for use by States when performing their safety oversight functions, including inspections as provided for in Article 16 of the Convention. The Assembly, at its 35th Session (Montreal, 28 September - 8 October 2004), adopted Resolution A35-7: Unified strategy to resolve safety-related deficiencies. The Resolution recognizes the challenges faced by States in the implementation of their safety oversight systems, and endorses the concept of a unified strategy to resolve safety-related deficiencies based on the principles of increased transparency, cooperation, assistance and partnerships, where appropriate.

4.2 Another element of the unified strategy is fostering partnerships among States, the industry, regional safety oversight organizations, financial institutions and other international organizations. This is expected to be achieved through the establishment and management of regional safety oversight initiatives. States will be encouraged to work together through regional safety oversight organizations (RSOOs) and Cooperative Development of Operational Safety and Continuing Airworthiness Programmes (COSCAPs) where applicable. In this respect, the *Safety Oversight Manual* (Doc 9734), Part B — *The Establishment and Management of a Regional Safety Oversight System*, has been developed and will provide the necessary guidance to States for the implementation of regional safety oversight initiatives.

4.3 Contracting States in need of assistance will be encouraged to take advantage of the funding opportunity offered by the administration of the International Financial Facility for Aviation Safety (IFFAS). Also, due to the scope of the implementation of the unified strategy worldwide and the limited funds available through IFFAS, ICAO will also support States in their efforts to obtain assistance from various sources such as the World Bank, regional development banks, the European Commission and also from the manufacturing industry and the private sector. This assistance may come in various forms such as loans, grants or services in kind. In all cases ICAO will help States ensure that such assistance will fit into a programme plan that generates results for both States and donors.

4.4 The meeting recognizing that the unified strategy, as reflected in Resolution A35-7, is of a high priority for addressing safety related deficiencies, urged States to share with other Contracting States critical safety information which may have an impact on the safety of international air navigation and to facilitate access to all relevant safety information. The meeting also requested States to provide tangible support for strengthening and furtherance of regional safety oversight organizations.

Status of deficiencies in the Air Navigation Field

4.5 The meeting reviewed the Lists of deficiencies in the various air navigation fields, as updated by the Sub-group meetings or through other sources since APANPIRG/15 meeting in August 2004. During the meeting, some of the participants advised actions taken by their States with regard to the items on the List of Deficiencies. The updated information had been included in the Appendices to the Report on Agenda Item 4. The meeting requested States and users to provide regular updates by letter to the Regional Office, including instances where actions had been taken for the resolution of deficiencies. The Lists as updated by the meeting are presented in **Appendices A to D**.

Deficiencies in the ATM/AIS/SAR fields

4.6 The list of Deficiencies in the ATM/AIS/SAR fields is included as **Appendix A** to the Report on Agenda Item 4. The meeting noted that the following progress had been made since APANPIRG/14.

ATS Routes

4.6.1 The meeting recalled that the APANPIRG/15 Deficiency list recorded 28 ATS route related entries, mainly as priority 'B' status. ANP amendment procedures had commenced for about half of these and the remainder had been allocated to the ATS Route Network Review Task Force (ARNR/TF) for review. APANPIRG/15 was of the view that the deficiency status on the ATS routes be retained as currently reflected until the ARNR/TF had undertaken a suitable review.

4.6.2 The ARNR/TF had reviewed routes on the List in its work to compile the Asia/Pacific ATS Route Catalogue. In the process of this work of the ARNR/TF, approximately 30 route related amendment proposals had been raised, leading to 21 route deficiency items being addressed. The meeting raised Conclusion 16/7 in respect of their removal in bulk from the Deficiencies List. The remaining 7 route items will be further assessed by States and the Regional Office in due course.

WGS-84

4.6.3 There were 9 States presently listed as deficient under priority 'A', of which four (4) had partially implemented WGS-84 at main airports. Of the 5 States that had not implemented, the meeting noted that 4 of these were small States that may not have suitable resources to undertake this work. It was important that the reasons behind the non-compliance be accurately established, in order that suitable assistance could be arranged if required.

4.6.4 The meeting recalled that during APANPIRG/15 Japan, in agreeing with the concerns raised, undertook to follow up with the Japan Civil Aviation Bureau with a view to assessing whether assistance would be available via current assistance programs sponsored by the Japanese government. Japan updated the meeting that some progress had been made in this respect, with one State in the process of being assisted by the Japanese government. Work was progressing, although unfortunately very slowly.

4.6.5 Australia also agreed with the concerns expressed during APANPIRG/15 and undertook to coordinate with the Pacific Aviation Safety Office (PASO) to see if assistance could be provided. Australia informed the meeting that although some coordination had taken place in this regard, there was no progress to report. Australia advised that they would continue to attempt to make arrangements in this regard.

4.6.6 The meeting also requested that the ICAO Regional Office draw the attention of relevant States in the Pacific region with regard to deficiencies and inform PASO accordingly.

Type of ATS

4.6.7 One State was listed as deficient under priority 'A" as not providing Area Control Service on international ATS routes. Equipment upgrades were taking place, with a HF radio upgrade expected to be completed shortly and CPDLC by the end of 2005, thereby addressing the deficiencies.

Airspace classification

4.6.8 Ten States were listed as deficient under priority 'A' as not having classified their airspace. Of these, 1 State has notified a difference and 2 States have advised the Regional Office that classification has been carried out but have not provided official confirmation. Two States reported that work was in progress.

AIP format

4.6.9 Six States were listed as deficient under priority 'A' as not having published their AIP in the ICAO format. Of these, one State advised the Regional Office that they have completed the format but have not provided official confirmation.

SAR capability

4.6.10 Three States were listed as deficient under priority 'U'. Although one State notified a single SAR agreement had been developed, assistance would be of benefit to the States listed in this respect.

ACAS and Pressure Altitude Reporting Transponders

4.6.11 The meeting reviewed the history of actions taken by APANPIRG in respect of the mandatory carriage of pressure altitude reporting transponders and ACAS II equipment. A survey was conducted by the Asia/Pacific Regional Office in August 2000 to obtain detailed information from States regarding the status of their implementation plans for the carriage and operation of pressure-altitude reporting transponders, and of the implementation plans for the carriage and operation of ACAS II. Despite regular reviews since that time, a number of States had still not implemented these provisions.

4.6.12 The meeting reviewed the Regional Office records in respect to ACAS II and pressure altitude reporting transponders and, in opening new categories on the Deficiencies List, added 11 States to the List Deficiencies in the ATM/AIS/SAR Fields in respect of ACAS II and 15 States in respect of pressure altitude reporting transponders.

Deficiencies in the AOP field

4.7 States listed in the AOP deficiencies list have been requested by an ICAO State letter, dated 26 May 2005, to report progress on the action taken to resolve those deficiencies. Replies have been received from Myanmar and Pakistan providing updates, as follows:

4.7.1 DCA of Myanmar informed that after the replacement of the runway overlay of the runway of Yangon/Mingaladon Airport, there have not been complaints from the international airlines of the runway surface being slippery when wet. The responsible organization has been monitoring any reports from airlines in this regard. However, it was also informed that the final layer of the asphalt overlay of the runway was still to be completed.

4.7.2 The CAA of Pakistan informed that action has been taken for repainting runway and taxiway markings using thermoplastic paint. The completion of this work is to be confirmed by Pakistan.

4.7.3 The meeting was also informed by Viet Nam on changes of the target dates of completion of actions related to Hanoi/Noibai Airport.

4.7.4 The updated List of Air Navigation Deficiencies in the AOP field is given in Appendix B.

Deficiencies in the CNS and MET fields

4.8 The meeting noted that CNS/MET SG/9 meeting reviewed and updated the List of Deficiencies in the CNS and MET fields and the updated Lists were incorporated in Appendix C and D to the report on this agenda item, respectively. The following developments were noted:

CNS deficiencies

4.8.1 As a result of actions taken by Bangladesh, the long standing deficiency of lack of VHF coverage in Dhaka FIR has been resolved by delegating the responsibility for the provision of ATS over the Southern part of Dhaka FIR to Kolkata ACC to overcome operational problems. A formal notification had been received from Bangladesh. It was therefore agreed to remove the deficiency.

4.8.2 An ICAO mission was conducted to Myanmar to discuss the issue with the high level officials of the government. Urgent need to overcome the air-ground communication deficiency was brought to the attention of the government. An action plan was developed for implementation by the end of 2004. Action was taken by Myanmar to implement the action plan. The VHF systems were upgraded and put on trial operation on 9 May 2005. AIP Supplement 01/05 dated 28 April 2005 was issued to notify change in frequencies and the new VHF system was declared operational effective 9 June 2005.

4.8.3 The meeting noted the work done by Myanmar to improve the VHF air-ground communication in the Yangon FIR.

4.8.4 The airlines had reported improvement in communication in Yangon FIR however some reports still indicate some communication difficulties. In view of this IATA suggested that the operation would be closely monitored through pilot reports for some time until the required reliability is achieved.

MET deficiencies

4.8.5 The main progress identified was the elimination of the long standing problem with the lack of TAF for the two international airports in Cambodia: Phnom Penh (VDPP) and Siem Reap (VDSR). It was appreciated that the elimination of this deficiency was possible due to the assistance provided to Cambodia by Viet Nam in terms of training of forecasters and provision of operational help in preparing TAF (issuance of “draft TAF” for VDPP and VDSR by the meteorological office at Tan Son Nhat airport in Viet Nam).

4.8.6 Some improvement in the issuance of SIGMET for volcanic ash had been identified; however, the removal of this deficiency from the list would be subject to further validation.

4.8.7 Deficiencies identified for Cambodia and Myanmar for non-utilization of the WAFS products had not yet been resolved. However, both States sent participants to the second WAFS GRIB/BUFR training seminar held in Bangkok in January 2005, and indicated firm intentions to ensure reception and utilization of these products in the near future.

4.8.8 As regards the long-standing deficiencies related to the Pacific States, ICAO established a Special Implementation Project (SIP), *Enhancement of the meteorological service for aviation in the Pacific*, to be held in 2005. It was expected that through this SIP ICAO would assist in resolving some of the safety-related MET deficiencies in this Region.

Review of the Effectiveness of the Asia/Pacific Supplement to the Uniform Methodology

4.8.9 The meeting recalled that APANPIRG/15 was of the opinion that a post-implementation review should be carried out by the Deficiency Review Task Force (DRTF) to assess the effectiveness and efficiency of resolving the deficiencies using the guidance materials in the Asia/Pacific Supplement to the Uniform Methodology for the Identification, Assessment and Reporting of Air Navigation Deficiencies. This review should include such issues as identification, collection and validation of information, safety assessment and prioritization, development of action plans, reporting and monitoring of the corrective actions. APANPIRG/15 considered that the review should be conducted post APANPIRG /16 and be completed not later that 30 May 2006.

4.8.10 In noting this matter, the meeting agreed that the review could be adequately managed via correspondence and tasked the Regional Office, in conjunction with the Chairman of the Deficiency Review Task Force, Mr Jeff Bollard (Airservices Australia), to make suitable arrangements for the review.

IATA's position on ATS deficiencies in the Asia/Pacific Region

4.8.11 The meeting was advised by IATA of details of deficiencies related to the provision of air traffic services in the Asia/Pacific Region. The information provided was not new, and some of the deficiencies identified had been in existence for a long time. These included air-ground and ground-ground communications, use of non-standard R/T phraseology, unintelligible communications due to poor command of English, poor ATC practices and procedures, non-compliance with Annex 14 requirements and Annex 15 notification requirements, etc. Operators continue to encounter airspace and air route closures, changes to navigation procedures, etc., where insufficient notice was given.

IFALPA's position on ATS Deficiencies in the Asia/Pacific Region

4.8.12 IFALPA expressed concerns with the slow progress in handling of deficiencies and noted that RASMAG had identified substantial issues associated with the lack of basic safety management systems in certain segments of Asia/Pacific region along with other major issues warranting immediate attention. These included the presence of non-RVSM aircraft in RVSM airspace.

4.8.13 IFALPA considered that the deficiencies list should be included as an agenda item at every regional ATS Coordination Group meeting. This would ensure that the list was continually updated by relevant experts and that progress was considered throughout the year. IFALPA urged the meeting to consider this approach, and also to raise these issues at the Conference of Directors General in September 2005.

4.8.14 The meeting in noting the information and suggestions provided by IFALPA, thanked IFALPA for their support in managing deficiencies, particularly via their Annex 19 processes.

Safety Contact Point

4.8.15 The meeting recognized that ICAO had placed considerable priority on identifying and rectifying deficiencies and strongly supported the sharing of safety data. With the expansion of the USOAP this year in the Asia/Pacific Region and in view of the persistence of operational deficiencies as reported by IATA, the meeting agreed that a renewed effort should be made by States to take proactive action in tackling such deficiencies. An important step in this process would be to provide to the Regional Office a contact address and person who would respond in a timely and effective manner in addressing operational deficiencies notified by operators. Accordingly, the meeting agreed to the following Conclusion:

Conclusion 16/62 – State focal point for safety-related activities

That, Asia/Pacific States notify to the Regional Office by the first quarter of 2006 a responsible contact officer or position to act as a focal point for safety related activities and in particular for the submission and coordination of ATS incident reports.

APANPIRG REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE ATM/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

(Changes proposed after APANPIRG/15 are shown in strikeout and underlining.)

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 V.III, Table ATS 1 of the Air Navigation Plan	~~Hong Kong, China/Japan~~	~~A202 - Partially implemented~~	~~24/11/93~~	~~Hong Kong-Bangkok segment was implemented on 1 November 2001.~~ ~~Japan considering implementation as a conditional route.~~	~~Japan - co-ordinate Hong Kong, China~~	~~Hong Kong, China/ Japan~~	~~HongKong-Bangkok segment 1/11/2001;~~ ~~Hong Kong-Chitose segment TBD~~ ~~Review by ARNR/TF~~	~~B~~
	~~China/Hong Kong, China~~	~~A203 - Not implemented~~	~~24/11/93~~	~~China advises no international flight requirements.~~	~~China requested deletion and amendment to BANP.~~	~~China/Hong Kong, China~~	~~Subject to BANP amendment.~~	~~B~~
	~~Indonesia~~	~~A211 - Partially implemented~~	~~24/11/93~~	~~ICAO has requested Malaysia to co-ordinate the early implementation of A211 with States concerned.~~ ~~Malaysia has advised at SEACG/10 of the implementation of the route within Malaysia on 29 November 2001.~~	~~Indonesia - implement the missing segement~~ ~~ICAO- coordinate the implementation with Indonesia~~	~~Indonesia~~ ~~ICAO~~	~~29/11/2001 (by Malaysia)~~ ~~TBD by Indoensia.~~ ~~Review by ARNR/TF~~	~~B~~

APANPIRG REPORTING FORM ON 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****
	~~China/Russian Federation~~	~~A218 - Partially implemented in Russia and Alaska~~	~~24/11/93~~	~~ICAO has taken action to co-ordinate with China/Russian Federation for implementation of Harbin-Ekimchan segment and to amend ANP. APAC 99/1-ATS was approved on 26/1/00. CAAC subsequently advises (14 Apr 03) that current route G212 meets the requirements and the proposed A218 is no longer required.~~	~~China requested deletion and amendment to BANP.~~	~~China/ Russian Federation ICAO~~	~~Subject to BANP amendment. Review by ARNR/TF~~	~~B~~
	~~Japan~~	~~A223 - Not implemented~~	~~24/11/93~~	~~Japan has advised that a domestic route network covers the route.~~	~~Japan – consider implementation as a conditional route.~~	~~Japan~~	~~TBD Review by ARNR/TF~~	~~B~~

APANPIRG REPORTING FORM ON 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****
	~~China/Mongolia/Russian Federation~~	~~A335 - Partially implemented~~	~~24/11/93~~	~~China and Mongolia advised that this segment is covered by other ATS routes properly; thus will **has** proposed its deletion from ANP.~~ ~~China reported to APANPIRG/14 the portion between HOHHOH – TUMURTAI was implemented.~~	~~China, Mongolia - propose BANP amendment~~	~~China/Mongolia~~	~~Deletion of A335 notified 9 Oct 01~~ ~~Subject to BANP amendment.~~	~~B~~
	~~Indonesia/Malaysia~~	~~A341 - Partially implemented~~	~~24/11/93~~	~~ICAO has requested Indonesia to co-ordinate implementation with Malaysia.~~ ~~Malaysia has advised that the existing route B584 fulfils sufficiently the requirement and would propose the deletion of the requirement for Syrabaya-Kota Kinabalu segment.~~	~~Indonesia/Malaysia - consider full implementation~~	~~Indonesia/Malaysia~~	~~12/2001~~ ~~Review by ARNR/TF~~	~~B~~

APANPIRG REPORTING FORM ON 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****
	~~Indonesia/United States~~	~~A450 - Partially implemented~~	~~24/6/94~~	~~ICAO has requested Indonesia to co-ordinate implementation with United States. United States has agreed to the implementation, and a response from Indonesia is being awaited.~~	~~Indonesia/United States - consider full implementation~~	~~Indonesia/United States~~	~~TBD Review by ARNR/TF~~	~~B~~
	~~Viet Nam~~	~~A469 - Implemented as W9 before. As of 1 Nov 2001 implemented as L643.~~	~~19/8/94~~	~~ICAO has requested Viet Nam to implement as A469. Viet Nam advised that W9 was replaced with L643 on 1 November 2001.~~	~~Viet Nam - propose deletion of the requirement as A469 ICAO process BANP amendment~~	~~Viet Nam ICAO~~	~~Subject to BANP amendment.~~	~~B~~
	India/Nepal	A473 - Not implemented	16/3/99	A new proposal was submitted in mid 2003 by Nepal. This is being coordinated by AAI with defense authorities.	India/Nepal - implement the route	India/Nepal	Item captured in Chapter 2 of the Route Catalogue.	B
	~~Thailand~~	~~A581 - Partially implemented~~	~~17/2/97~~	~~China, Lao PDR and Thailand proposed an amendment to ANP. ICAO processed APAC99/11 in co-ordination with China/Myanmar/Thailand. APAC99/1 was approved on 15 December 2000.~~	~~Thailand - implement accordingly.~~	~~Thailand~~	~~Review by ARNR/TF.~~	~~B~~

APANPIRG REPORTING FORM ON 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****
	~~United States~~	~~A584 - Partially implemented~~	~~24/6/94~~	~~ICAO has requested United States to implement the missing segment. United States has proposed deletion of the missing segment, and the proposal is under preparation.~~	~~ICAO - process an amendment in co-ordiantion with United States.~~	~~United States ICAO~~	~~Subject to BANP amendment.~~	~~B~~
	~~Fiji/New Zealand~~	~~B201 - Not implemented~~	~~24/11/93~~	~~Fiji/New Zealand have advised that they agreed to delete the requirement. ICAO will process ANP amendment as this was covered by routes B575, G457 and R327.~~	~~Fiji/New Zealand - propose an amendment to delete the requirement in BANP~~	~~Fiji/New Zealand ICAO~~	~~Subject to BANP amendment.~~	~~B~~
	~~Maldives~~	~~B204 - The requirements for this route are not detailed in BANP~~	~~24/1/96~~		~~Maldives - propose an amendment to ANP to add the route.~~	~~Maldives ICAO~~	~~Subject to BANP amendment~~	~~B~~
	~~Japan/Rep of Korea~~	~~B212 - Not implemented~~	~~24/11/93~~	~~Japan is considering implementation as a conditional route and will coordinate with Republic of Korea.~~	~~Japan/Rep of Korea - consider implementation~~	~~Japan/Rep of Korea~~	~~12/2005 Review by ARNR/TF .~~	~~B~~

APANPIRG REPORTING FORM ON 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****
	~~Papua New Guinea~~	~~B456 - Partially implemented~~	~~24/11/93~~	~~Papua New Guinea has advised that they will formally propose ANP amendment for deletion of the missing segment.~~	~~Papua New Guinea - propose an amendment to BANP. ICAO process BANP amendment.~~	~~Papua New Guinea ICAO~~	~~Subject to BANP amendment .~~	~~B~~
	China	B591 - Partially implemented	22/7/97	~~Co-ordination is in progress among States and ICAO.~~	~~ICAO - continue on-going implementation co-ordination related to the Revised South China Sea route structure with States.~~ China will consider for future imeplementation.	China	TBD Review by ARNR/TF. Captured in Chapter 2 of the Route Catalogue	B
	Indonesia	G461 - Implemented with different route specification	24/11/93	ICAO co-ordinated with Indonesia to amend BANP requirement. APAC00/1-ATS was approved on 15 January 2001.	Indonesia-implement the requirement accordingly.	Indonesia	Implemented with different route specification. Amendment Proposal to be submitted. Captured in Chapter 3 of the Route Catalogue.	B
	Cambodia/Philippines/ Thailand/Viet Nam	G473 - Partially implemented	24/11/93	Co-ordination is in progress among States and ICAO.	ICAO - continue ~~ongoing~~ implementation co-ordination ~~related to the Revised South China Sea route structure with States~~	Cambodia /Philippines Thailand/Viet Nam/ICAO	Captured in Chapter 2 of the Route Catalogue.	B
	~~DPR Korea/ Rep of Korea~~	~~G589 - Not implemented~~	~~24/11/93~~		~~B467 established instead of G589 April 1998~~	~~DPR Korea/ Rep of Korea~~	~~April 1998 completed Review requirement for G589 by ARNR/TF~~	~~B~~

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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****
	China/Kazakhstan	R216 - Not implemented	24/11/93	CAAC advises current route B215 KUQA A460 REVKI to Alma Ata meets the requirements for traffic from Urumqi to Alma Ata and requests deletion of R216 from BANP (14 Apr 03).	CAAC ~~proposed deletion.~~ will coordinate with Kazakhstan to delete R216 from BANP	China/Kazakhstan ICAO	Captured in Chapter 2 of the Route Catalogue.	B
	~~China~~	~~R333 - Not implemented~~	~~24/11/93~~	~~China is considering future implementation.~~	~~China and Hong Kong, China – co-ordinating with Hong Kong CAA~~	~~China~~	~~TBD Review by ARNR/TF~~	~~B~~
	~~China/Hong Kong, China~~	~~R335 - Not implemented~~	~~24/11/93~~	~~CAAC advises no international flight requirements and requests deletion from ANP (14 Apr 03).~~	~~China proposed deletion and amendment to BANP~~	~~China/Hong Kong, China ICAO~~	~~Subject to BANP amendment.~~	~~B~~
	Cambodia/Lao PDR/Thailand	R345 - Not implemented	24/11/93	Cambodia has advised that the requirement is no longer valid and will propose the deletion of requirement in consultation with Lao PDR and Thailand.	~~ICAO - continue ongoing implementation co-ordination related to the Revised South China Sea route structure with States~~ Cambodia- coordinate the deletion with IATA as well as Lao PDR and Thailand	Cambodia/Lao PDR/ Thailand	Captured in Chapter 2 of the Route Catalogue.	B

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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****
	Indonesia	R459 - Implemented as W51 and W36	24/11/93	ICAO has requested Indonesia to implement as R459.	Indonesia, Singapore - consider promulgationimplementation of the route with designator R459L504 in AIP	Indonesia/Singapore	TBD Implementation by Indonesia 25/11/2004 Singapore 20/1/2005 Review by ARNR/TF To be implemented as L504. Target implementation date TBD	B
	Russian Federation	R466 - Implemented as R446 in Russian Federation. Route requirement is listed in EUR/NAT ANP	24/11/93	ICAO has requested Russian Federation to delete R221 and promulgate the route as R466 in AIP. Implemented as R446.		Russian Federation ICAO	Coordination with the Paris Office to amend ANP	A
	Indonesia/Malaysia	R579 - Not implemented	24/11/93	ICAO has requested Malaysia to co-ordinate with Indonesia for implementation. Malaysia considered there was no longer requirement due to a low trafficmovement; thus will propose the deletion.	Indonesia/Malaysia - consider implementation.	Indonesia	12/2001 Review by ARNR/TF	B
	India/Oman	R593 - Not implemented	24/11/93	India advised ATM/AIS/SAR/SG/14 that India and Oman had agreed to delete.	India proposed deletion and amendment to ANP	India/Oman	Subject to ANP amendment.	B
WGS-84								

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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****
Requirements of Paragraph 3.6.4 of Annex 15	Bhutan	WGS-84 - Not implemented	2/7/1999	Data conversion completed, but not published		Bhutan	TBD	A
	Cambodia	WGS-84 - Partially implemeted	28/6/2001	Cambodia reported ICAO on 22 June 2004 that the WGS-84 coordinates have been implemented in international airports, airspace and international routing.		Cambodia	TBD	A
	China	WGS-84 - Not implemented * implemented in the Sanya AOR as of 1 Nov 2001	2/7/1999	Differences to Annex 15 - *Aeronautical Information Services* are notified		China		A
	DPR Korea	WGS-84 - Not implemented				DPR Korea	~~TBD~~ 2004	A
	Kiribati	WGS-84 - Not implemented				Kiribati	TBD	A
	~~Malaysia~~	~~WGS-84 - Partially implemented~~		~~In progress. Updated information received. Confirmation of completion date required.~~		~~Malaysia~~	~~December 2002.~~ In AIP	~~A~~
	Nauru	WGS-84 - Not implemented		Conferring with consultant		Nauru	TBD	A
	Philippines	WGS-84 - Implemented at main airports		on-going		Philippines	~~2003 2004~~ 2006	A
	Solomon Islands	WGS-84 - Not implemented				Solomon Islands	1999	A

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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****
	Vanuatu	WGS-84 - Implemented at main airports	2/7/1999			Vanuatu	1999	A
Type of ATS								
Requirements of Part II, Table ATS 3D of the air navigation plan	India	Some ATS route segments in part of Mumbai FIR are subject to Advisory Services	24/11/93	Co-ordination in progress through BBACG. HF radio being modernized and datalink being installed.	India - implement Area Control Services	India	Modernization of HF radio by the end of 2004 CPDLC by the end of 2005	A

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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****
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		A
	Cook Islands	Airspace Classification - Not implemented	7/7/99			Cook Islands	TBD	A
	DPR Korea	Airspace Classification - Not implemented	7/7/99			DPR Korea	~~TBD~~ 2005	A
	Japan	Airspace Classification - ~~Not~~ Partially implemented	~~2/19/04~~		Implementation in oceanic airspace in progress	Japan	Domestic airspace complete, final stage of oceanic airspace classification will occur on AIRAC 29 September 2005	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	~~mid 2001 Offical confirmation pending~~ Project in place, anticipated implementation first quarter 2006	A
	Samoa	Airspace Classification - Not implemented	7/7/99		CTR C and D Samoa Sector Class G	Samoa	Completed Official confirmation required	A
	Solomon Islands	Airspace Classification - Not implemented	7/7/99			Solomon Islands	TBD	A
	Viet Nam	Airspace Classificatio - Not implemented	7/7/99			Viet Nam	~~2003/2004~~ Some work is being carried out, expected completion 2006	A

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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****
AIP Format								
Requirements of Chapter 4 of Annex 15	Cook Islands	AIP Format - Not implemented	7/7/99			Cook Islands	TBD	A
	Kiribati	AIP Format - Not implemented	7/7/99			Kiribati		A
	Lao PDR	AIP Format - Not implemented	7/7/99			Lao PDR	Sep 2003+H6	A
	~~Myanmar~~	~~AIP Format - Not implemented~~	~~7/7/99~~			~~Myanmar~~	~~Completed 2003 (To be published) AIP published 2005~~	~~A~~
	Nauru	AIP Format - Not implemented	7/7/99			Nauru	TBD	A
	Papua New Guinea	AIP Format - Not implemented	7/7/99	under development		Papua New Guinea	TBA, under review during 2006	A
	Samoa	AIP Format - Not implemented	7/7/99			Samoa	5/15/2003 (to be confirmed)	A
	~~Tonga~~	~~AIP Format - Not implemented~~	~~7/7/99~~		~~Under preparation~~	~~Tonga~~	~~2004 AIP published with effect 14 April 2005~~	~~A~~
SAR capability								
Requirements of Annex 12	Cambodia	Annex 12 requirements not implemented. ~~No agreements with adjacent States.~~	20/2/97		Cambodia - implement Annex 12 requirements and co-ordinate LOA with adjacent States ICAO - assist to develop SAR capability and to co-ordinate with adjacent States	Cambodia	~~TBD~~ SAR agreement established with Viet Nam February 1999	U

APANPIRG REPORTING FORM ON 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****
	Cook Islands	Annex 12 requirements not implemented. No agreements with adjacent States.	31/1/95	SAR agreement with New Zealand under development	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	2004	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	2004	U
Carriage of ACAS II		ACAS II required for aeroplanes in excess of 15,000kg or 30 pax.						
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

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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****
	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
	Philippines	Annex 6 requirement not implemented.	26/8/05		Philippines - implement Annex 6 as required.	Philippines	TBD	U
	Solomon Islands	Annex 6 requirement not implemented.	26/8/05		Solomon Islands - implement Annex 6 as required.	Solomon Islands	TBD	U
	Vanuatu	Annex 6 requirement not implemented.	26/8/05		Vanuatu - implement Annex 6 as required.	Vanuatu	TBD	U
Carriage of Pressure Altitude Reporting Transponder		Pressure altitude reporting transponder required for all aeroplanes since since 1/1/02.						
Requirement of Chapter 6 of Annex 6	Bangladesh	Annex 6, Annex 10 requirements not implemented.	26/8/05		Bangladesh - implement Annex 6, Annex 10 as required.	Bangladesh	TBD	U
	Bhutan	Annex 6, Annex 10 requirements not implemented.	26/8/05		Bhutan - implement Annex 6, Annex 10 as required.	Bhutan	TBD	U
	Cambodia	Annex 6, Annex 10 requirements not implemented.	26/8/05		Cambodia - implement Annex 6, Annex 10 as required.	Cambodia	TBD	U
	Cook Islands	Annex 6, Annex 10 requirements not implemented.	26/8/05		Cook Island - implement Annex 6, Annex 10 as required.	Cook Islands	TBD	U

APANPIRG REPORTING FORM ON 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****
	DPR Korea	Annex 6, Annex 10 requirements not implemented.	26/8/05		DPR Korea - implement Annex 6, Annex 10 as required.	DPR Korea	TBD	U
	New Caledonia	Annex 6, Annex 10 requirements not implemented.	26/8/05		New Caledonia - implement Annex 6, Annex 10 as required.	New Caledonia	TBD	U
	Kiribati	Annex 6, Annex 10 requirements not implemented.	26/8/05		Kiribati - implement Annex 6, Annex 10 as required.	Kiribati	TBD	U
	Lao PDR	Annex 6, Annex 10 requirements not implemented.	26/8/05		Lao PDR - implement Annex 6, Annex 10 as required.	Lao PDR	TBD	U
	Marshall Islands	Annex 6, Annex 10 requirements not implemented.	26/8/05		Marshall Islands - implement Annex 6, Annex 10 as required.	Marshall Islands	TBD	U
	Micronesia	Annex 6, Annex 10 requirements not implemented.	26/8/05		Micronesia - implement Annex 6, Annex 10 as required.	Micronesia	TBD	U
	Nauru	Annex 6, Annex 10 requirements not implemented.	26/8/05		Nauru - implement Annex 6, Annex 10 as required.	Nauru	TBD	U
	Palau	Annex 6, Annex 10 requirements not implemented.	26/8/05		Palau - implement Annex 6, Annex 10 as required.	Palau	TBD	U
	Papua New Guinea	Annex 6, Annex 10 requirements not implemented.	26/8/05		Papua New Guinea - implement Annex 6, Annex 10 as required.	Papua New Guinea	TBD	U
	Philippines	Annex 6, Annex 10 requirements not implemented.	26/8/05		Philippines - implement Annex 6, Annex 10 as required.	Philippines	TBD	U
	Solomon Islands	Annex 6, Annex 10 requirements not implemented.	26/8/05		Solomon Islands - implement Annex 6, Annex 10 as required.	Solomon Islands	TBD	U

Appendix B to Agenda Item 4

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION

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 § 5.3.1.1	**India** Madras/ Chennai	Runway 25, potential hazard as runway lighting blends with existing road lights and is difficult to differentiate.	2003	Action has been reported to disconnect electric supply to markings along highway NOTAM action required.	The matter is sub-judice, being taken up separately.	AAI	On-going	"U"
Annex 14 Vol. I § 3.1.22	**Myanmar** Yangon/ Mingaladon	New runway surface slippery when wet.	2003	Surface of a paved runway shall be so constructed as to provide good friction characteristics when runway is wet.	RWY surface replaced; no new reports from airlines Final RWY layer still to be completed (update 2005)		On-going	"A"
Annex 14 Vol. I Amendment 6 ***§ 10.1*** ***§ 10.2***				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.				
Annex 14 Vol. I § 4.2	**Nepal** Kathmandu	High ground in the vicinity of aerodrome.	2003	Airspace around aerodromes to be free from obstacles as	The manoeuvring area is faraway from the obstacles (a small hillock) and a temple	CAAN	Apr. 2005	"U"

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REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**State/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action**
				defined by the obstacle limitation surfaces for safe aircraft operation.	being there which is bit sentimental. However, verbal negotiations with the stake holders for dismantling the temple subject to replacement to other place has been made.			
Annex 14 Vol. I § 3.4	**New Zealand** Wellington	Runway-end safety areas RWY 16/34 inadequate.	2000	RESA shall be provided and shall extend from the end of a runway strip for a distance of at least 90 m.	On 2 July 2004 New Zealand issued a Notice of Proposed Rule Making (NPRM 04-03) to implement the ICAO Annex 14 standards and recommended practices for RESA at New Zealand aerodromes where:- (a) there are regular air transport services operating internationally; or (b) there are runway development proposals including- ● new runways ● upgrading a runway to instrument approach status	Civil Aviation Authority	February 2005	"U"

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REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**State/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action**
					• significant extensions to an existing runway • a runway is being re-commissioned • an aerodrome is first certificated after the date the proposals are implemented. The proposal also establishes requirements for New Zealand air operators conducting regular air transport services internationally to introduce limitations on aircraft performance calculations where, at offshore aerodromes, RESA are shorter than the ICAO standard length. Included with the requirements for aircraft operators are requirements to ensure that where there are regular air transport services operated internationally, foreign operators operating in			

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REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**State/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action**
					New Zealand, and operators of smaller aircraft operating internationally, meet the same requirements as New Zealand Part 121 operators, or in the case of foreign Part 129 operators, the aerodromes they operate from have, for RESA, the physical characteristics and requirements of Part 139. This will give foreign and smaller high performance aircraft operators the same level of risk reduction in undershoot and overrun incidents when operating in New Zealand as that achieved by New Zealand Part 121 operators. The proposal will prescribe requirements and physical characteristics for RESA, and will require a similar level of risk mitigation against takeoff and landing overrun, in both the aerodrome operating and flight operations Rules.			

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REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**State/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action**
	Pakistan							
RAN/3 Rec. 4/10 **Annex 14 Vol. I** ***§ 5.2.1.7***	Karachi	Runway and Taxiway markings inadequate and are not clearly visible at night.	2003	All markings on paved areas should be inspected and a schedule of painting be establish. Pavement markings should be made with reflective materials designed to enhance visibility of markings at night.	Runway & Taxiway markings schedule has been developed for the period July 04 to June 05. A programme has been forwarded to the Regional Office. Next painting shall be carried out as scheduled. Repainting scheduled for July 2005 (update 2005)	CAA Pakistan	On-going	"A"
	Philippines							
Annex 14 Vol. 1 Amendment 6 ***§ 9.10.1***	Manila	Airport security lax, allowing livestock to	2004	Improved airport perimeter fencing and general security within the perimeter of the				"A"

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective Action			
Requirements	**State/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action**
§ 9.10.2		stray on to active runways.		airport required.				
Annex 14 Vol. I § 3.1.21	**Viet Nam** Hanoi/Noibai	RWY surface is rough.	2003	Surface of runway shall be constructed without irregularities that would result in friction loss or adversely affect take-off and landing.	New main runway 11R/29L (RWY 1B) is planned to be put into operation in IV Quarter 2004. After that, the existing RWY will be closed for upgrading.	Northern Airport Authority	~~IV Quarter 2004~~ 2nd Qtr 2006	U
Annex 14 Vol. I Amendment 6 ***§ 9.10.1*** ***§ 9.10.2***		Apron congested. Poor security with no proper perimeter fencing.	2003	Improved airport perimeter fencing and general security within the perimeter of the airport required.	Currently the apron is able to hold 17-19 aircraft. The re-design for aircraft stands is being carried out. Perimeter fence was set up: a permanent fence in the East area and a temporary fence in the West area of airport. This will be replaced by permanent fence as runway 11R/29L on operation. Safeguard is carried out on 24/24h basis. The security is maintained in good conditions.		~~First Quarter of 2005~~ 2nd Qtr 2006	A

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REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION

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***	Ho Chi Minh/ Tan Son Nhat			A maintenance programme shall be established to maintain facilities in a condition that does not impair safety of air navigation.	2004 new RWYs commissioned	Southern Airport Authority		A
RAN/3 **Rec. 4/10**		Taxiway markings not clear. Bay markings also not clear.		All markings on paved areas should be inspected and a schedule of painting be established.	Taxiway and bay markings have been repainted by schedule.			A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE CNS FIELD IN THE ASIA/PACIIC REGION

Identification		Deficiencies			Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
~~VHF coverage to be provided in the Southern Part of Dhaka FIR and withdrawal of HF~~	~~Bangladesh~~	~~No requirement for HF except for smaller portion of FIR.~~	~~1992~~	~~Relevant sector of ATS routes has been delegated to adjacent ACC at Kolkata.~~	~~An action item was developed by a COM coordination meeting held in June 03 to expedite implementation of RCAGs included in a Project. An interim arrangement has been made for implementation of one RCAG site in the southern part of Dhaka FIR.~~	~~Civil Aviation Authority of Bangladesh~~	~~Target date is set by the end of 2006 for implementation of RCAG. There is neither operational problem nor any impact on flight safety as ATS is provided in the delegated airspace by adjacent ACC. This arrangement will continue until full VHF coverage is provided in Dhaka~~	~~A formal notification has been received starting that Kolkata ACC is providing ATS in the Southern part of Dhaka FIR including ATS Route L507.~~
Adequate and reliable VHF COM	Myanmar	Quality and reliability of RCAG VHF inadequate and unavailability of required coverage	1998	Improvements in the quality of link to RCAG stations and power supply system are required.	Action should be taken to provide reliable links between the RCAG stations and Yangon ACC. Power supply to the RCAG sites needs improvement. High level ICAO mission was conducted. An action plan was developed to upgrade equipment at RCAG stations, provide VSAT link at all RCAG stations, to improve power supply system and to shift ACC to the new location.	DCA Myanmar	Revised target date is end of 2004 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.	

Identification		Deficiencies			Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
					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. After a trial period of one month the facilities were formally implemented effective 9 June 2005 using new frequencies in place of old frequencies affected by interference.		.	

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PACIIC REGION

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	Reported by airlines operating to Solomon I.	Equipment to be upgraded and arrangements to be made for regular observations	Ministry of Transport, Works and Aviation, Solomon I. *Note: OPMET/M TF to carry out survey* ICAO SIP planned for 2005	TBD	A
Meteorological observations and reports. (Annex 3, Chapter 4)	Kiribati	METAR from Kiribati not available on regular basis.	1998	Reported by airlines	State's MET authority to consider urgent action to be taken for providing regular observations and reports	Directorate of Civil Aviation, Kiribati. *Note: OPMET/M TF to carry out survey* ICAO SIP planned for 2005	TBD	A
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 ICAO SIP mission Dec 2003	a) Observed by States concerned. b) Reported at the WMO/ICAO Workshop on Volcanic Ash Hazards (Darwin,	Three-party LOA to be signed between the MGA, DGCA and DVGHM	DGCA, MGA Indonesia *Note: ICAO Regional Office to monitor*	2004	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PACIIC REGION

Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
	~~Philippines~~		~~1995~~ ~~ICAO SIP mission May 2003~~	1995)	~~Three-party LOA to be signed between the ATO, PAGASA and PHIVOLCS~~	~~PAGASA, ATO~~ ~~Philippines~~ ~~*Note: ICAO Regional Office to monitor*~~ LOA signed and submitted to regional Office		
	Papua New Guinea		1995 ICAO SIP mission Dec 2003		Procedures to be set up for exchange of data between NWS, ATS and Rabaul Observatory and a LOA to be signed	NWS, ATS Papua New Guinea *Note: ICAO Regional Office to monitor*		

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PACIIC REGION

Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Provision of SIGMET information including SIGMETs 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 volcanic ash, have not been fully implemented	2000	a) Reported by airlines b) Noted by Volcanic Ash Advisory Centres	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 SIGMET procedures.	a) State's Met authorities b) ICAO to implement the SIP. c) ICAO Regional Office to co-ordinate and monitor. *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 time*	2005	U
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	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 consider urgent action to be taken for installation of SADIS VSAT for receiving WAFS products and OPMET information. Action plan proposed by ICAO MET mission 2003	State's MET authorities	TBD	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PACIIC REGION

Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
~~a) Provision of TAF for international airports~~ ~~(Annex 3, Chapter 6;~~ ~~ASIA/PAC FASID Table MET 1A)~~	Cambodia	~~No TAF for Phnom Penh and Siem Reap international airports~~	~~ICAO MET mission 2003~~		~~Action plan proposed by ICAO MET mission 2003~~ ~~Training of forecasters for issuing TAF urgently required~~ ~~*Note: Initial 2-week training for two forecasters from SSCA carried out at the Thai MET Department in coordination with the ICAO regional Office*~~ *Note: TAF for VDPP introduced in May 2005 with assistance from Viet Nam*	SSCA, Cambodia	TBD	U
b) MWO for Phnom Penh FIR and SIGMET (Annex 3, Chapter 7; ASIA/PAC FASID Table MET 1B)		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 – serious safety issue.	Establishment of MWO currently not feasible. Urgent need for bi-lateral agreement for SIGMET service by a neighboring State.			

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PACIIC REGION

Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Provision of SIGMET information (Annex 3, Chapter 7; ASIA/PAC FASID Table MET 1B)	~~Bangladesh~~ ~~India~~ Lao PDR Myanmar 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 *Action taken by India to improve SIGMET issuance as discussed during MET mission to India in Oct 2004*	State's MET authorities	2005	U

AGENDA ITEM 5: REVIEW OF THE OUTSTANDING CONCLUSIONS AND DECISIONS OF APANPIRG

Agenda Item 5: Review of Outstanding Conclusions and Decisions of APANPIRG

5.1 The meeting reviewed the progress made on the outstanding conclusions and decisions of APANPIRG including the conclusions and decisions of its fourteenth meeting.

5.2 The actions taken by States and the Secretariat on the above mentioned conclusions and decisions were reviewed and the updated list is provided in **Appendices A and B** to the Report on Agenda Item 5.

5.3. The meeting recalled that after a thorough review of the list of outstanding Conclusions/Decisions presented to the APANPIRG/15, which contained 46 items, the meeting identified that 38 items were completed or closed, which was 83% of the total number.

5.4. The current List contained 17 outstanding Conclusion/Decisions, 7 of which are in the ATM/AIS/SAR field and 10 in the CNS/MET field. The meeting noted that the follow-up action on 7 of these Conclusions/Decisions had been completed and they were proposed for removal from the List. Action has also been taken on most of the remaining 10 items, however, they have not been completed by the time of APANPIRG/16.

5.5. The meeting recommended that Secretariat and the States concerned should undertake necessary action for completion of the outstanding Conclusions/Decisions.

LIST OF OUTSTANDING CONCLUSIONS/DECISIONS OF APANPIRG IN ATM/AIS/SAR FIELDS

(Changes recommended by the APANPIRG/16 in redline and ~~strikeout~~. Items closed by APANPIRG/15 removed from the list)

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 10/4		**Implementation of Area Control Service and 10-Minute Longitudinal Separation using Mach Number Technique in the Bay of Bengal area** 1) That, States in the Bay of Bengal area a) Complete the upgrade of airspace from advisory and flight information services to area control service along ATS routes, as appropriate; b) identify ATS routes where 10-minute longitudinal separation minima for RNAV equipped aircraft without using MNT could be applied and implement such minima. 2) That, Sub-regional ATS Co-ordination Groups concerned place a high priority on items 1) a),and b) above.	a) Some routes in the Mumbai FIR remain under advisory service due to inadequate communications which is being remedied Note: LOAs of some States require updating. The Regional Office to coordinate b) Implementation subject to provisions of ICAO separation standards. 2) Implementation continues to be co-ordinated through the Bay of Bengal ATS Co-ordination Group (BBACG).	~~Supercedes C2/28~~ On-going On-going On-going
~~C 12/10~~		~~**Special implementation project – International seminar and SAREX**~~ ~~That, ICAO urgently consider a proposal for an Asia/Pacific Special Implementation Project to be established with the primary objective to improve search and rescue services, co-ordination and cooperation between States.~~	~~Note: The SIP was established but was unable to be actioned. SIP approval has expired.~~ ~~An ICAO Seminar and SAREX for the Bay of Bengal hosted by India took place in March 2005.~~ ~~The ATM/AIS/SAR/SG to keep under review and~~	~~Closed~~

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
	~~C~~	~~Noted the conclusion and that such a project would be put forward for the Council's approval through established procedures.~~	~~identify other candidates for SIPs.~~ ~~Superseded by APANPIRG Conclusion 16/23~~	
C 13/34		**Strengthening the Civil/Military Coordination Programme** That, due to an increase in military activity within and adjacent to the Asia Pacific Region, 1. States are urged to:		
		a) remain vigilant with regard to military activity within or near their area of responsibility;	States are encouraged to strengthen activities in this area	Ongoing
		b) continue effective civil/military coordination with military authorities concerned; and,	States are encouraged to strengthen activities in this area	Ongoing
		c) advise and coordinate with adjacent States and ICAO of any significant increase in military activity which may have an affect on international aircraft operations.	States are encouraged to strengthen activities in this area Note: APANPIRG/16 raised Conclusion 16/17 in respect of the equitable sharing of airspace and facilities, and Decision 16/16 to include Civil Military Coordination on the Agendas of ATS Coordination Groups. APANPIRG/16 tasked Regional Office to issue State Letter highlighting the concerns in a), b), and c)	Ongoing
		2. ~~ICAO to arrange an Asia/Pacific Regional Seminar on Civil/Military Coordination and, if considered necessary, to follow-up with sub-regional Civil/Military Co-ordination Workshops in areas as deemed appropriate.~~	~~A Seminar had been planned for 2003, but postponed due to disrupted meeting schedule, and to be re-scheduled for 2004.~~ ~~Regional Office has scheduled a Seminar for December 2004.~~ ~~(Note: A Civil Military seminar was held on 14-17 December 2005 at the Asia/Pacific Office~~	~~Completed~~

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
~~C14/5~~		~~**ATS Route Network Review Task Force (ARNR/TF)**~~ ~~That, a Task Force comprising representatives from States and appropriate International Organizations be formed to review the ATS route network for the Asia/Pacific Region with draft Terms of Reference as shown in Appendix B to the Report on Agenda Item 2.1.~~	~~The Regional Office requested States and users by letter to identify present and future route requirements to be considered by ARNR/TF/1 to be held in September 2004.~~	~~On-going~~ ~~Completed~~
~~C14/7~~		~~**Implementation of a 2 NM lateral offset procedure**~~ ~~That, subject to the ICAO guidelines being revised, States should develop a 2 NM lateral offset procedure to be implemented in all relevant airspace in the Asia/Pacific Region, and the Regional Supplementary Procedures amended as appropriate. This procedure to be harmonized with other regions to ensure uniform application globally.~~	~~A State Letter is under preparation by ICAO Headquarters to revise the guidelines for 2 NM offset procedures to be applied globally .~~ ~~Based on the ICAO revised guidelines, States to promulgate in State AIPs the routes and airspace where offsets are authorized as required by Annex 2 (Chapter 3, 3.6.2.1.1).~~ ~~Superseded by C15/8~~	~~On-going~~ ~~Closed~~
C14/9		**AIRAC provisions** That, ICAO be requested to again reinforce to States the critical safety nature of AIS and adherence to Annex 15 provisions, particular those relating to AIRAC, as well as the need to ensuring accurate and timely publication of AIS data.	Timelines for the dissemination of changes to AIS are contained in Annex 15. The AIS Implementation Task Force (AIS/TF) to undertake a study of the application of Annex 15 requirements by the end of 2005.	On-going
C14/45		**Fostering of exchanges between MET and ATM** a) the MET Authorities/Providers of the States, be encouraged to continually assess with the corresponding ATM authorities the requirements for MET information with the aim of developing new products/information to support the ATM, bearing in mind	~~A seminar to be scheduled by the Regional Office during 2005~~. A draft seminar programme was agreed by	Ongoing

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
		the potential costs and benefits involved; and b) ICAO be invited, in coordination with WMO, to organize a MET/ATM coordination seminar in ASIA/PAC Region in 2004, to foster the exchanges between the MET and ATM experts in order to facilitate further development of the MET component of the CNS/ATM systems in the ASIA/PAC Region. *Noted the conclusion and invited the Secretary General, in coordination with WMO, to organize a MET/ATM coordination seminar in the ASIA/PAC Region during 2004.*	CNS/MET/SG/9 and ATM/AIS/SAR/SG/15 in July 2005. The MET/ATM Seminar has been scheduled for 8-10 February 2006.	
	C			

LIST OF OUTSTANDING CONCLUSIONS/DECISIONS OF APANPIRG IN THE CNS/MET FIELDS

Report Reference ---------- Conc/Dec No.	Noted by ANC/ Council	Decision/Conclusion ANC/Council Action, if any	Action by States/ICAO	Status
~~C 5/19~~	~~C~~	~~Need for technical assistance to support WAFS implementation in the ASIA/PAC Regions~~ ~~That, ICAO initiate action to provide technical assistance in terms of equipment and training of personnel under the Technical Co-operation Programme to those States that are in need of assistance to receive WAFS products by satellite broadcast.~~ ~~*Noted the conclusion and requested the Secretary General to take action as appropriate.*~~	~~The use of SADIS and ISCS/2 by ASIA/PAC States has continued to grow and further expansion is expected.~~ ~~Implementation of the SADIS and ISCS/2 is being monitored to define the extent of the assistance required.~~ ~~UK provided GRIB/BUFR training for SADIS User States in ASIA/PAC region in November 2002.~~ ~~Second GRIB/BUFR training for ISCS and SADIS Users is planned for late 2004 (update: training dates fixed for 25 – 27 January 2005);~~ ~~Seminar held 25 – 27 January 2005~~	~~On-going~~ ~~Completed~~
C 12/25		**Application of EUR OPMET update procedure in the ASIA/PAC Regions** That, the procedure similar to the EUR OPMET update procedure be developed and introduced in the ASIA/PAC Regions.	~~The procedure is to be developed by the OPMET Exchange Task Force.~~ ~~Part of the OPMET Monitoring/Quality Control Procedures under development by OPMET/M TF~~ OPMET/M Task Force is working on developing appropriate update procedure by 2006	On-going

Report Reference ---------- Conc/Dec No.	Noted by ANC/ Council	Decision/Conclusion ANC/Council Action, if any	Action by States/ICAO	Status
~~C 13/23~~		~~**Process of Review and Notification of Differences**~~ ~~That, States establish a procedure with assistance of a database for review of SARPs and notification of differences to Annexes in a timely and comprehensive manner.~~	~~A possibility of conducting a special implementation programme (SIP) is being explored.~~ ~~SIP on the subject approved by the Council and was conducted by the end of 2004~~.	~~Completed~~
~~C 13/32~~	~~C~~	~~**QA MET seminar for ASIA/PAC Region**~~ ~~That, ICAO, in coordination with WMO, organizes a seminar on the quality assurance in the provision of meteorological services to aviation in the ASIA/PAC Region during 2003.~~ ~~*Noted the conclusion and recognizing that in accordance with the Working Arrangements between the International Civil Aviation Organization and the World Meteorological Organization (WMO) (Doc 7475) this conclusion should be addressed to WMO, requesting the Secretary General of WMO to arrange, in coordination with ICAO, training on quality assurance for provision of meteorological services to aviation in the ASIA/PAC Region after 2003.*~~	~~Action taken by the HQs. WMO has been invited to organize the seminar in coordination with ICAO. Hong Kong, China, proposed to host the seminar, subject to confirmation by WMO.~~ ~~WMO was invited to organize the QA seminar. Currently planned for October 2004 at Hong Kong Observatory.~~ ~~Update: WMO advised that the seminar should be postponed for the second half of 2005~~ ~~Seminar to be organized by WMO in coordination with ICAO from 22 to 25 November 2005~~	~~On-going~~ ~~Completed~~
C.14/21	-	**Conclusion 14/21 - Target date of ADS-B Implementation** That States, where necessary to do so, be encouraged to implement "ADS-B out" for ground-based surveillance services in ASIA/PAC Region on a sub-region by sub-region basis with a target date of January 2006.	ADS-B Task Force assisting Members to develop plan for air-ground ADS-B implementation on a Sub-regional basis ~~in an evolutionary manner~~.	On going

Report Reference ---------- Conc/Dec No.	Noted by ANC/ Council	Decision/Conclusion ANC/Council Action, if any	Action by States/ICAO	Status
C. 14/24		**Conclusion 14/24 - Preparation for World Radio Communication Conference 2007 (WRC-2007)** That, States, a) assign high priority to aeronautical spectrum management; b) participate in the development of States' position for WRCs at the national level to ensure support to the ICAO position; c) ensure, to the extent possible that, aviation representatives are included in States delegations to the Asia-Pacific Telecommunity (APT) Conference Preparatory Group) meetings and at WRCs; d) to nominate an ICAO designated focal point or contact person for aviation issues related to the WRC-07; and e) ensure participation of the designated focal point or contact person at the ICAO Regional Preparatory Group Meetings for WRC-07, APT Conference Preparatory Group Meetings for WRC-07, and at WRC-2007.	As a follow up action this Conclusion was presented to the 41st DGCA Conference. States have been urged to nominate focal point of contact. 30 States have designated focal point of contact and replies from 5 States awaited.	On going
	ANC	*Noted the Conclusion and requested the Secretary General to continue encouraging the States to participate at various levels in different fora to provide support for the ICAO position at the forthcoming WRC-2007 so as to protect aeronautical frequency spectrum.*		

Report Reference ---------- Conc/Dec No.	Noted by ANC/ Council	Decision/Conclusion ANC/Council Action, if any	Action by States/ICAO	Status
C. 14/30	-	**Conclusion 14/30 – States' Actions for the Migration to the Operational Use of GRIB and BUFR coded WAFS Products** That, a) ASIA/PAC States be urged to start the necessary preparations for the migration to the operational use of GRIB and BUFR coded WAFS products as a matter of urgency, if they have not already done so; b) States having difficulties in the migration to the operational use of GRIB and BUFR coded WAFS products be encouraged to urgently approach WMO for assistance under the WMO Voluntary Cooperation Programme (VCP). *Note: In order to expedite WMO consideration of VCP requests, States are encouraged to contact potential donors and subsequently inform WMO.*	~~States have been notified on a number of occasions on the need to upgrade their systems for receiving/processing WAFS data. The migration process is yet to be finalized by 1 July 2005.~~ ~~2005~~ ~~GRIB Transition took place on 1 July 2005~~ BUFR Transition postponed by WAFSOPSG to 30 November 2006	On-going
~~C. 14/32~~		~~**Conclusion 14/32 – GRIB/BUFR Training**~~ ~~That, the SADIS and ISCS provider States be invited to provide further training on the operational use of GRIB and BUFR coded WAFS products for the States in the ASIA/PAC Regions in coordination with ICAO and WMO.~~ ~~*Note: It is desirable that the above training is organized conjointly by the SADIS and ISCS provider States for both SADIS and ISCS user States in the ASIA/PAC Region in late 2004/early 2005.*~~	~~Consultations between SADIS and ISCS provider States carried out. Training event expected agreed and scheduled for December 2004.~~ ~~GRIB/BUFR Training held in January 2005.~~	~~On-going~~ ~~Completed~~

Report Reference ---------- Conc/Dec No.	Noted by ANC/ Council	Decision/Conclusion ANC/Council Action, if any	Action by States/ICAO	Status
	~~C~~	~~*Noted the conclusion and requested the Secretary General to invite the SADIS and ISCS Provider States to arrange, in coordination with ICAO and WMO, training on the operational use of GRIB- and BUFR-coded WAFS products for the States in the Asia/Pacific Regions during 2004/2005.*~~		
C. 14/33		**Conclusion 14/33 – Amendment of regional procedures related to WAFS in the ASIA/PAC Basic ANP and FASID** That, the ASIA/PAC Basic ANP and FASID (Doc 9673) be amended as indicated in Appendix G to the report on Agenda Item 2.2.	~~Amendment proposal for BANP – processed~~ Consolidated amendment proposal for FASID presented at CNS/MET SG/9; scheduled for circulation to States in September 2005	~~Completed~~ On-going
C. 14/40	-	**Conclusion 14/40 – Amendment to FASID Table MET 1B in regard to the service provided by the meteorological watch office Wellington** That, FASID Table MET 1B be amended by adding a note for MWO Wellington, New Zealand, as shown in the Appendix K to the report on Agenda Item 2.2.	Consolidated amendment proposal for FASID presented at CNS/MET SG/9; scheduled for circulation to States in September 2005	On-going

AGENDA ITEM 6: DEVELOP FUTURE WORK PROGRAMME

Agenda Item 6: Develop Future Work Programme

Terms of Reference and Composition of the Group

6.1 The meeting reviewed the TORs of APANPIRG and recalled that the last major update of the TORs was done by APANPIRG/14 meeting in 2003. The Group agreed that no changes to the TORs were necessary at this stage.

6.2 The Composition of APANPIRG was reviewed. The Group noted that since APANPIRG/15, new Members have been designated by Australia, Fiji and Japan. The updated List is presented in **Appendix A** to the report on Agenda Item 6.

6.3 The meeting recognized the need for the designated APANPIRG Members or their Alternates to participate regularly in the Group's meetings and requested the Secretary of the Group to inform the APANPIRG Member States accordingly.

6.4 In noting the current structure of the APANPIRG Contributory bodies as shown in **Appendix B** to the report on Agenda Item 6, the meeting reiterated the need for all ATS coordination groups and other informal and formal grouping currently in the Region to coordinate relevant activities via APANPIRG in the interest of harmonization and minimizing duplication.

Report of coordination meeting of the Chairman of Sub-groups

6.5 The Chairmen of the ATM/AIS/SAR SG and CNS/MET SG and the MET Vice Chairman of CNS/MET held a coordination meeting on 21 August 2005. Comment was also sought from the Chairman of the RASMAG who was unable to attend.

6.6 The meeting noted that it had been twelve months since the dissolution of the CNS/ATM/IC Sub-group, and in the year prior to dissolution the CNS/ATM/IC Sub-group had been in suspension. The additional tasks had been effectively incorporated in the Sub-groups' programs and coordination had been effected by the Secretariat and through Chairman-to-Chairman notes. The review of the Key Priority List was an example of this coordination. Advice received from RASMAG has been effectively incorporated in the activities of the Sub-groups.

6.7 In view of the above, it was agreed that the dissolution of the IC Sub-group did not have a detrimental impact on the work of the APANPIRG.

6.8 Contingency planning was discussed and the different approaches of the two Sub-groups was recognized. The ATM/AIS/SAR SG was considering the maintenance of traffic flow in the event of the loss of an ATS service. The CNS/MET focus was on the provision of temporary services and facilities in the CNS/MET area and also assistance in the recovery of services. The two approaches were considered complementary.

Schedule of future meetings

6.9 The meeting agreed that the tentative schedule of meetings for the rest of 2005, 2006 and 2007 should be as follows:

2005 (outstanding meetings)

RASMAG/4	Oct 2005	Bangkok
AITF/1	Nov 2005	Narita, Japan

2006

RVSM/TF/27	Jan 2006	Bangkok
ADS-B TF/5	Mar 2006	New Delhi India
RASMAG/5	Mar 2006	Bangkok
ATN/ICG/1	May 2006	Seoul Republic of Korea
RVSM/TF/28	Apr 2006	Bangkok
ATM/AIS/SAR SG/16	26 – 30 Jun 2006	Bangkok
CNS/MET SG/10	17 – 21 Jul 2006	Bangkok
RVSM/TF/29	Aug 2006	Bangkok
APANPIRG/17	**4 - 8 Sep 2006**	**Bangkok**
RASMAG/6	Nov 2006	Bangkok
AITF/2	Nov 2006	New Delhi India

2007

RVSM/30	Jan 2007	Bangkok
ADS-B TF/6	Mar 2007	Seoul Republic of Korea
ATN/ICG/2	Apr 2007	Hong Kong, China
RASMAG/7	May 2007	Bangkok
ATM/AIS/SAR SG/17	Jun 2007	Bangkok
CNS/MET SG/11	Jul 2007	Bangkok
APANPIRG/18	**Sep 2007**	**Bangkok**
RASMAG/8	Oct 2007	Bangkok
AITF/3	Nov 2007	Bangkok

6.10 The meeting decided on the following provisional agenda for the next meeting:

Provisional agenda for APANPIRG/17

Item 1: Review of Council and ANC actions on APANPIRG/16 Report

Item 2: ASIA/PAC Air Navigation System and Related Activities

2.1 ATM/AIS/SAR Matters
2.2 CNS/MET Matters
2.3 ATS Co-ordination Groups' Activities
2.4 Other Related Matters

Item 3: CNS/ATM Implementation and Related Activities

Item 4: Deficiencies in the Air Navigation fields

Item 5: Review of Outstanding Conclusions and Decisions of APANPIRG

Item 6: Develop Future Work Programme

Item 7: Any other business

Regional Office Resources

6.11 In reviewing the future work programme, Australia drew attention to the difficulties with Regional Office resources in general and ATM staffing in particular. It was recalled that at APANPIRG/15 attempts had been focused on retaining the AIS/MAP post, however, as result of the triennial budget processes completed last year, not only had the AIS/MAP post been abolished but and additional ATM post has also been lost. Australia had concerns at the ability of the Secretariat to sustain the proposed work programme under these circumstances.

6.12 IATA strongly supported the above concerns noting that they were extremely reliant on the Regional Office to provide leadership in the region. IATA noted that a great part of the current implementation effort had an ATM focus and many problems were still being experienced with AIS matters.

6.13 The Secretariat acknowledged the concerns raised and informed that ICAO had an ongoing procedure encouraging States to second officers to ICAO for defined periods. This had advantages both to ICAO and the State in that the seconded officers would gain an increased awareness of the ICAO activities, whilst assisting in ICAO's work programme. In the case of the Regional Office, some positive developments had occurred recently and it was anticipated that arrangements would shortly be finalized to provide an ATM officer on secondment. All States were encouraged to consider this opportunity to support the Regional Office.

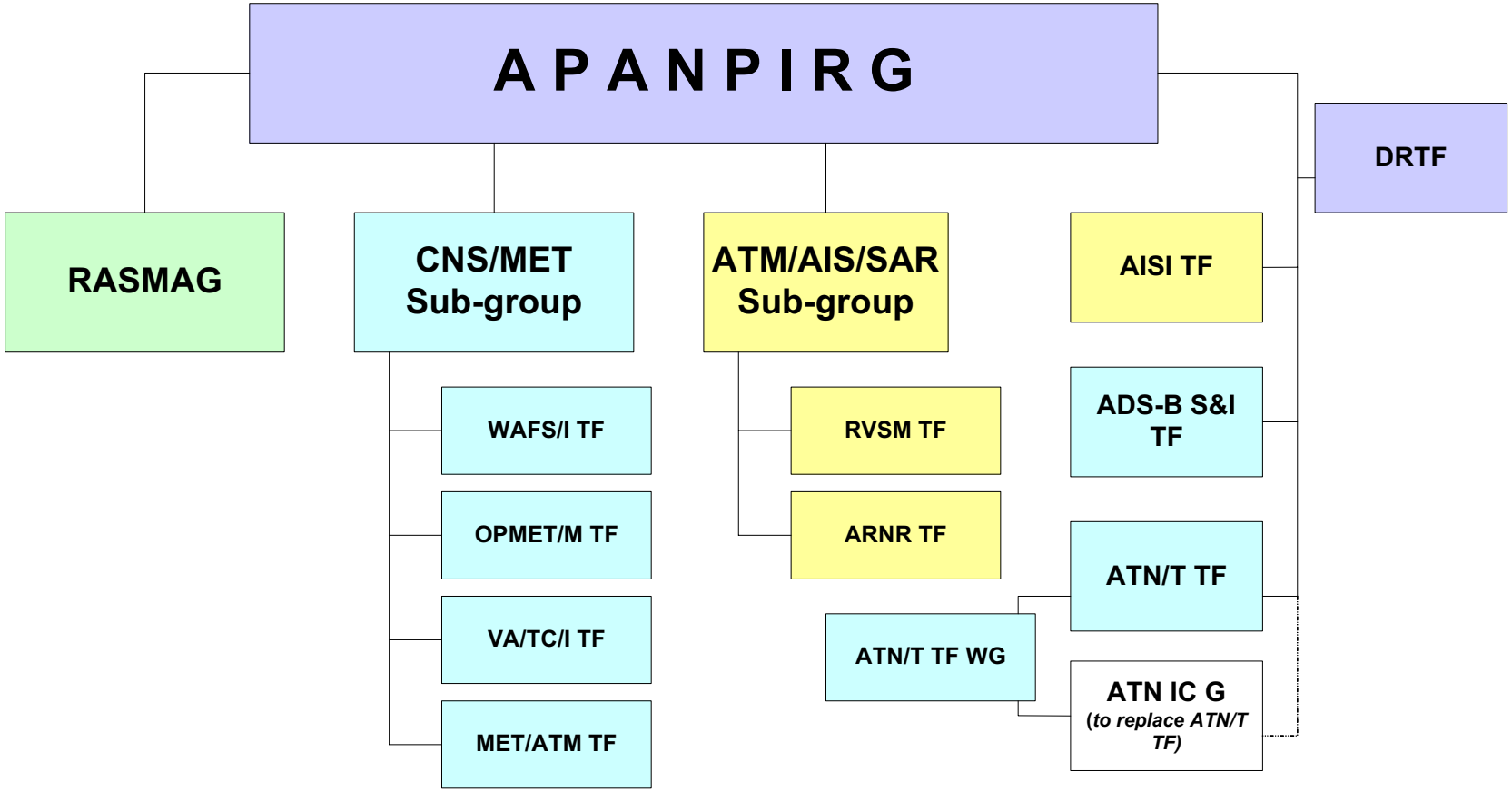
Meeting Programme

6.14 The meeting expressed appreciation to Hong Kong, China, India, Japan and Republic of Korea for their kind proposals to host some of the future meetings of the APANPIRG Contributory Bodies as indicated in the table above.

APANPIRG COMPOSITION (August 2005)

Regional Planning Group	Members	Alternate Members	Nominated by
ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG)	Alam, Mohammad K.		Bangladesh
	Bollard, Jeffrey		Australia
	Bissara, C.		Indonesia
	Choe, Young-il		Korea, Republic of
	Faletau, A., *Second Vice-Chairman*		Tonga
Established: 26/6/91	Fong, R.Y.		Fiji
	Grandclaude, Alain		France
Total members: 17	Hingston, Mark		New Zealand
	Khan, Jahangir M.		Pakistan
	Liu, Yajun, *First Vice-Chairman*		China
	Nguyen, The Hung		Vietnam
	Singh, Satendra		India
	Suzuki, Akihisa		Japan
	Theanthanoo, P.		Thailand
	Wong, Woon Liong, *Chairman*		Singapore
	Yatim, H.M.		Malaysia
	TBD		United States

APANPIRG and its Contributory Bodies (August 2005)



Explanation of Acronyms:

APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ADS-B S&I TF	ADS-B Study and Implementation Task Force
AIS TF	AIS Implementation Task Force
ARNR TF	ATS Route Network Review Task Force
ATM/AIS/SAR SG	ATM/AIS/SAR Sub-group
ATN/ICG	ATN Implementation Coordination Group
ATN/T TF	ATN Transition Task Force
CNS/MET SG	CNS/MET Sub-group
DRTF	Deficiency Review Task Force
MET/ATM TF	MET/ATM Coordination Task Force
OPMET/M TF	OPMET Management Task Force
RASMAG	Regional Airspace Safety Monitoring Advisory Group
RVSM TF	RVSM Task Force
VA/TC/I TF	Task Force on the Implementation of Volcanic Ash and Tropical Cyclone Advisories and Warnings
WAFS/I TF	World Area Forecast System Implementation Task Force

AGENDA ITEM 7: ANY OTHER BUSINESS

Agenda Item 7: Any Other Business

Safety and security aspects of economic liberalization of international civil aviation

7.1 The meeting recalled that, in reaffirming the global commitment to the economic liberalization of international civil aviation, the fifth Worldwide Air Transport Conference (ATConf/5, Montreal 2003) had attached paramount importance to safety and security in any regulatory change. It was noted that issues had been raised at ATConf/5 about the essentially national-based safety and security regulatory system in an increasingly multinational operating environment and that an ICAO study had been requested to clarify "the definition of the State or States responsible for safety and security oversight, and possibly to recommend amendments to the existing ICAO regulatory provisions in this area".

7.2 The Secretariat informed the meeting that the ICAO Council had endorsed a follow-up activity in the form of a coordinated inter-Bureaux review of various liberalization arrangements and existing ICAO SARPs and guidance materials. The meeting was further advised that the study had been completed and the report and supporting documentation had been transmitted to States (State Letter EC 2/93 AN 11/41-05/83 sent on 12 August 2005).

7.3 The meeting considered how the study had been conducted and also discussed the types of situations where concerns had been raised about identifying or attributing responsibility for safety/security compliance and oversight. Notwithstanding the complexity of some contemporary commercial practices, the Secretariat informed the meeting that existing SARPs and guidance material were found to be adequate in general. The potential value of making greater use of Article 83 *bis* of the Convention was noted.

7.4 The meeting observed the need for all parties, governments, service providers and air operators to have a clear understanding of their respective responsibilities for safety and security compliance and oversight. It also recognized the importance for States to have coherent policies and guidelines and of involving both economic and technical oversight authorities to promote high levels of safety and security in the constantly changing environment.

7.5 In expressing its appreciation of the Secretariat's work, IBAC drew attention to the rapid growth occurring in the industry and the emergence of practices such as fractional ownership of aircraft and welcomed the attention being placed on these trends by ICAO. IATA emphasized the importance of the study and urged the Secretariat to bring the matter to the attention of the Directors General of Civil Aviation at their forthcoming 42nd Conference for further discussion and appropriate action.

Follow-up to the 35th Session of the ICAO Assembly (A35) – air transport matters

7.6 The meeting noted the outcome of the ICAO Assembly (A35) concerning air transport matters. In particular, it was observed that the Assembly adopted a revised *Consolidated statement of continuing ICAO policies and practices related to environmental protection*. Attention was focused by the meeting on particular elements of the work programme in the air transport field for the 2005, 2006 and 2007 concerning regulation of international air transport services, regulation and organization of airports and air navigation services, facilitation, and other air transport issues. The meeting noted that the Assembly adopted Resolution 31/1 updating the consolidated statement of continuing ICAO policies in the air transport field, and further noted that a comprehensive review will be made of the content of this Resolution prior to the next ordinary Session of the Assembly with a view to identifying any changes to be recommended.

IT Support for the Meeting

7.7 The meeting noted with appreciation the efforts to provide improved information technology support for participants of the meeting, in particular the upgraded Internet Café and the provision of the wireless LAN within the main conference hall.

ATTACHMENTS TO THE REPORT

Attachment 1

Sixteenth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/16)
Bangkok, Thailand, 22 to 26 August 2005

List of Participants

	Name	Title/Organization	TEL/FAX Number	E-mail
1.	**AUSTRALIA (2)**			
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Attachment 1

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Attachment 1

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Attachment 1

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Attachment 1

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Total participants	***= 95***
APANPIRG Member States –	***= 17***
APANPIRG Members –	***= 5 (Australia, Fiji, Indonesia, Pakistan, Singapore)***
Non-Member States –	***= 9***
States/Administrations (total)	***= 26***
International Organizations	***= 3***

International civil Aviation Organization

SIXTEENTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/16)

(Bangkok, 22 to 26 August 2005)

LIST OF WORKING AND INFORMATION PAPERS

A) Working Papers

Paper No.	Agenda Item	Title	Presented by
WP/1	-	Provisional Agenda	Secretariat
WP/2	1	Review of the Council and ANC Actions on the Report of the Fifteenth Meeting of ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG/15)	Secretariat
WP/3	2.1, 2.3	ATM/AIS/SAR SG/15 Report	Chairman SG
WP/4	2.1	Report of the Activities of the Regional Airspace Safety Monitoring Advisory Group (RASMAG)	Secretariat
WP/5	2.2, 3	Report of the Ninth Meeting of CNS/MET sub-group	Chairman SG
WP/6	2.4	Developments in the Modernization of Air Navigation Systems	Secretariat
WP/7	4	Progress Report on the Unified Strategy Implementation Plan	Secretariat
WP/8	2.4	Revised Statement of the Basic Operational Requirements and Planning Criteria (BORPC)	Secretariat
WP/9	2.4	Follow-up to the 35th Session of the ICAO Assembly (A35) — Air Navigation Matters	Secretariat
WP/10	2.4, 4	A Report on the Implementation of the Comprehensive Systems Approach for the Conduct of Safety Oversight Audits Under ICAO USOAP	Secretariat
WP/11	3	Status of the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750)	Secretariat
WP/12	3	Progress Report on Proposed Amendment to the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750)	Secretariat
WP/13	1, 5	Follow-up action on APANPIRG/15 Conclusions and Decisions	Secretariat
WP/14	5	Status of outstanding Conclusions and Decisions of APANPIRG	Secretariat

Paper No.	Agenda Item	Title	Presented by
WP/15	4	Status of Air Navigation Deficiencies in the ASIA/PAC Region	Secretariat
WP/16	3	Key Priorities for CNS/ATM implementation	Secretariat
WP/17	6	APANPIRG Work Programme 2006+	Secretariat
WP/18	7	Funding arrangements for regional airspace safety monitoring	Secretariat
WP/19	6	Report of coordination meeting between Chairmen of Sub-groups	Chairmen of SGs
WP/20	6	Review of TORs and Composition of APANPIRG	Secretariat
WP/21	2.1	Summary of Activities of the RVSM Task Force	Secretariat
WP/22	2.1	ACAS II and Pressure Altitude Reporting Transponders	Secretariat
WP/23	2.1	Summary of Activities of the ATS Route Network Review Task Force (ARNR/TF)	Secretariat
WP/24	7	Safety and Security Aspects of Economic Liberalization of International Civil Aviation	Secretariat
WP/25	2.4	ICAO 5 Letter Name Code System	Secretariat
WP/26	3	Use of aircraft identification for correlation between flight plan data and aircraft radar returns	Thailand
WP/27	2.4	The Fuel Crisis and the Urgent Need to Implement Fuel Saving Measures	IATA
WP/28	2.1	UAV Operations	India

B) Information Papers

Paper No.	Agenda Item	Title	Presented by
IP/1	-	Meeting Bulletin	Secretariat
IP/2	7	Follow-up to the 35th Session of the ICAO Assembly (A35) — Air Transport matters	Secretariat
IP/3	3	CNS/ATM Strategy for Business Aviation	IBAC
IP/4	7	Business Aviation Safety Brief	IBAC
IP/5	-	Content of CD-ROM	Secretariat
IP/6	-	List of Working and Information Papers for the meeting	Secretariat
IP/7	2.3	Summary of ATS Co-ordination Group's activities	Secretariat
IP/8	2.4	Prospects of Himalayan Routes via Nepal under EMARSSH	Nepal
IP/9	2.2	Enhancement of HF Communication in Mumbai FIR	India
IP/10	3	Update on CNS/ATM system in India	India
IP/11	2.1	Indian SAR organisation - International Seminar on SAR and SAREX 2005 in India	India
IP/13	2.1	Language Proficiency Improvement in the Republic of Korea	Republic of Korea
IP/14	2.4	ATC Quality Assurance Programme	Republic of Korea